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Brochures

For brochures serving as selection guides for SIMATIC products, refer to:

www.siemens.com/simatic/printmaterial

Overview

- Modular, scalable, and universally usable system in IP20 level of protection
- The system solution for a variety of automation applications in discrete automation
- Highest performance with excellent usability
- Configurable exclusively in the Totally Integrated Automation Portal with STEP 7 Professional V12 or higher

Performance

- Increase in performance through
  - Faster command execution
  - Language extensions
  - New data types
  - Faster backplane bus
  - Optimized code generation
- Powerful communication:
  - PROFINET IO (2-port switch) as standard interface; from CPU 1515-2 PN, one or more additional integrated PROFINET interfaces, e.g. for network separation, for connecting further PROFINET devices or for high-speed communication as an I-device
  - OPC UA Data Access Server as runtime option for the easy connection of SIMATIC S7-1500 in third-party devices/ systems
  - Expandable with communication modules for bus systems and point-to-point connection

Integrated technology

- Motion control integrated without additional modules:
  - Standardized blocks (PLCopen) for connection of analog and PROFIdrive-capable drives
  - The motion control functionality supports speed-controlled axes, positioning axes, relative synchronous operation (synchronizing without specification of the synchronized position), as well as external encoders, cams and probes.
  - Extended motion control functions such as absolute synchronous operation (synchronizing with specification of the synchronized position) and camming are also integrated in the technology CPUs.
- Comprehensive trace functions for all CPU tags for real-time diagnostics and sporadic error detection; for effective commissioning and quick optimization of drives and controls
- Comprehensive control functionalities: e.g. easily configurable blocks for automatic optimization of the control parameters for optimum control quality
- Additional functions through available technology modules: e.g. high-speed counting, position detection, or measurement functions for signals up to 1 MHz

Safety Integrated

Protection of personnel and machinery – within the framework of an integrated complete system

- Fail-safe SIMATIC S7-1500(T)F Controllers for processing standard and safety programs on the same controller. Generation of the fail-safe and standard user program is carried out in the TIA Portal with the same editors; this enables fail-safe data to be evaluated like standard data in the standard user program, for example. Due to this integration the system benefits and the comprehensive functionality of SIMATIC are also available for fail-safe applications.

Security Integrated

- Password-based know-how protection against unauthorized reading and modification of program blocks
- Copy protection for greater protection against unauthorized copying of program blocks: With copy protection, individual blocks on the SIMATIC Memory Card can be tied to its serial number so that the block can only be run if the configured memory card is inserted into the CPU.
- Rights concept with four different authorization levels: Different access rights can be assigned to various user groups. The new protection level 4 makes it possible to also restrict communication to HMI devices.
- Improved manipulation protection: Changed or unauthorized transfers of engineering data are detected by the controller.
- For use of an Ethernet CP (CP 1543-1):
  - Additional access protection by means of a firewall
  - Establishment of secure VPN connections

Design and handling

- CPUs with display for plain text information (display simulator tool on the Internet):
  - Information about article numbers, firmware version, and the serial number of all connected modules can be displayed
  - Setting the IP address of the CPU and additional network settings possible directly on site, without programming device on the display
  - Display of occurring error messages directly as plain text message, meaning reduction in downtime
- Uniform front connectors for all modules and integrated potential bridges for flexible potential group formation simplify stock keeping and reduce wiring costs
- Integrated DIN rail in the S7-1500 DIN rail: quick and easy installation of additional components such as miniature circuit breakers, relays, etc.
- Central expansion with signal modules: for flexible adaptation to any application
- System cabling for digital signal modules: for fast and clearly arranged connecting to sensors and actuators in the field and simple wiring inside the control cabinet
- Power supply:
  - Load power supply modules (PMs) for supplying the module with 24 V
  - Power supply modules to supply power to the internal module electronics via the backplane bus
- Distributed expansion:
  - Use of up to 30 signal modules, communication modules, and technology modules via the PROFINET interface module IM 155-5 for the ET 200MP I/O system
  - No difference in terms of handling and system functions in central and distributed operation

Overview (continued)

Integrated system diagnostics

- Integrated system diagnostics for CPUs, activated by default:
  - Consistent plain text display of system diagnostic information in the display, TIA Portal, HMI, and web server, even for drive messages. 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.

Support of SIMATIC ProDiag S7-1500

- ProDiag is a concept for the easy creation of machine and plant diagnostics. It increases availability and supports with fault analysis and elimination on-site.

Datalog (archives) and recipes

- SIMATIC Memory Card:
  - Plug-in load memory
  - Permits firmware updates
  - Storage option for STEP 7 projects (including comments and symbols), additional documentation, or csv files (for recipes and archives)
  - Easy access to plant-relevant operating data and configuration data with Office tools via the SD card reader (two-way data exchange from and to the controller)
- Integrated web server:
  - Easy access to plant-relevant operating data and configuration data via a web browser

Approvals

The SIMATIC S7-1500 complies with the following national and international standards:

- cULus approval
- cULus HazLoc approval
- FM approval
- ATEX approval (only for 24 V; not for 230 V)
- CE
- RCM (formerly C-Tick)
- KCC
- IECEx (24 V only; not for 230 V)
- EN 61000-6-4
- EN 60068-2-1/ -2/ -6/ -14/ -27/ -30/ -32
- EN 61131-2

You can find the marine approvals available for the S7-1500 on the Internet (SIMATIC Customer Support):
http://www.siemens.com/automation/support

Technical specifications

General technical specifications SIMATIC S7-1500	
Degree of protection	IP20 acc. to IEC 60 529
Ambient temperature	
• Horizontal installation	0...60 °C (display: at an operating temperature of typ. 50 °C, the display is switched off.)
• Vertical installation	0... 40 °C (display: at an operating temperature of typ. 40 °C, the display is switched off.)
Relative humidity	5%...95%, no condensation
Atmospheric pressure	From 1080 to 795 hPa (corresponds to an altitude of -1000 to +2000 m)
Insulation	
• < 50 V	707 V DC test voltage (type test)
• < 150 V	2200 V DC test voltage
• < 250 V	2500 V DC test voltage
Electromagnetic compatibility	Requirements of the EMC directive; interference immunity according to IEC 61000-6-2
• Pulse-shaped disturbance variables	Test according to: Electrostatic discharge according to IEC 61000-4-2, burst pulses according to IEC 61000-4-4, energy single pulse (surge) according to IEC 61000-4-5,
• Sinusoidal disturbance variables	Test according to: HF irradiation according to IEC 61000-4-3, HF decoupling according to IEC 61000-4-6
	Requirements of the EMC directive; interference emission according to EN 61000-6-4
• Emission of radio frequency interference	Interference emission according to 61000-6-4
	Interference emission of electromagnetic fields according to EN 61000-6-4

General technical specifications SIMATIC S7-1500	
Mechanical stress	
• Vibrations	Testing according to EN 60068-2-6 Tested with: 5 Hz ≤ f ≤ 8.4 Hz, constant amplitude 7 mm; 9 Hz ≤ f ≤ 150 Hz, constant acceleration 2 g; duration of vibration: 10 frequency passes per axis in each direction of the 3 mutually perpendicular axes
• Shock	Testing according to EN 60068-2-27 Tested with: Half-wave: strength of shock 15 g peak value, 11 ms duration; shock direction: 3 shocks each in ± direction in each of the 3 mutually vertical axes

Technical specifications (continued)

General technical data of SIPLUS S7-1500	
Ambient temperature range	-40/-25/-20 ... +55/60/70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical data of the standard product applies except for the ambient conditions.

General technical data of SIPLUS S7-1500	
Ambient conditions	
Extended range of environmental conditions	

• with reference to ambient temperature, air pressure and altitude	Tmin ... Tmax
	at 1080 hPa ... 795 hPa
	(-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K)
	at 795 hPa ... 658 hPa
	(+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K)
	at 658 hPa ... 540 hPa
	(+3500 m ... +5000 m)

• At cold restart, min.	0° C
Relative humidity	
• with condensation, max.	100 %; RH incl. bedewing/frost (no commissioning in bedewed state)
Resistance	
• to biologically active substances/ compliance with EN 60721-3-3	Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation.
• to chemically active substances/ compliance with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation.
• to mechanically active substances, compliance with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation.

Overview CPU 1511-1 PN

- Entry-level CPU in the S7-1500 Controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1513-1 PN

- The CPU for applications with medium requirements for program/data storage in the S7-1500 Controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1515-2 PN

- The CPU for applications with medium to high requirements for program/data storage in the S7-1500 Controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, precise position gearing between axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1516-3 PN/DP

- The CPU with a large program and data memory in the S7-1500 Controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1517-3 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1518-4 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Two additional PROFINET interfaces with separate IP address; for network separation. The PROFINET interface X2 can be used for connecting additional PROFINET IO RT devices or for fast communication as an I-device. The PROFINET interface X3 gives you the capability of transferring data at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

4

Overview CPU 1518-4 PN/DP ODK

- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- C/C++ Runtime for the execution of functions and algorithms implemented in C/C++ in the CPU 1518-4 PN/DP ODK.
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Two additional PROFINET interfaces with separate IP addresses for network separation The PROFINET interface X2 can be used for connecting additional PROFINET IO RT devices or for fast communication as an I-device. The PROFINET interface X3 gives you the capability of transferring data at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Technical specifications

Article number	**6ES7511-1AK01-0AB0** CPU 1511-1PN, 150KB PROGRAM, 1MB DATA	**6ES7513-1AL01-0AB0** CPU 1513-1 PN, 300KB PROG., 1,5MB DATA	**6ES7515-2AM01-0AB0** CPU 1515-2 PN, 500KB PROG., 3MB DATA
General information			
Product type designation	CPU 1511-1 PN	CPU 1513-1 PN	CPU 1515-2 PN
Engineering with			
• STEP 7 TIA Portal configurable/ integrated as of version	V14	V14	V14
Display			
Screen diagonal [cm]	3.45 cm	3.45 cm	6.1 cm
Supply voltage			
Type of supply voltage	24 V DC	24 V DC	24 V DC
Power loss			
Power loss, typ.	5.7 W	5.7 W	6.3 W
Memory			
Work memory			
• integrated (for program)	150 kbyte	300 kbyte	500 kbyte
• integrated (for data)	1 Mbyte	1.5 Mbyte	3 Mbyte
Load memory			
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times			
for bit operations, typ.	60 ns	40 ns	30 ns
for word operations, typ.	72 ns	48 ns	36 ns
for fixed point arithmetic, typ.	96 ns	64 ns	48 ns
for floating point arithmetic, typ.	384 ns	256 ns	192 ns
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
IEC counter			
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times			
• Number	2 048	2 048	2 048
IEC timer			
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)

Technical specifications (continued)

Article number	**6ES7511-1AK01-0AB0** CPU 1511-1PN, 150KB PROGRAM, 1MB DATA	**6ES7513-1AL01-0AB0** CPU 1513-1 PN, 300KB PROG., 1,5MB DATA	**6ES7515-2AM01-0AB0** CPU 1515-2 PN, 500KB PROG., 3MB DATA
Data areas and their retentivity			
Flag			
• Number, max.	16 kbyte	16 kbyte	16 kbyte
Address area			
I/O address area			
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day			
Clock			
• Type	Hardware clock	Hardware clock	Hardware clock
1. Interface			
Interface types			
• Number of ports	2	2	2
• integrated switch	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1	Yes; X1
Functionality			
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes
• Web server	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes
PROFINET IO Controller			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes
- IRT	Yes	Yes	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes		Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64	64
- Number of connectable IO Devices for RT, max.	128	128	256
- of which in line, max.	128	128	256
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data

4

Technical specifications (continued)

Article number	6ES7511-1AK01-0AB0 CPU 1511-1PN, 150KB PROGRAM, 1MB DATA	6ES7513-1AL01-0AB0 CPU 1513-1 PN, 300KB PROG., 1,5MB DATA	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB PROG., 3MB DATA
Update time for IRT			
- for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive
- for send cycle of 500 µs	500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	500 µs to 8 ms	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms
- for send cycle of 2 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms
- With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT			
- for send cycle of 250 µs	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms
PROFINET IO Device			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes
- Isochronous mode	No	No	No
- Open IE communication	Yes	Yes	Yes
- IRT	Yes	Yes	Yes
- MRP	Yes	Yes	Yes
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4
2. Interface			
Interface types			
• Number of ports			1
• integrated switch			No
• RJ 45 (Ethernet)			Yes; X2
Functionality			
• PROFINET IO Controller			Yes
• PROFINET IO Device			Yes
• SIMATIC communication			Yes
• Open IE communication			Yes
• Web server			Yes
• Media redundancy			No

Technical specifications (continued)

Article number	**6ES7511-1AK01-0AB0**	**6ES7513-1AL01-0AB0**	**6ES7515-2AM01-0AB0**
	CPU 1511-1PN, 150KB PROGRAM, 1MB DATA	CPU 1513-1 PN, 300KB PROG., 1,5MB DATA	CPU 1515-2 PN, 500KB PROG., 3MB DATA
PROFINET IO Controller			
Services			
- PG/OP communication			Yes
- S7 routing			Yes
- Isochronous mode			No
- Open IE communication			Yes
- IRT			No
- MRP			No
- PROFIenergy			Yes
- Prioritized startup			No
- Number of connectable IO Devices, max.			32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.			32
- of which in line, max.			32
- Number of IO Devices that can be simultaneously activated/ deactivated, max.			8; in total across all interfaces
- Number of IO Devices per tool, max.			8
- Updating times			The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for RT			
- for send cycle of 1 ms			1 ms to 512 ms
PROFINET IO Device			
Services			
- PG/OP communication			Yes
- S7 routing			Yes
- Isochronous mode			No
- Open IE communication			Yes
- IRT			No
- MRP			No
- MRPD			No
- PROFIenergy			Yes
- Prioritized startup			No
- Shared device			Yes
- Number of IO Controllers with shared device, max.			4
Protocols			
Supports protocol for PROFINET IO	Yes	Yes	Yes
PROFIsafe	No	No	No
PROFIBUS	No	No	No
Number of connections			
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs	192; via integrated interfaces of the CPU and connected CPs / CMs
PROFINET IO Controller			
Services			
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	
- Of which IO devices with IRT, max.	64	64	
- Number of connectable IO Devices for RT, max.	128	128	
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 625 µs	Yes; With minimum OB 6x cycle of 500 µs	Yes; With minimum OB 6x cycle of 500 µs

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Technical specifications (continued)

Article number	6ES7511-1AK01-0AB0 CPU 1511-1PN, 150KB PROGRAM, 1MB DATA	6ES7513-1AL01-0AB0 CPU 1513-1 PN, 300KB PROG., 1,5MB DATA	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB PROG., 3MB DATA
Supported technology objects			
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	800	800	2 400
• 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
Controller			
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring			
• High-speed counter	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration			
Programming			
Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes
Access protection			
• Password for display	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes
Dimensions			
Width	35 mm	35 mm	70 mm
Height	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm
Weights			
Weight, approx.	430 g	430 g	830 g

Technical specifications (continued)

Article number	**6ES7516-3AN01-0AB0** CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA	**6ES7517-3AP00-0AB0** CPU 1517-3 PN/DP, 2MB PROG./8MB DATA	**6ES7518-4AP00-0AB0** CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA	**6ES7518-4AP00-3AB0** CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA
General information				
Product type designation	CPU 1516-3 PN/DP	CPU 1517-3 PN/DP	CPU 1518-4 PN/DP	CPU 1518-4 PN/DP ODK
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V14	V14	V14	V14
Display				
Screen diagonal [cm]	6.1 cm	6.1 cm	6.1 cm	6.1 cm
Supply voltage				
Type of supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
Power loss				
Power loss, typ.	7 W	24 W	24 W	24 W
Memory				
Work memory				
• integrated (for program)	1 Mbyte	2 Mbyte	4 Mbyte	4 Mbyte
• integrated (for data)	5 Mbyte	8 Mbyte	20 Mbyte	20 Mbyte
• Integrated (for ODK application)				20 Mbyte
Load memory				
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times				
for bit operations, typ.	10 ns	2 ns	1 ns	1 ns
for word operations, typ.	12 ns	3 ns	2 ns	2 ns
for fixed point arithmetic, typ.	16 ns	3 ns	2 ns	2 ns
for floating point arithmetic, typ.	64 ns	12 ns	6 ns	6 ns
Counters, timers and their retentivity				
S7 counter				
• Number	2 048	2 048	2 048	2 048
IEC counter				
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times				
• Number	2 048	2 048	2 048	2 048
IEC timer				
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity				
Flag				
• Number, max.	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area				
I/O address area				
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day				
Clock				
• Type	Hardware clock	Hardware clock	Hardware clock	Hardware clock
1. Interface				
Interface types				
• Number of ports	2	2	2	2
• integrated switch	Yes	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1	Yes; X1	Yes; X1
Functionality				
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes	Yes
• Web server	Yes	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article number	**6ES7516-3AN01-0AB0** CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA	**6ES7517-3AP00-0AB0** CPU 1517-3 PN/DP, 2MB PROG./8MB DATA	**6ES7518-4AP00-0AB0** CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA	**6ES7518-4AP00-3AB0** CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA
PROFINET IO Controller				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	Yes	Yes	Yes	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes	Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64	64	64
- Number of connectable IO Devices for RT, max.	256	512	512	512
- of which in line, max.	256	512	512	512
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT				
- for send cycle of 125 µs			125 µs	125 µs
- for send cycle of 187.5 µs			187.5 µs	187.5 µs
- for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms	250 µs to 4 ms	250 µs to 4 ms
- for send cycle of 500 µs	500 µs to 8 ms	500 µs to 8 ms	500 µs to 8 ms	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms
- for send cycle of 2 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms
- With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT				
- for send cycle of 250 µs	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms

Technical specifications (continued)

Article number	**6ES7516-3AN01-0AB0** CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA	**6ES7517-3AP00-0AB0** CPU 1517-3 PN/DP, 2MB PROG./8MB DATA	**6ES7518-4AP00-0AB0** CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA	**6ES7518-4AP00-3AB0** CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA
PROFINET IO Device				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	No	No	No	No
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	Yes	Yes	Yes	Yes
- MRP	Yes	Yes	Yes	Yes
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4	4
2. Interface				
Interface types				
• Number of ports	1	1	1	1
• integrated switch	No	No	No	No
• RJ 45 (Ethernet)	Yes; X2	Yes; X2	Yes; X2	Yes; X2
Functionality				
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes	Yes
• Web server	Yes	Yes	Yes	Yes
• Media redundancy	No	No	No	No
PROFINET IO Controller				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	No	No	No	No
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	No	No	No	No
- MRP	No	No	No	No
- PROFIenergy	Yes	Yes	Yes	Yes
- Prioritized startup	No	No	No	No
- Number of connectable IO Devices, max.	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.	32	128	128	128
- of which in line, max.	32	128	128	128
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8		
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for RT				
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms

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Technical specifications (continued)

Article number	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB PROG./8MB DATA	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA	6ES7518-4AP00-3AB0 CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA
PROFINET IO Device				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	No	No	No	No
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	No	No	No	No
- MRP	No	No	No	No
- MRPD	No	No	No	No
- PROFIenergy	Yes	Yes	Yes	Yes
- Prioritized startup	No	No	No	No
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4	4
3. Interface				
Interface types				
• Number of ports	1	1	1	1
• integrated switch			No	No
• RJ 45 (Ethernet)			Yes; X3	Yes; X3
• RS 485	Yes; X3	Yes; X3		
Functionality				
• PROFINET IO Controller			No	No
• PROFINET IO Device			No	No
• PROFIBUS DP master	Yes	Yes		
• PROFIBUS DP slave	No	No		
• SIMATIC communication	Yes	Yes	Yes	Yes
• Open IE communication			Yes	Yes
• Web server			Yes	Yes
4. Interface				
Interface types				
• Number of ports			1	1
• RS 485			Yes; X4	Yes; X4
Functionality				
• PROFIBUS DP master			Yes	Yes
• PROFIBUS DP slave			No	No
• SIMATIC communication			Yes	Yes
Protocols				
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes
PROFIsafe	No	No	No	No
PROFIBUS	Yes	Yes	Yes	Yes
Number of connections				
• Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs / CMs	320; via integrated interfaces of the CPU and connected CPs / CMs	384; via integrated interfaces of the CPU and connected CPs / CMs	384; via integrated interfaces of the CPU and connected CPs / CMs
PROFIBUS DP master				
Services				
- Number of DP slaves	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 375 µs	Yes; With minimum OB 6x cycle of 250 µs	Yes; With minimum OB 6x cycle of 125 µs	Yes; With minimum OB 6x cycle of 125 µs
Supported technology objects				
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	2 400	10 240	10 240	10 240

Technical specifications (continued)

Article number	**6ES7516-3AN01-0AB0** CPU 1516-3 PN/DP, 1MB PROG., 5MB DATA	**6ES7517-3AP00-0AB0** CPU 1517-3 PN/DP, 2MB PROG./8MB DATA	**6ES7518-4AP00-0AB0** CPU 1518-4 PN/DP, 4MB PROG., 20MB DATA	**6ES7518-4AP00-3AB0** CPU 1518-4 PN/DP ODK 4MB PROG./20MB DATA
Supported technology objects (continued)				
• Required Motion Control resources				
- per speed-controlled axis	40	40	40	40
- per positioning axis	80	80	80	80
- per synchronous axis	160	160	160	160
- per external encoder	80	80	80	80
- per output cam	20	20	20	20
- per cam track	160	160	160	160
- per probe	40	40	40	40
Controller				
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring				
• High-speed counter	Yes	Yes	Yes	Yes
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration				
Programming				
Programming language				
- LAD	Yes	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
Know-how protection				
• User program protection/password protection	Yes	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes	Yes
Access protection				
• Password for display	Yes	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes	Yes
Open Development interfaces				
• Size of ODK SO file, max.				5.8 Mbyte
Dimensions				
Width	70 mm	175 mm	175 mm	175 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	845 g	1 978 g	1 988 g	1 988 g

Standard CPUs

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Ordering data	Article No.
CPU 1511-1 PN	**6ES7511-1AK01-0AB0**
Work memory 150 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
CPU 1513-1 PN	**6ES7513-1AL01-0AB0**
Work memory 300 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
CPU 1515-2 PN	**6ES7515-2AM01-0AB0**
Work memory 500 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC Memory Card required	
CPU 1516-3 PN/DP	**6ES7516-3AN01-0AB0**
Work memory 1 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
CPU 1517-3 PN/DP	**6ES7517-3AP00-0AB0**
Work memory 2 MB for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
CPU 1518-4 PN/DP	**6ES7518-4AP00-0AB0**
Work memory 4 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	
CPU 1518-4 PN/DP ODK	**6ES7518-4AP00-3AB0**
Work memory 4 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	
Accessories	
SIMATIC Memory Card	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP02-0AA0**
32 GB	**6ES7954-8LT03-0AA0**
SIMATIC S7-1500 DIN rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 245 mm	**6ES7590-1AC40-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**

	Article No.
PE connection element for DIN rail 2000 mm	**6ES7590-5AA00-0AA0**
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
24/48/60 V DC input voltage, power 60 W, buffering functionality	**6ES7505-0RB00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units	
Load power supply	
24 V DC/3 A	**6EP1332-4BA00**
24 V DC/8 A	**6EP1333-4BA00**
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• With push-in terminals	**6ES7193-4JB00-0AA0**
PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet	
With insulation displacement, max. transmission rate 12 Mbps	
Without PG interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BA70-0XA0**
With PG interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BB70-0XA0**
PROFIBUS FC Standard Cable GP	**6XV1830-0EH10**
Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Robust Cable	**6XV1830-0JH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	**6XV1831-2K**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Trailing Cable	
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
Sheath color: Petrol	**6XV1830-3EH10**
Sheath color: Violet	**6XV1831-2L**
PROFIBUS FC Food Cable	**6XV1830-0GH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	

Ordering data	Article No.
PROFIBUS FC Ground Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1830-3FH10**
PROFIBUS FC FRNC Cable GP 2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1830-0LH10**
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1905-6AA00**
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-3AH10**
IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-4AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Display	
For CPU 1511-1 PN and CPU 1513-1 PN; spare part	**6ES7591-1AA01-0AA0**
For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part	**6ES7591-1BA01-0AA0**

	Article No.
Front cover for PROFIBUS DP interface For CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part	**6ES7591-8AA00-0AA0**
SIMATIC S7-1500 Starter Kit Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation	**6ES7511-1CK00-4YB5**
STEP 7 Professional V14 SP1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: English, German, Chinese, Italian, French, Spanish	
STEP 7 Professional V14 SP1, floating license	**6ES7822-1AA04-0YA5**
STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] Email address required for delivery	**6ES7822-1AE04-0YA5**
SIMATIC ODK 1500S V2.0 Open Development Kit for support in developing Windows and real-time library functions	
Package with data storage medium	**6ES7806-2CD02-0YA0**
Download incl. license key [1] Email address required for delivery	**6ES7806-2CD02-0YG0**
SIMATIC Target 1500S for Simulink V1.0 Download incl. license key [1] Email address required for delivery	**6ES7823-1BE00-0YA5**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

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

SIPLUS Standard CPUs

Overview SIPLUS CPU 1511-1 PN

- Entry-level CPU in the S7-1500 Controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode
- SIMATIC Memory Card required for operation of the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Overview SIPLUS CPU 1513-1 PN

- The CPU for applications with medium/high requirements for program and data storage in the S7-1500 Controller product range
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode
- SIMATIC Memory Card required for operation of the CPU

Please note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Overview SIPLUS CPU 1516-3 PN/DP

- The CPU with large program and data memory in the S7-1500 Controller product range for applications with high program scope requirements.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- SIMATIC Memory Card required for operation of the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Overview SIPLUS CPU 1518-4 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- Two additional PROFINET interfaces with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages

SIMATIC Memory Card required for operating the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information has been added.

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Technical specifications

Article number	**6AG1511-1AK01-2AB0**	**6AG1511-1AK01-7AB0**	**6AG1513-1AL01-2AB0**	**6AG1513-1AL01-7AB0**
Based on	**6ES7511-1AK01-0AB0**	**6ES7511-1AK01-0AB0**	**6ES7513-1AL01-0AB0**	**6ES7513-1AL01-0AB0**
	SIPLUS S7-1500 CPU 1511-1 PN	SIPLUS S7-1500 CPU 1511-1 PN	SIPLUS S7-1500 CPU 1513-1 PN	SIPLUS S7-1500 CPU 1513-1 PN
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	70 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	70 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation

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Technical specifications (continued)

Article number	6AG1511-1AK01-2AB0	6AG1511-1AK01-7AB0	6AG1513-1AL01-2AB0	6AG1513-1AL01-7AB0
Based on	6ES7511-1AK01-0AB0	6ES7511-1AK01-0AB0	6ES7513-1AL01-0AB0	6ES7513-1AL01-0AB0
	SIPLUS S7-1500 CPU 1511-1 PN	SIPLUS S7-1500 CPU 1511-1 PN	SIPLUS S7-1500 CPU 1513-1 PN	SIPLUS S7-1500 CPU 1513-1 PN
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Article number	6AG1516-3AN01-2AB0	6AG1516-3AN01-7AB0	6AG1518-4AP00-4AB0
Based on	6ES7516-3AN01-0AB0	6ES7516-3AN01-0AB0	6ES7518-4AP00-0AB0
	SIPLUS S7-1500 CPU 1516-3 PN/DP	SIPLUS S7-1500 CPU 1516-3 PN/DP	SIPLUS S7-1500 CPU 1518-4 PN/DP
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	70 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin; Startup @ -20 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Extended ambient conditions			

• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax
	at 1080 hPa ... 795 hPa
	(-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K)
	at 795 hPa ... 658 hPa
	(+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K)
	at 658 hPa ... 540 hPa
	(+3500 m ... +5000 m)
			Tmin ... Tmax
			at 1080 hPa ... 795 hPa
			(-1000 m ... +2000 m) //
			Tmin ... (Tmax - 10K)
			at 795 hPa ... 658 hPa
			(+2000 m ... +3500 m) //
			Tmin ... (Tmax - 20K)
			at 658 hPa ... 540 hPa
			(+3500 m ... +5000 m)

Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Available soon
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 incl. salt spray. The supplied connector covers must remain on the unused interfaces during operation!	Available soon
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres!	Available soon

Ordering data	Article No.
SIPLUS CPU 1511-1 PN	
(Extended temperature range and exposure to media)	
Work memory 150 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
Temperature range -40 ... +60 °C (startup -20 °C)	**6AG1511-1AK01-2AB0**
Temperature range -40 ... +70 °C (startup -20 °C)	**6AG1511-1AK01-7AB0**
SIPLUS CPU 1513-1 PN	
(Extended temperature range and exposure to media)	
Work memory 300 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
Temperature range -40 ... +60 °C (startup -20 °C)	**6AG1513-1AL01-2AB0**
Temperature range -40 ... +70 °C (startup -20 °C)	**6AG1513-1AL01-7AB0**
SIPLUS CPU 1516-3 PN/DP	
(Extended temperature range and exposure to media)	
Work memory 1 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
Temperature range -40 ... +60 °C (startup -20 °C)	**6AG1516-3AN01-2AB0**
Temperature range -40 ... +70 °C (startup -20 °C)	**6AG1516-3AN01-7AB0**
SIPLUS CPU 1518-4 PN/DP	**6AG1518-4AP00-4AB0**
(Exposure to media)	
Work memory 3 MB for program, 10 MB for data, PROFINET IO IRT interface, 2 PROFINET/PROFIBUS interfaces; SIMATIC Memory Card required	

	Article No.
Accessories	
System power supply	
(Extended temperature range and exposure to media)	
24 V DC input voltage, power 25 W	**6AG1505-0KA00-7AB0**
24/48/60 V DC input voltage, power 60 W	**6AG1505-0RA00-7AB0**
120/230 V AC input voltage, power 60 W	**6AG1507-0RA00-7AB0**
Load power supply	
(Extended temperature range and exposure to media)	
24 V DC/3A	**6AG1332-4BA00-7AA0**
24 V DC/8A	**6AG1333-4BA00-7AA0**
Display	
(Extended temperature range and exposure to media)	
For SIPLUS CPU 1511-1 PN and CPU 1513-1 PN; spare part	**6AG1591-1AA01-2AA0**
For SIPLUS CPU 1516-3 PN/DP and SIPLUS CPU 1518-4 PN/DP; spare part	**6AG1591-1BA01-2AA0**
Further accessories	See SIMATIC S7-1500, standard CPUs, page 4/18

Overview CPU 1511C-1 PN

- The compact CPU with integral digital and analog inputs and outputs in the S7-1500 Controller product range
- With integrated technological functions, e.g. high-speed counter (HSC), frequency measurement, period duration measurement or stepper motor control, pulse duration modulation, frequency output
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Overview CPU 1512C-1 PN

- The compact CPU with integral digital and analog inputs and outputs in the S7-1500 Controller product range
- With integrated technological functions, e.g. high-speed counter (HSC), frequency measurement, period duration measurement or stepper motor control, pulse duration modulation, frequency output
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Technical specifications

Article number	**6ES7511-1CK00-0AB0**	**6ES7512-1CK00-0AB0**
	CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA	CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA
General information		
Product type designation	CPU 1511C-1 PN	CPU 1512C-1 PN
Engineering with		
• STEP 7 TIA Portal configurable/ integrated as of version	V14	V14
Display		
Screen diagonal [cm]	3.45 cm	3.45 cm
Supply voltage		
Type of supply voltage	24 V DC	24 V DC
Input current		
Digital inputs		
• from load voltage L+ (without load), max.	20 mA; per group	20 mA; per group
Digital outputs		
• from load voltage L+, max.	30 mA; Per group, without load	30 mA; Per group, without load
Power loss		
Power loss, typ.	11.8 W	15.2 W
Memory		
Work memory		
• integrated (for program)	175 kbyte	250 kbyte
• integrated (for data)	1 Mbyte	1 Mbyte
Load memory		
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte
CPU processing times		
for bit operations, typ.	60 ns	48 ns
for word operations, typ.	72 ns	58 ns
for fixed point arithmetic, typ.	96 ns	77 ns
for floating point arithmetic, typ.	384 ns	307 ns
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
IEC counter		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times		
• Number	2 048	2 048
IEC timer		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity		
Flag		
• Number, max.	16 kbyte	16 kbyte
Address area		
I/O address area		
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day		
Clock		
• Type	Hardware clock	Hardware clock
Digital inputs		
integrated channels (DI)	16	32
Digital outputs		
integrated channels (DO)	16	32
Short-circuit protection	Yes; electronic/thermal	Yes; electronic/thermal
Analog outputs		
integrated channels (AO)	2	2
1. Interface		
Interface types		
• Number of ports	2	2
• integrated switch	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1

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Technical specifications (continued)

Article number	**6ES7511-1CK00-0AB0**	**6ES7512-1CK00-0AB0**
	CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA	CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA
Functionality		
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes	Yes
• Web server	Yes	Yes
• Media redundancy	Yes	Yes
PROFINET IO Controller		
Services		
- PG/OP communication	Yes	Yes
- S7 routing	Yes	Yes
- Isochronous mode	Yes	Yes
- Open IE communication	Yes	Yes
- IRT	Yes	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	128	128
- of which in line, max.	128	128
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT		
- for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive
- for send cycle of 500 µs	500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive
- for send cycle of 1 ms	1 ms to 16 ms	1 ms to 16 ms
- for send cycle of 2 ms	2 ms to 32 ms	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms	4 ms to 64 ms
- With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT		
- for send cycle of 250 µs	250 µs to 128 ms	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms	4 ms to 512 ms
PROFINET IO Device		
Services		
- PG/OP communication	Yes	Yes
- S7 routing	Yes	Yes
- Isochronous mode	No	No
- Open IE communication	Yes	Yes
- IRT	Yes	Yes
- MRP	Yes	Yes
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4

Technical specifications (continued)

Article number	**6ES7511-1CK00-0AB0**	**6ES7512-1CK00-0AB0**
	CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA	CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA
Protocols		
Number of connections		
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs
PROFINET IO Controller		
Services		
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64
- Number of connectable IO Devices for RT, max.	128	128
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 625 µs	Yes; With minimum OB 6x cycle of 625 µs
Supported technology objects		
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	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
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring		
• High-speed counter	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C; Note derating data for onboard I/O in the manual. Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Note derating data for onboard I/O in the manual. Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	40 °C; Note derating data for onboard I/O in the manual. Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Note derating data for onboard I/O in the manual. Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration		
Programming		
Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes

Technical specifications (continued)

Article number	**6ES7511-1CK00-0AB0** CPU 1511C-1 PN, 175 KB PROG, 1 MB DATA	**6ES7512-1CK00-0AB0** CPU 1512C-1 PN, 250 KB PROG, 1 MB DATA
Access protection		
• Password for display	Yes	Yes
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	85 mm	110 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	1 050 g	1 360 g

Ordering data

	Article No.
CPU 1511C-1 PN Work memory 175 KB for program, 1 MB for data, 16 digital inputs, 16 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IO IRT interface; SIMATIC Memory Card required	**6ES7511-1CK00-0AB0**
CPU 1512C-1 PN Work memory 250 KB for program, 1 MB for data, 32 digital inputs, 32 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IO IRT interface; SIMATIC Memory Card required	**6ES7512-1CK00-0AB0**
Accessories	
SIMATIC Memory Card	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP02-0AA0**
32 GB	**6ES7954-8LT03-0AA0**
Front connector For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
Shielding set I/O For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module).	**6ES7590-5CA10-0XA0**
Shield terminal 10 units; spare part	**6ES7590-5BA00-0AA0**

	Article No.
SIMATIC S7-1500 DIN rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 245 mm	**6ES7590-1AC40-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**
PE connection element for DIN rail 2000 mm 20 units	**6ES7590-5AA00-0AA0**
Power supply For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
24/48/60 V DC input voltage, power 60 W, buffering functionality	**6ES7505-0RB00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector With coding element for power supply module; spare part, 10 units	**6ES7590-8AA00-0AA0**
Load power supply	
24 V DC/3A	**6EP1332-4BA00**
24 V DC/8A	**6EP1333-4BA00**
Power supply connector Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**

Ordering data	Article No.
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-3AH10**
IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-4AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Display For CPU 1511(F), CPU 1511C, CPU 1512C, CPU 1513(F); spare part	**6ES7591-1AA01-0AA0**
SIMATIC S7-1500 Starter Kit Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation	**6ES7511-1CK00-4YB5**

	Article No.
STEP 7 Professional V14 SP1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP 1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: English, German, Chinese, Italian, French, Spanish	
STEP 7 Professional V14 SP1, floating license	**6ES7822-1AA04-0YA5**
STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] Email address required for delivery	**6ES7822-1AE04-0YA5**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**

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

Overview CPU 1511F-1 PN

- Entry-level CPU in the S7-1500F Controller product range
- Suitable for standard and fail-safe applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configuration
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1513F-1 PN

- The CPU for standard and fail-safe applications with medium/high requirements for program/data storage in the S7-1500 Controller product range
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configuration
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1515F-2 PN

- The CPU for applications with medium to high requirements for program/data storage in the S7-1500 Controller product range
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1516F-3 PN/DP

- The CPU with a large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU

4

Overview CPU 1517F-3 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, positionally precise gearing between axes
- Integrated web server with the option of creating user-defined web pages

Note:

SIMATIC Memory Card required for operation of the CPU

Overview CPU 1518F-4 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for fail-safe applications with highest requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- Extremely high processing speed for binary and floating-point arithmetic.
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Two additional PROFINET interfaces with separate IP addresses.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

Overview CPU 1518F-4 PN/DP ODK

- The CPU with a very large program and data memory in the S7-1500 Controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- C/C++ Runtime for the execution of functions and algorithms implemented in C/C++ in the CPU 1518-4 PN/DP ODK.
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Two additional PROFINET interfaces with separate IP addresses for network separation. The PROFINET interface X2 can be used for connecting additional PROFINET IO RT devices or for fast communication as an I-device. The PROFINET interface X3 gives you the capability of transferring data at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, precise position gearing between axes, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Technical specifications

Article number	**6ES7511-1FK01-0AB0** CPU 1511F-1PN, 225KB PROG, 1MB DATA	**6ES7513-1FL01-0AB0** CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA	**6ES7515-2FM01-0AB0** CPU 1515F-2 PN, 750KB PROG.,3MB DATA	**6ES7516-3FN01-0AB0** CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA
General information				
Product type designation	CPU 1511F-1 PN	CPU 1513F-1 PN	CPU 1515F-2 PN	CPU 1516F-3 PN/DP
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V14	V14	V14	V14
Display				
Screen diagonal [cm]	3.45 cm	3.45 cm	6.1 cm	6.1 cm
Supply voltage				
Type of supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
Power loss				
Power loss, typ.	5.7 W	5.7 W	6.3 W	7 W
Memory				
Work memory				
• integrated (for program)	225 kbyte	450 kbyte	750 kbyte	1.5 Mbyte
• integrated (for data)	1 Mbyte	1.5 Mbyte	3 Mbyte	5 Mbyte
Load memory				
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times				
for bit operations, typ.	60 ns	40 ns	30 ns	10 ns
for word operations, typ.	72 ns	48 ns	36 ns	12 ns
for fixed point arithmetic, typ.	96 ns	64 ns	48 ns	16 ns
for floating point arithmetic, typ.	384 ns	256 ns	192 ns	64 ns
Counters, timers and their retentivity				
S7 counter				
• Number	2 048	2 048	2 048	2 048
IEC counter				
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times				
• Number	2 048	2 048	2 048	2 048
IEC timer				
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)

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Technical specifications (continued)

Article number	6ES7511-1FK01-0AB0 CPU 1511F-1PN, 225KB PROG, 1MB DATA	6ES7513-1FL01-0AB0 CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA	6ES7515-2FM01-0AB0 CPU 1515F-2 PN, 750KB PROG.,3MB DATA	6ES7516-3FN01-0AB0 CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA
Data areas and their retentivity				
Flag				
• Number, max.	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area				
I/O address area				
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day				
Clock				
• Type	Hardware clock	Hardware clock	Hardware clock	Hardware clock
1. Interface				
Interface types				
• Number of ports	2	2	2	2
• integrated switch	Yes	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1	Yes; X1	Yes; X1
Functionality				
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes	Yes
• Web server	Yes	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes	Yes
PROFINET IO Controller				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	Yes	Yes	Yes	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes		Yes	Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64	64	64
- Number of connectable IO Devices for RT, max.	128	128	256	256
- of which in line, max.	128	128	256	256
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data

Technical specifications (continued)

Article number	**6ES7511-1FK01-0AB0** CPU 1511F-1PN, 225KB PROG, 1MB DATA	**6ES7513-1FL01-0AB0** CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA	**6ES7515-2FM01-0AB0** CPU 1515F-2 PN, 750KB PROG.,3MB DATA	**6ES7516-3FN01-0AB0** CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA
Update time for IRT				
- for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive
- for send cycle of 500 µs	500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	500 µs to 8 ms	500 µs to 8 ms	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms
- for send cycle of 2 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms
- With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT				
- for send cycle of 250 µs	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms
PROFINET IO Device				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	No	No	No	No
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	Yes	Yes	Yes	Yes
- MRP	Yes	Yes	Yes	Yes
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4	4
2. Interface				
Interface types				
• Number of ports			1	1
• integrated switch			No	No
• RJ 45 (Ethernet)			Yes; X2	Yes; X2
Functionality				
• PROFINET IO Controller			Yes	Yes
• PROFINET IO Device			Yes	Yes
• SIMATIC communication			Yes	Yes
• Open IE communication			Yes	Yes
• Web server			Yes	Yes
• Media redundancy			No	No

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Technical specifications (continued)

Article number	6ES7511-1FK01-0AB0 CPU 1511F-1PN, 225KB PROG, 1MB DATA	6ES7513-1FL01-0AB0 CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA	6ES7515-2FM01-0AB0 CPU 1515F-2 PN, 750KB PROG.,3MB DATA	6ES7516-3FN01-0AB0 CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA
PROFINET IO Controller				
Services				
- PG/OP communication			Yes	Yes
- S7 routing			Yes	Yes
- Isochronous mode			No	No
- Open IE communication			Yes	Yes
- IRT			No	No
- MRP			No	No
- PROFIenergy			Yes	Yes
- Prioritized startup			No	No
- Number of connectable IO Devices, max.			32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.			32	32
- of which in line, max.			32	32
- Number of IO Devices that can be simultaneously activated/ deactivated, max.			8; in total across all inter-faces	8; in total across all inter-faces
- Number of IO Devices per tool, max.			8	8
- Updating times			The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for RT				
- for send cycle of 1 ms			1 ms to 512 ms	1 ms to 512 ms
PROFINET IO Device				
Services				
- PG/OP communication			Yes	Yes
- S7 routing			Yes	Yes
- Isochronous mode			No	No
- Open IE communication			Yes	Yes
- IRT			No	No
- MRP			No	No
- MRPD			No	No
- PROFIenergy			Yes	Yes
- Prioritized startup			No	No
- Shared device			Yes	Yes
- Number of IO Controllers with shared device, max.			4	4
3. Interface				
Interface types				
• Number of ports				1
• RS 485				Yes; X3
Functionality				
• PROFIBUS DP master				Yes
• PROFIBUS DP slave				No
• SIMATIC communication				Yes
Protocols				
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes
PROFIsafe	Yes	Yes	Yes	Yes
PROFIBUS	No	No	No	Yes
Number of connections				
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	128; via integrated interfaces of the CPU and connected CPs / CMs	192; via integrated interfaces of the CPU and connected CPs / CMs	256; via integrated interfaces of the CPU and connected CPs / CMs

Technical specifications (continued)

Article number	**6ES7511-1FK01-0AB0** CPU 1511F-1PN, 225KB PROG, 1MB DATA	**6ES7513-1FL01-0AB0** CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA	**6ES7515-2FM01-0AB0** CPU 1515F-2 PN, 750KB PROG.,3MB DATA	**6ES7516-3FN01-0AB0** CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA
PROFINET IO Controller				
Services				
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET		
- Of which IO devices with IRT, max.	64	64		
- Number of connectable IO Devices for RT, max.	128	128		
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 625 µs	Yes; With minimum OB 6x cycle of 500 µs	Yes; With minimum OB 6x cycle of 500 µs	Yes; With minimum OB 6x cycle of 375 µs
Supported technology objects				
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	800		2 400	2 400
• 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
• Speed-controlled axis				
- Number of speed-controlled axes, max.		6; Requirement: There must be no other motion technology objects created		
• Positioning axis				
- Number of positioning axes, max.		6; Requirement: There must be no other motion technology objects created		
• Synchronized axes (relative gear synchronization)				
- Number of axes, max.		3; Requirement: There must be no other motion technology objects created		
• External encoders				
- Number of external encoders, max.		6; Requirement: There must be no other motion technology objects created		
Controller				
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring				
• High-speed counter	Yes	Yes	Yes	Yes
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	< 2.00E-05	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09	< 1.00E-09	< 1.00E-09	< 1.00E-09 1/h

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Technical specifications (continued)

Article number	6ES7511-1FK01-0AB0 CPU 1511F-1PN, 225KB PROG, 1MB DATA	6ES7513-1FL01-0AB0 CPU 1513F-1 PN, 450KB PROG, 1.5MB DATA	6ES7515-2FM01-0AB0 CPU 1515F-2 PN, 750KB PROG.,3MB DATA	6ES7516-3FN01-0AB0 CPU 1516F-3 PN/DP, 1.5MB PROG., 5MB DATA
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
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
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
Know-how protection				
• User program protection/password protection	Yes	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes	Yes
Access protection				
• Password for display	Yes	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes; Specific write protection both for Standard and for Failsafe	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes	Yes
Dimensions				
Width	35 mm	35 mm	70 mm	70 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	430 g	430 g	830 g	845 g

Article number	6ES7517-3FP00-0AB0 CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA	6ES7518-4FP00-0AB0 CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA	6ES7518-4FP00-3AB0 CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA
General information			
Product type designation	CPU 1517F-3PN/DP	CPU 1518F-4PN/DP	CPU 1518F-4 PN/DP ODK
Engineering with			
• STEP 7 TIA Portal configurable/ integrated as of version	V14	V14	V14
Display			
Screen diagonal [cm]	6.1 cm	6.1 cm	6.1 cm
Supply voltage			
Type of supply voltage	24 V DC	24 V DC	24 V DC
Power loss			
Power loss, typ.	24 W	24 W	24 W

Technical specifications (continued)

Article number	**6ES7517-3FP00-0AB0** CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA	**6ES7518-4FP00-0AB0** CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA	**6ES7518-4FP00-3AB0** CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA
Memory			
Work memory			
• integrated (for program)	3 Mbyte	6 Mbyte	6 Mbyte
• integrated (for data)	8 Mbyte	20 Mbyte	20 Mbyte
• Integrated (for ODK application)			20 Mbyte
Load memory			
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times			
for bit operations, typ.	2 ns	1 ns	1 ns
for word operations, typ.	3 ns	2 ns	2 ns
for fixed point arithmetic, typ.	3 ns	2 ns	2 ns
for floating point arithmetic, typ.	12 ns	6 ns	6 ns
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
IEC counter			
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times			
• Number	2 048	2 048	2 048
IEC timer			
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity			
Flag			
• Number, max.	16 kbyte	16 kbyte	16 kbyte
Address area			
I/O address area			
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day			
Clock			
• Type	Hardware clock	Hardware clock	Hardware clock
1. Interface			
Interface types			
• Number of ports	2	2	2
• integrated switch	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1	Yes; X1
Functionality			
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes
• Web server	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes

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Technical specifications (continued)

Article number	6ES7517-3FP00-0AB0 CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA	6ES7518-4FP00-0AB0 CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA	6ES7518-4FP00-3AB0 CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA
PROFINET IO Controller			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes
- IRT	Yes	Yes	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64	64
- Number of connectable IO Devices for RT, max.	512	512	512
- of which in line, max.	512	512	512
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT			
- for send cycle of 125 µs		125 µs	125 µs
- for send cycle of 187.5 µs		187.5 µs	187.5 µs
- for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms	250 µs to 4 ms
- for send cycle of 500 µs	500 µs to 8 ms	500 µs to 8 ms	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms
- for send cycle of 2 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms
- With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT			
- for send cycle of 250 µs	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms
PROFINET IO Device			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes
- Isochronous mode	No	No	No
- Open IE communication	Yes	Yes	Yes
- IRT	Yes	Yes	Yes
- MRP	Yes	Yes	Yes
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4

Technical specifications (continued)

Article number	**6ES7517-3FP00-0AB0** CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA	**6ES7518-4FP00-0AB0** CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA	**6ES7518-4FP00-3AB0** CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA
2. Interface			
Interface types			
• Number of ports	1	1	1
• integrated switch	No	No	No
• RJ 45 (Ethernet)	Yes; X2	Yes; X2	Yes; X2
Functionality			
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes
• Web server	Yes	Yes	Yes
• Media redundancy	No	No	No
PROFINET IO Controller			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes
- Isochronous mode	No	No	No
- Open IE communication	Yes	Yes	Yes
- IRT	No	No	No
- MRP	No	No	No
- PROFIenergy	Yes	Yes	Yes
- Prioritized startup	No	No	No
- Number of connectable IO Devices, max.	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.	128	128	32
- of which in line, max.	128	128	128
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8		
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for RT			
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
PROFINET IO Device			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes
- Isochronous mode	No	No	No
- Open IE communication	Yes	Yes	Yes
- IRT	No	No	No
- MRP	No	No	No
- MRPD	No	No	No
- PROFIenergy	Yes	Yes	Yes
- Prioritized startup	No	No	No
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4
3. Interface			
Interface types			
• Number of ports	1	1	1
• integrated switch		No	No
• RJ 45 (Ethernet)		Yes; X3	Yes; X3
• RS 485	Yes; X3		

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Technical specifications (continued)

Article number	6ES7517-3FP00-0AB0 CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA	6ES7518-4FP00-0AB0 CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA	6ES7518-4FP00-3AB0 CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA
Functionality			
• PROFINET IO Controller		No	No
• PROFINET IO Device		No	No
• PROFIBUS DP master	Yes		
• PROFIBUS DP slave	No		
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication		Yes	Yes
• Web server		Yes	Yes
4. Interface			
Interface types			
• Number of ports		1	1
• RS 485		Yes; X4	Yes; X4
Functionality			
• PROFIBUS DP master		Yes	Yes
• PROFIBUS DP slave		No	No
• SIMATIC communication		Yes	Yes
Protocols			
Supports protocol for PROFINET IO	Yes	Yes	Yes
PROFIsafe	Yes	Yes	Yes
PROFIBUS	Yes	Yes	Yes
Number of connections			
• Number of connections, max.	320; via integrated interfaces of the CPU and connected CPs / CMs	384; via integrated interfaces of the CPU and connected CPs / CMs	384; via integrated interfaces of the CPU and connected CPs / CMs
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 250 µs	Yes; With minimum OB 6x cycle of 125 µs	Yes; With minimum OB 6x cycle of 125 µs
Supported technology objects			
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	10 240	10 240	10 240
• 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
Controller			
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring			
• High-speed counter	Yes	Yes	Yes
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	< 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09	< 1.00E-09	< 1.00E-09

Technical specifications (continued)

Article number	**6ES7517-3FP00-0AB0** CPU 1517F-3 PN/DP, 3MB PROG., 8MB DATA	**6ES7518-4FP00-0AB0** CPU 1518F-4 PN/DP, 6 MB PROG, 20MB DATA	**6ES7518-4FP00-3AB0** CPU 1518F-4 PN/DP ODK, 6 MB PROG, 20MB DATA
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration			
Programming			
Programming language			
- LAD	Yes; incl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes
Access protection			
• Password for display	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes
Open Development interfaces			
• Size of ODK SO file, max.			6 Mbyte
Dimensions			
Width	175 mm	175 mm	175 mm
Height	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm
Weights			
Weight, approx.	1 978 g	1 988 g	1 988 g

Fail-safe CPUs

Ordering data	Article No.
CPU 1511F-1 PN	**6ES7511-1FK01-0AB0**
Fail-safe CPU, work memory 230 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
CPU 1513F-1 PN	**6ES7513-1FL01-0AB0**
Fail-safe CPU, work memory 450 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
CPU 1515F-2 PN	**6ES7515-2FM01-0AB0**
Fail-safe CPU, work memory 750 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC Memory Card required	
CPU 1516F-3 PN/DP	**6ES7516-3FN01-0AB0**
Fail-safe CPU, work memory 1.5 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
CPU 1517F-3 PN/DP	**6ES7517-3FP00-0AB0**
Fail-safe CPU, work memory 3 MB for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
CPU 1518F-4 PN/DP	**6ES7518-4FP00-0AB0**
Fail-safe CPU, work memory 6 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	
CPU 1518F-4 PN/DP ODK	**6ES7518-4FP00-3AB0**
Fail-safe CPU, work memory 6 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	
Accessories	
SIMATIC Memory Card	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP02-0AA0**
32 GB	**6ES7954-8LT03-0AA0**

	Article No.
SIMATIC S7-1500 DIN rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 245 mm	**6ES7590-1AC40-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**
PE connection element for DIN rail 2000 mm	**6ES7590-5AA00-0AA0**
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
24/48/60 V DC input voltage, power 60 W, buffering functionality	**6ES7505-0RB00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units	
Load power supply	
24 V DC/3A	**6EP1332-4BA00**
24 V DC/8A	**6EP1333-4BA00**
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet	
With insulation displacement, max. transmission rate 12 Mbps	
Without PG interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BA70-0XA0**
With PG interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BB70-0XA0**
PROFIBUS FC Standard Cable GP	**6XV1830-0EH10**
Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Robust Cable	**6XV1830-0JH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	**6XV1831-2K**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	

Ordering data	Article No.
PROFIBUS FC Trailing Cable	
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
Sheath color: Petrol	**6XV1830-3EH10**
Sheath color: Violet	**6XV1831-2L**
PROFIBUS FC Food Cable	**6XV1830-0GH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Ground Cable	**6XV1830-3FH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC FRNC Cable GP	**6XV1830-0LH10**
2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FastConnect Stripping Tool	**6GK1905-6AA00**
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
IE FC TP Standard Cable GP 2x2	**6XV1840-2AH10**
4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
IE FC TP Trailing Cable 2 x 2 (Type C)	**6XV1840-3AH10**
4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
IE FC TP Marine Cable 2 x 2 (Type B)	**6XV1840-4AH10**
4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
IE FC Stripping Tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
Display	
For CPU 1511(F)-1 PN and CPU 1513(F)-1 PN; spare part	**6ES7591-1AA01-0AA0**
For CPU 1515(F)-2 PN, CPU 1516(F)-3 PN/DP, CPU 1517(F)-3 PN/DP, CPU 1518(F)-4 PN/DP and CPU 1518(F)-4 PN/DP ODK; spare part	**6ES7591-1BA01-0AA0**
Front cover for PROFIBUS DP interface	**6ES7591-8AA00-0AA0**
For CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part	
SIMATIC S7-1500 Starter Kit	**6ES7511-1CK00-4YB5**
Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation	
STEP 7 Safety Advanced V14 SP1	
Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1	
Floating license for 1 user, software and documentation on DVD, license key on USB flash drive	**6ES7833-1FA14-0YA5**
Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery	**6ES7833-1FA14-0YH5**

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

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Ordering data	Article No.
STEP 7 Professional V14 SP1	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: English, German, Chinese, Italian, French, Spanish	
STEP 7 Professional V14 SP1, floating license	**6ES7822-1AA04-0YA5**
STEP 7 Professional V14 SP1, floating license, software download incl. license key [1]	**6ES7822-1AE04-0YA5**
Email address required for delivery	

	Article No.
SIMATIC ODK 1500S V2.0	
Open Development Kit for support in developing Windows and real-time library functions	
Package with data storage medium	**6ES7806-2CD02-0YA0**
Download incl. license key [1]	**6ES7806-2CD02-0YG0**
Email address required for delivery	
SIMATIC Target 1500S for Simulink V1.0	**6ES7823-1BE00-0YA5**
Download incl. license key [1]	
Email address required for delivery	
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	

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

Overview SIPLUS CPU 1511F-1 PN

- Entry-level CPU in the SIPLUS S7-1500F Controller product range
- Suitable for standard and fail-safe applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

Overview SIPLUS CPU 1513F-1 PN

- The CPU for standard and fail-safe applications with medium/high requirements for program/data storage in the SIPLUS S7-1500 Controller product range
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Supports PROFIsafe in centralized and distributed configurations
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

Overview SIPLUS CPU 1516F-3 PN/DP

- The CPU with a large program and data memory in the SIPLUS S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

Overview SIPLUS CPU 1518-4 PN/DP

- The CPU with a very large program and data memory in the SIPLUS S7-1500 Controller product range for fail-safe applications with highest requirements regarding program scope, performance and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849.
- Extremely high processing speed for binary and floating-point arithmetic.
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Two additional PROFINET interfaces with separate IP addresses.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the corresponding standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	**6AG1511-1FK01-2AB0**	**6AG1513-1FL01-2AB0**	**6AG1516-3FN01-2AB0**	**6AG1518-4FP00-4AB0**
Based on	**6ES7511-1FK01-0AB0**	**6ES7513-1FL01-0AB0**	**6ES7516-3FN01-0AB0**	**6ES7518-4FP00-0AB0**
	SIPLUS S7-1500 CPU 1511F-1 PN	SIPLUS S7-1500 CPU 1513F-1 PN	SIPLUS S7-1500 CPU-1516F-3 PN/DP	SIPLUS S7-1500 CPU 1518F-4 PN/DP
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

SIPLUS fail-safe CPUs

Ordering data	Article No.
CPU 1511F-1 PN (Extended temperature range and exposure to media) Fail-safe CPU, work memory 225 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	**6AG1511-1FK01-2AB0**
SIPLUS CPU 1513F-1 PN (Extended temperature range and exposure to media) Fail-safe CPU, work memory 450 KB for program, 1.5 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	**6AG1513-1FL01-2AB0**
SIPLUS CPU 1516F-3 PN/DP (Extended temperature range and exposure to media) Fail-safe CPU, work memory 1.5 MB for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	**6AG1516-3FN01-2AB0**
CPU 1518F-4 PN/DP (Exposure to media) Fail-safe CPU, work memory 6 MB for program, 20 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	**6AG1518-4FP00-4AB0**

Accessories	Article No.
Power supply (Extended temperature range and exposure to media) For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6AG1505-0KA00-7AB0**
24/48/60 V DC input voltage, power 60 W	**6AG1505-0RA00-7AB0**
24/48/60 V DC input voltage, power 60 W, buffering functionality	**6ES7505-0RB00-0AB0**
120/230 VAC input voltage, power 60 W	**6AG1507-0RA00-7AB0**
Load power supply (Extended temperature range and exposure to media)	
24 V DC/3A	**6AG1332-4BA00-7AA0**
24 V DC/8A	**6AG1333-4BA00-7AA0**
Display (Extended temperature range and exposure to media)	
For SIPLUS CPU 1511F-1 PN and CPU 1513F-1 PN; spare part	**6AG1591-1AA01-2AA0**
For SIPLUS CPU 1516F-3 PN/DP and CPU 1518-4F PN/DP; spare part	**6AG1591-1BA01-2AA0**
Other accessories	See SIMATIC S7-1500, fail-safe CPUs, page 4/44

Overview CPU 1511T-1 PN

- Entry-level CPU in the S7-1500T Controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operating the CPU.

Overview CPU 1515T-2 PN

- The CPU for applications with medium to high requirements for program/data storage in the S7-1500T Controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Overview CPU 1517T-3 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Overview CPU 1517TF-3 PN/DP

- The CPU with a very large program and data memory in the S7-1500 Controller product range for fail-safe applications with high requirements regarding program scope and networking.
- Can be used for fail-safe functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- High processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machines, special machines and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or third-party PROFINET IO controller.
- Additional PROFINET interface with separate IP address for network separation, for connecting further PROFINET IO RT devices, or for high-speed communication as an I-device
- PROFIBUS DP master interface
- OPC UA Server (Data Access) as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems
- Isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note

SIMATIC Memory Card required for operation of the CPU.

Technical specifications

Article number	**6ES7511-1TK01-0AB0**	**6ES7515-2TM01-0AB0**	**6ES7517-3TP00-0AB0**	**6ES7517-3UP00-0AB0**
	CPU 1511T-1PN, 225KB prog., 1MB data	CPU 1515T-2 PN, 750KB prog., 3MB data	CPU 1517T-3 PN/DP, 3MB prog., 8MB data	CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
General information				
Product type designation	CPU 1511T-1 PN	CPU 1515T-2 PN	CPU 1517T-3 PN/DP	CPU 1517TF-3 PN/DP
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V14	V14	V14	V14
Display				
Screen diagonal [cm]	3.45 cm	6.1 cm	6.1 cm	6.1 cm
Supply voltage				
Type of supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
Power loss				
Power loss, typ.	5.7 W	6.3 W	24 W	24 W
Memory				
Work memory				
• integrated (for program)	225 kbyte	750 kbyte	3 Mbyte	3 Mbyte
• integrated (for data)	1 Mbyte	3 Mbyte	8 Mbyte	8 Mbyte
Load memory				
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times				
for bit operations, typ.	60 ns	30 ns	2 ns	2 ns
for word operations, typ.	72 ns	36 ns	3 ns	3 ns
for fixed point arithmetic, typ.	96 ns	48 ns	3 ns	3 ns
for floating point arithmetic, typ.	384 ns	192 ns	12 ns	12 ns
Counters, timers and their retentivity				
S7 counter				
• Number	2 048	2 048	2 048	2 048
IEC counter				
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times				
• Number	2 048	2 048	2 048	2 048
IEC timer				
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity				
Flag				
• Number, max.	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area				
I/O address area				
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day				
Clock				
• Type	Hardware clock	Hardware clock	Hardware clock	Hardware clock
1. Interface				
Interface types				
• Number of ports	2	2	2	2
• integrated switch	Yes	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1	Yes; X1	Yes; X1
Functionality				
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes	Yes
• Web server	Yes	Yes	Yes	Yes
• Media redundancy	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB prog., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB prog., 3MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog., 8MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
PROFINET IO Controller				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	Yes	Yes	Yes	Yes
- MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes	Yes
- Prioritized startup	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Of which IO devices with IRT, max.	64	64	64	64
- Number of connectable IO Devices for RT, max.	128	256	512	512
- of which in line, max.	128	256	512	512
- Number of IO Devices that can be simultaneously activated/ deactivated, max.	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.	8	8	8	8
- Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT				
- for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive
- for send cycle of 500 µs	500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive	500 µs to 8 ms	500 µs to 8 ms	500 µs to 8 ms
- for send cycle of 1 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms	1 ms to 16 ms
- for send cycle of 2 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms	2 ms to 32 ms
- for send cycle of 4 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms	4 ms to 64 ms
- With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT				
- for send cycle of 250 µs	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms	250 µs to 128 ms
- for send cycle of 500 µs	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms	500 µs to 256 ms
- for send cycle of 1 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
- for send cycle of 2 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms	2 ms to 512 ms
- for send cycle of 4 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms	4 ms to 512 ms
PROFINET IO Device				
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- S7 routing	Yes	Yes	Yes	Yes
- Isochronous mode	No	No	No	No
- Open IE communication	Yes	Yes	Yes	Yes
- IRT	Yes	Yes	Yes	Yes
- MRP	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	**6ES7511-1TK01-0AB0** CPU 1511T-1PN, 225KB prog., 1MB data	**6ES7515-2TM01-0AB0** CPU 1515T-2 PN, 750KB prog., 3MB data	**6ES7517-3TP00-0AB0** CPU 1517T-3 PN/DP, 3MB prog., 8MB data	**6ES7517-3UP00-0AB0** CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
Services (continued)				
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFIenergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4	4
2. Interface				
Interface types				
• Number of ports		1	1	1
• integrated switch		No	No	No
• RJ 45 (Ethernet)		Yes; X2	Yes; X2	Yes; X2
Functionality				
• PROFINET IO Controller		Yes	Yes	Yes
• PROFINET IO Device		Yes	Yes	Yes
• SIMATIC communication		Yes	Yes	Yes
• Open IE communication		Yes	Yes	Yes
• Web server		Yes	Yes	Yes
• Media redundancy		No	No	No
PROFINET IO Controller				
Services				
- PG/OP communication		Yes	Yes	Yes
- S7 routing		Yes	Yes	Yes
- Isochronous mode		No	No	No
- Open IE communication		Yes	Yes	Yes
- IRT		No	No	No
- MRP		No	No	No
- PROFIenergy		Yes	Yes	Yes
- Prioritized startup		No	No	No
- Number of connectable IO Devices, max.		32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- Number of connectable IO Devices for RT, max.		32	128	32
- of which in line, max.		32	128	128
- Number of IO Devices that can be simultaneously activated/deactivated, max.		8; in total across all interfaces	8; in total across all interfaces	8; in total across all interfaces
- Number of IO Devices per tool, max.		8	8	8
- Updating times		The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for RT				
- for send cycle of 1 ms		1 ms to 512 ms	1 ms to 512 ms	1 ms to 512 ms
PROFINET IO Device				
Services				
- PG/OP communication		Yes	Yes	Yes
- S7 routing		Yes	Yes	Yes
- Isochronous mode		No	No	No
- Open IE communication		Yes	Yes	Yes
- IRT		No	No	No
- MRP		No	No	No
- MRPD		No	No	No
- PROFIenergy		Yes	Yes	Yes
- Prioritized startup		No	No	No
- Shared device		Yes	Yes	Yes
- Number of IO Controllers with shared device, max.		4	4	4

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Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB prog., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB prog., 3MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog., 8MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
3. Interface				
Interface types				
• Number of ports			1	1
• RS 485			Yes	Yes
Functionality				
• PROFIBUS DP master			Yes	Yes
• PROFIBUS DP slave			No	No
• SIMATIC communication			Yes	Yes
Protocols				
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes
PROFIsafe	No	No	No	Yes
PROFIBUS	No	No	Yes	Yes
Number of connections				
• Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs	192; via integrated interfaces of the CPU and connected CPs / CMs	320; via integrated interfaces of the CPU and connected CPs / CMs	320; via integrated interfaces of the CPU and connected CPs / CMs
PROFINET IO Controller				
Services				
- Number of connectable IO Devices, max.	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET			
- Of which IO devices with IRT, max.	64			
- Number of connectable IO Devices for RT, max.	128			
PROFIBUS DP master				
Services				
- Number of DP slaves			125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 625 µs	Yes; With minimum OB 6x cycle of 500 µs	Yes; With minimum OB 6x cycle of 250 µs	Yes; With minimum OB 6x cycle of 250 µs
Supported technology objects				
Motion Control	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	800	2 400	10 240	10 240
• Required Motion Control resources				
- per speed-controlled axis	40	40	40	40
- per positioning axis	80	80	80	80
- per synchronous axis	160	160	160	160
- per external encoder	80	80	80	80
- per output cam	20	20	20	20
- per cam track	160	160	160	160
- per probe	40	40	40	40
Controller				
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring				
• High-speed counter	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	**6ES7511-1TK01-0AB0** CPU 1511T-1PN, 225KB prog., 1MB data	**6ES7515-2TM01-0AB0** CPU 1515T-2 PN, 750KB prog., 3MB data	**6ES7517-3TP00-0AB0** CPU 1517T-3 PN/DP, 3MB prog., 8MB data	**6ES7517-3UP00-0AB0** CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
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
- High demand/continuous mode: PFH in accordance with SIL3				< 1.00E-09 1/h
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration				
Programming				
Programming language				
- LAD	Yes	Yes	Yes	Yes; incl. failsafe
- FBD	Yes	Yes	Yes	Yes; incl. failsafe
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
Know-how protection				
• User program protection/password protection	Yes	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes	Yes
Access protection				
• Password for display	Yes	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes	Yes
Dimensions				
Width	35 mm	70 mm	175 mm	175 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	430 g	830 g	1 978 g	1 978 g

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Ordering data	Article No.
CPU 1511T-1 PN	**6ES7511-1TK01-0AB0**
Work memory 225 KB for program, 1 MB for data, PROFINET IO IRT interface; SIMATIC Memory Card required	
CPU 1515T-2 PN	**6ES7515-2TM01-0AB0**
Work memory 750 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC Memory Card required	
CPU 1517T-3 PN/DP	**6ES7517-3TP00-0AB0**
3 MB work memory for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
CPU 1517T-3 PN/DP	**6ES7517-3UP00-0AB0**
3 MB work memory for program, 8 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC Memory Card required	
Accessories	
SIMATIC Memory Card	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP02-0AA0**
32 GB	**6ES7954-8LT03-0AA0**
SIMATIC S7-1500 DIN rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 245 mm	**6ES7590-1AC40-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**
PE connection element for DIN rail 2000 mm	**6ES7590-5AA00-0AA0**
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
24/48/60 V DC input voltage, power 60 W, buffering functionality	**6ES7505-0RB00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units	

	Article No.
Load power supply	
24 V DC/3A	**6EP1332-4BA00**
24 V DC/8A	**6EP1333-4BA00**
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet	
With insulation displacement, max. transmission rate 12 Mbps	
Without PG interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BA70-0XA0**
With PG interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BB70-0XA0**
PROFIBUS FC Standard Cable GP	**6XV1830-0EH10**
Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Robust Cable	**6XV1830-0JH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	**6XV1831-2K**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Trailing Cable	
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
Sheath color: Petrol	**6XV1830-3EH10**
Sheath color: Violet	**6XV1831-2L**
PROFIBUS FC Food Cable	**6XV1830-0GH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC Ground Cable	**6XV1830-3FH10**
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FC FRNC Cable GP	**6XV1830-0LH10**
2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	
PROFIBUS FastConnect Stripping Tool	**6GK1905-6AA00**
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	

Ordering data	Article No.
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-3AH10**
IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 Plug 180/90 with marine approval, sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1840-4AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Display	
For CPU 1511T-1 PN; spare part	**6ES7591-1AA01-0AA0**
For CPU 1515T-2 PN, CPU 1517T-3 PN/DP and CPU 1517TF-3 PN/DP; spare part	**6ES7591-1BA01-0AA0**
Front cover for PROFIBUS DP interface For CPU 1517T-3 PN/DP and CPU 1517TF-3 PN/DP; spare part	**6ES7591-8AA00-0AA0**
SIMATIC S7-1500 Starter Kit Comprising: CPU 1511C-1 PN, SIMATIC Memory Card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation	**6ES7511-1CK00-4YB5**

	Article No.
STEP 7 Professional V14 SP1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows 10 Professional Version 1607, Windows 10 Enterprise Version 1607, Windows 10 Enterprise 2016 LTSB, Windows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation), Windows Server 2016 Standard (full installation); Type of delivery: English, German, Chinese, Italian, French, Spanish	
STEP 7 Professional V14 SP1, floating license	**6ES7822-1AA04-0YA5**
STEP 7 Professional V14 SP1, floating license, software download incl. license key [1]	**6ES7822-1AE04-0YA5**
Email address required for delivery	
STEP 7 Safety Advanced V14 SP1 Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1	
Floating license for 1 user, software and documentation on DVD, license key on USB flash drive	**6ES7833-1FA14-0YA5**
Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery	**6ES7833-1FA14-0YH5**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

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

SM 521 digital input modules

Overview

- 16 and 32-channel digital input modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- 35 mm wide modules with parameters and diagnostic functions
- 25 mm wide modules for use in tight spaces: particularly economical, without parameters or diagnostic functions

Technical specifications

Article number	**6ES7521-1BH00-0AB0**	**6ES7521-1BL00-0AB0**	**6ES7521-1BH50-0AA0**	**6ES7521-1FH00-0AA0**	**6ES7521-7EH00-0AB0**
	S7-1500, DI 16X24VDC HF	S7-1500, DI 32X24VDC HF	S7-1500, DI 16X24VDC SRC BA	S7-1500, DI 16X230VAC BA	S7-1500, DI 16 X 24...125V UC HF
General information					
Product type designation	DI 16x24VDC HF	DI 32x24VDC HF	DI 16x24VDC SRC BA	DI 16x230VAC BA	DI 16x24 ... 125VUC HF
Product function					
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with					
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 / -	V13 SP1 / -	V12 / V12	V12 / V12	V13 SP1 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
Operating mode					
• DI	Yes	Yes	Yes	Yes	Yes
• Counter	Yes	Yes	No	No	No
• Oversampling	No				No
• MSI	Yes	Yes	Yes	Yes	Yes
Supply voltage					
Type of supply voltage	DC	DC	DC		
Rated value (DC)	24 V	24 V			
Reverse polarity protection	Yes	Yes			
Digital inputs					
Number of digital inputs	16	32	16	16	16
Digital inputs, parameterizable	Yes	Yes	No	No	Yes
Source/sink input	P-reading	P-reading	m-reading	P-reading	Yes
Input characteristic curve in accordance with IEC 61131, type 1				Yes	
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes		Yes; at 24 V DC
Digital input functions, parameterizable					
• Gate start/stop	Yes	Yes			
• Freely usable digital input	Yes	Yes			
• Counter					
- Number, max.	2	2			
- Counting frequency, max.	1 kHz	1 kHz			
- Counting width	32 bit	32 bit			
- Counting direction up/down	Up	Up			

Technical specifications (continued)

Article number	**6ES7521-1BH00-0AB0** S7-1500, DI 16X24VDC HF	**6ES7521-1BL00-0AB0** S7-1500, DI 32X24VDC HF	**6ES7521-1BH50-0AA0** S7-1500, DI 16X24VDC SRC BA	**6ES7521-1FH00-0AA0** S7-1500, DI 16X230VAC BA	**6ES7521-7EH00-0AB0** S7-1500, DI 16 X 24...125V UC HF
Input voltage					
• Type of input voltage	DC	DC	DC	AC	AC/DC
• Rated value (DC)	24 V	24 V	24 V		24 V; 48 V, 125 V
• Rated value (AC)				230 V; 120/230V AC, 50/60 Hz	24 V; 48 V, 125 V (50 - 60 Hz)
• for signal "0"	-30 to +5V	-30 to +5V	-5 to +30V	0V AC to 40V AC	-5 ... +5 V
• for signal "1"	+11 to +30V	+11 to +30V	-11 to -30V	79V AC to 264V AC	+11 V DC to +146 V DC
Input current					
• for signal "1", typ.	2.5 mA	2.5 mA	4.5 mA	11 mA; At 230 V AC and 5.5 mA at 120 V AC	3 mA; at 24 V DC
Input delay (for rated value of input voltage)					
for standard inputs					
- parameterizable	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms	No	No	Yes; 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms parameterizable with DC, 20 ms fixed with AC
for interrupt inputs					
- parameterizable	Yes	Yes	No	No	Yes
for counter/technological functions					
- parameterizable	Yes	Yes	No	No	No
Cable length					
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m	1 000 m
• unshielded, max.	600 m	600 m	600 m	600 m	600 m
Encoder					
Connectable encoders					
• 2-wire sensor	Yes	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.5 mA	2 mA	1.5 mA
Isochronous mode					
Isochronous operation (application synchronized up to terminal)	Yes	Yes	No	No	No
Filtering and processing time (TCI), min.	80 µs; At 50 µs filter time	80 µs; At 50 µs filter time			
Bus cycle time (TDP), min.	250 µs	250 µs			
Interrupts/diagnostics/ status information					
Diagnostics function	Yes	Yes	No	No	Yes
Alarms					
• Diagnostic alarm	Yes	Yes	No	No	Yes
• Hardware interrupt	Yes	Yes	No	No	Yes
Diagnostic messages					
• Monitoring the supply voltage	Yes	Yes	No	No	No
• Wire-break	Yes; to I < 350 µA	Yes; to I < 350 µA	No	No	Yes; To I < 550 µA
• Short-circuit	No	No	No	No	No
Diagnostics indication LED					
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	No	No	No
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	No	No	Yes; Red LED
• for module diagnostics	Yes; Red LED	Yes; Red LED	No	Yes; Red LED	Yes; Red LED
Potential separation					
Potential separation channels					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	3 100 V DC	2 000 V DC

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Technical specifications (continued)

Article number	6ES7521-1BH00-0AB0 S7-1500, DI 16X24VDC HF	6ES7521-1BL00-0AB0 S7-1500, DI 32X24VDC HF	6ES7521-1BH50-0AA0 S7-1500, DI 16X24VDC SRC BA	6ES7521-1FH00-0AA0 S7-1500, DI 16X230VAC BA	6ES7521-7EH00-0AB0 S7-1500, DI 16 X 24...125V UC HF
Standards, approvals, certificates					
Suitable for safety functions	No	No	No	No	No
Ambient conditions					
Ambient temperature during operation					
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C	40 °C	40 °C
Decentralized operation					
Prioritized startup	Yes	Yes	Yes	Yes	Yes
Dimensions					
Width	35 mm	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm	129 mm
Weights					
Weight, approx.	240 g	260 g	230 g	300 g	240 g

Article number	6ES7521-1BH10-0AA0 S7-1500, DI 16X24VDC BA	6ES7521-1BL10-0AA0 S7-1500, DI 32X24VDC BA
General information		
Product type designation	DI 16 x 24 V DC BA	DI 32x24VDC BA
Product function		
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with		
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -
Operating mode		
• DI	Yes	Yes
• Counter	No	No
• MSI	Yes	Yes
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Digital inputs		
Number of digital inputs	16	32
Digital inputs, parameterizable	No	No
Source/sink input	P-reading	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes
Input voltage		
• Type of input voltage	DC	DC
• Rated value (DC)	24 V	24 V
• for signal "0"	-30 to +5V	-30 to +5V
• for signal "1"	+11 to +30V	+11 to +30V
Input current		
• for signal "1", typ.	2.7 mA	2.7 mA
Input delay (for rated value of input voltage)		
for standard inputs		
- parameterizable	No	No
for interrupt inputs		
- parameterizable	No	No
for counter/technological functions		
- parameterizable	No	No

Technical specifications (continued)

Article number	**6ES7521-1BH10-0AA0** S7-1500, DI 16X24VDC BA	**6ES7521-1BL10-0AA0** S7-1500, DI 32X24VDC BA
Cable length		
• shielded, max.	1 000 m	1 000 m
• unshielded, max.	600 m	600 m
Encoder		
Connectable encoders		
• 2-wire sensor	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	No
Interrupts/diagnostics/ status information		
Diagnostics function	No	No
Alarms		
• Diagnostic alarm	No	No
• Hardware interrupt	No	No
Diagnostic messages		
• Monitoring the supply voltage	No	No
• Wire-break	No	No
• Short-circuit	No	No
Diagnostics indication LED		
• RUN LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	No	No
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No
• for module diagnostics	No	No
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates		
Suitable for safety functions	No	No
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C
Decentralized operation		
Prioritized startup	Yes	Yes
Dimensions		
Width	25 mm	25 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	230 g	260 g
Other		
Note:	Supplied incl. 40-pole push-in front connectors	Supplied incl. 40-pole push-in front connectors

SM 521 digital input modules

Ordering data	Article No.
SM 521 digital input modules	
Module width 35 mm	
16 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts	**6ES7521-1BH00-0AB0**
32 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts	**6ES7521-1BL00-0AB0**
16 inputs, 24 V DC, isolated, input delay 3.2 ms	**6ES7521-1BH50-0AA0**
16 inputs, 230 V AC, isolated, input delay 20 ms	**6ES7521-1FH00-0AA0**
16 inputs, 24 ... 125 V UC, input delay 0.05 ... 20 ms, parameterizable diagnostics and hardware interrupts	**6ES7521-7EH00-0AB0**
Module width 25 mm; front connector (push-in) included in delivery package	
16 inputs, 24 V DC, isolated	**6ES7521-1BH10-0AA0**
32 inputs, 24 V DC, isolated	**6ES7521-1BL10-0AA0**
Accessories	
Front connectors	
For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
Potential bridges for front connectors	**6ES7592-3AA00-0AA0**
For 35 mm modules; 20 pieces; spare part	

Ordering data	Article No.
DIN A4 labeling sheets	
For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-2AX00-0AA0**
For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-1AX00-0AA0**
U connector	**6ES7590-0AA00-0AA0**
5 units; spare part	
Universal front door for I/O modules	
For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**
For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-0AA0**
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	

Overview

- 8, 16 and 32-channel digital output modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- 35 mm wide modules with parameters and diagnostic functions
- 25 mm wide modules for use in tight spaces: particularly economical, without parameters or diagnostic functions

Technical specifications

Article number	**6ES7522-1BH01-0AB0** S7-1500, DQ 16X24V DC/ 0.5A HF	**6ES7522-1BL01-0AB0** S7-1500, DQ 32X24VDC/ 0.5A HF	**6ES7522-1BF00-0AB0** S7-1500, DQ 8X24VDC/2A HF	**6ES7522-5EH00-0AB0** S7-1500, DQ 16X24...48VUC/125VDC/ 0.5A ST
General information				
Product type designation	DQ 16x24VDC/0.5A HF	DQ 32x24VDC/0.5A HF	DQ 8x24VDC/2A HF	DQ 16x24 ... 48VUC/ 125VDC/0.5A ST
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 / -	V13 SP1 / -	V13 SP1 / -	V13 SP1 / -
• STEP 7 configurable/integrated as of version			V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
Operating mode				
• DQ	Yes	Yes	Yes	Yes
• DQ with energy-saving function	No	No	Yes; with an application	No
• PWM	No	No	Yes	No
• Oversampling	No	No	No	No
• MSO	Yes	Yes	Yes	Yes
Supply voltage				
Type of supply voltage	DC	DC	DC	
Rated value (DC)	24 V	24 V	24 V	
Reverse polarity protection	Yes; through internal protection with 7 A per group	Yes; through internal protection with 7 A per group	Yes; through internal protection with 10 A per group	
Digital outputs				
Type of digital output	Transistor	Transistor	Transistor	Transistor
Number of digital outputs	16	32	8	16
Current-sinking				Yes
Current-sourcing	Yes	Yes	Yes	Yes
Digital outputs, parameterizable	Yes	Yes	Yes	Yes
Short-circuit protection	Yes; Clocked electronically	Yes; Clocked electronically	Yes	
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)	-17 V	200 V (suppressor diode)
Controlling a digital input	Yes	Yes	Yes	Yes
Digital output functions, parameterizable				
• Freely usable digital output			Yes	
• PWM output			Yes	
- Number, max.			2	
- Cycle duration, parameterizable			Yes; 2 ... 100 ms continuous	

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Technical specifications (continued)

Article number	6ES7522-1BH01-0AB0 S7-1500, DQ 16X24V DC/ 0.5A HF	6ES7522-1BL01-0AB0 S7-1500, DQ 32X24VDC/ 0.5A HF	6ES7522-1BF00-0AB0 S7-1500, DQ 8X24VDC/2A HF	6ES7522-5EH00-0AB0 S7-1500, DQ 16X24...48VUC/125VDC/ 0.5A ST
Switching capacity of the outputs				
• with resistive load, max.	0.5 A	0.5 A		0.5 A
• on lamp load, max.	5 W	5 W	10 W	40 W; At 125 V DC, 10 W at 48 V UC, 5 W at 24 V UC
Load resistance range				
• lower limit	48 Ω	48 Ω	12 Ω	
• upper limit	12 kΩ	12 kΩ	4 kΩ	
Output voltage				
• Type of output voltage	DC	DC	DC	UC
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-1.0 V)
Output current				
• for signal "1" rated value	0.5 A	0.5 A	2 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	
Output delay with resistive load				
• "0" to "1", typ.			80 µs	
• "0" to "1", max.	100 µs	100 µs	100 µs	5 ms
• "1" to "0", typ.			300 µs	
• "1" to "0", max.	500 µs	500 µs	500 µs	5 ms
Parallel switching of two outputs				
• for logic links	Yes	Yes	Yes	Yes
• for uprating	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz; With PWM operation: 500 Hz	25 Hz
• with inductive load, max.	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz; According to IEC 60947-5-1, DC-13; max. 500 Hz with PWM operation only with external circuit; see additional description in the manual	0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz
Total current of the outputs				
• Current per channel, max.	0.5 A; see additional description in the manual	0.5 A; see additional description in the manual	2 A; see additional description in the manual	0.5 A
• Current per group, max.	4 A; see additional description in the manual	4 A; see additional description in the manual	8 A; see additional description in the manual	0.5 A
• Current per module, max.	8 A; see additional description in the manual	16 A; see additional description in the manual	16 A; see additional description in the manual	8 A
Cable length				
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m
• unshielded, max.	600 m	600 m	600 m	600 m
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes	Yes	No	No
Execution and activation time (TCO), min.	70 µs	70 µs		
Bus cycle time (TDP), min.	250 µs	250 µs		
Interrupts/diagnostics/status information				
Diagnostics function	Yes	Yes	Yes	No
Substitute values connectable	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	No
Diagnostic messages				
• Monitoring the supply voltage	Yes	Yes	Yes	No
• Wire-break	Yes	Yes	No	No
• Short-circuit	Yes	Yes	Yes	No
• Group error	Yes	Yes	Yes	

Technical specifications (continued)

Article number	6ES7522-1BH01-0AB0	6ES7522-1BL01-0AB0	6ES7522-1BF00-0AB0	6ES7522-5EH00-0AB0
	S7-1500, DQ 16X24V DC/ 0.5A HF	S7-1500, DQ 32X24VDC/ 0.5A HF	S7-1500, DQ 8X24VDC/2A HF	S7-1500, DQ 16X24...48VUC/125VDC/ 0.5A ST
Diagnostics indication LED				
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	Yes; Green LED	No
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	No
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	2 000 V DC
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C			0 °C
• horizontal installation, max.	60 °C			60 °C
• vertical installation, min.	0 °C			0 °C
• vertical installation, max.	60 °C			40 °C
Decentralized operation				
Prioritized startup	Yes	Yes	Yes	Yes
Dimensions				
Width	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	230 g	280 g	240 g	230 g

Article number	6ES7522-5HF00-0AB0	6ES7522-5HH00-0AB0	6ES7522-5FF00-0AB0	6ES7522-5FH00-0AB0
	S7-1500, DQ 8X230VAC/5A ST (RELAY)	S7-1500, DQ 16X230VAC/2A ST (RELAY)	S7-1500, DQ 8X230VAC/2A ST (TRIAC)	S7-1500, DQ 16X230VAC/1A ST (TRIAC)
General information				
Product type designation	DQ 8x230 V AC/5 A ST (relay)	DQ 16x230VAC/2A ST (relay)	DQ 8x230 V AC/2A ST (triac)	DQ 16x230VAC/1A ST (Triac)
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V12 / V12	V13 SP1 / -	V12 / V12	V13 SP1 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
Operating mode				
• DQ	Yes	Yes	Yes	Yes
• DQ with energy-saving function	No	No	No	No
• PWM	No	No	No	No
• Oversampling	No	No	No	No
• MSO	Yes	Yes	Yes	Yes
Supply voltage				
Type of supply voltage	DC	DC		
Rated value (DC)	24 V	24 V		
Reverse polarity protection	Yes	Yes		

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Technical specifications (continued)

Article number	6ES7522-5HF00-0AB0	6ES7522-5HH00-0AB0	6ES7522-5FF00-0AB0	6ES7522-5FH00-0AB0
	S7-1500, DQ 8X230VAC/5A ST (RELAY)	S7-1500, DQ 16X230VAC/2A ST (RELAY)	S7-1500, DQ 8X230VAC/2A ST (TRIAC)	S7-1500, DQ 16X230VAC/1A ST (TRIAC)
Digital outputs				
Type of digital output	Relays	Relays	Triac	Triac
Number of digital outputs	8	16	8	16
Current-sinking	Yes	Yes		Yes
Current-sourcing	Yes	Yes	Yes	Yes
Digital outputs, parameterizable	Yes	Yes	Yes	Yes
Short-circuit protection	No	No	No	No
Controlling a digital input	possible	Yes		
Switching capacity of the outputs				
• with resistive load, max.			2 A	1 A
• on lamp load, max.	1 500 W; 10 000 operating cycles	50 W (230 V AC), 5 W (24 V DC)	50 W	50 W
• Low energy/fluorescent lamps with electronic control gear	10x 58 W (25 000 operating cycles)			
• Fluorescent tubes, conventionally compensated	1x 58 W (25 000 operating cycles)			
• Fluorescent tubes, uncompensated	10x 58 W (25 000 operating cycles)			
Output voltage				
• Type of output voltage			AC	AC
• for signal "1", min.			L1 (-1.5 V) at maximum output current; L1 (-8.5 V) at minimum output current	L1 (-1.5 V) at maximum output current; L1 (-8.5 V) at minimum output current
Output current				
• for signal "1" rated value	5 A	2 A	2 A	1 A
• for signal "0" residual current, max.	0 A	0 A	2 mA	2 mA
Output delay with resistive load				
• "0" to "1", max.			1 AC cycle	1 AC cycle
• "1" to "0", max.			1 AC cycle	1 AC cycle
Parallel switching of two outputs				
• for logic links	Yes	Yes	No	No
• for uprating	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes
Switching frequency				
• with resistive load, max.	2 Hz	1 Hz	10 Hz	10 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	2 Hz	1 Hz	1 Hz	1 Hz
Total current of the outputs				
• Current per channel, max.	8 A; see additional description in the manual	2 A; see additional description in the manual	2 A; see additional description in the manual	1 A; see additional description in the manual
• Current per group, max.	8 A; see additional description in the manual	2 A; see additional description in the manual	2 A; see additional description in the manual	2 A; see additional description in the manual
• Current per module, max.	64 A; see additional description in the manual	32 A; see additional description in the manual	10 A; see additional description in the manual	10 A; see additional description in the manual
Relay outputs				
• Number of relay outputs	8	16		
• Rated supply voltage of relay coil L+ (DC)	24 V	24 V		
• Current consumption of relays (coil current of all relays), typ.	80 mA	150 mA		
• external protection for relay outputs	With miniature circuit breaker with characteristic B for: cos φ 1.0: 600 A cos φ 0.5 ... 0.7: 900 A with 8 A Diazed fuse: 1000 A	Miniature circuit breaker B10 / B16		

Technical specifications (continued)

Article number	6ES7522-5HF00-0AB0	6ES7522-5HH00-0AB0	6ES7522-5FF00-0AB0	6ES7522-5FH00-0AB0
	S7-1500, DQ 8X230VAC/5A ST (RELAY)	S7-1500, DQ 16X230VAC/2A ST (RELAY)	S7-1500, DQ 8X230VAC/2A ST (TRIAC)	S7-1500, DQ 16X230VAC/1A ST (TRIAC)
Relay outputs (continued)				
• Contact connection (internal)	No	No		
• Size of motor starters according to NEMA, max.	5	5		
• Number of operating cycles, max.	4 000 000; see additional description in the manual	see additional description in the manual		
• Relay approved acc. to UL 508	Yes; 250 V AC/5 A g.p.; 120 V AC TV-4 tungsten; A300, R300	No		
Switching capacity of contacts				
- with inductive load, max.	see additional description in the manual	2 A; see additional description in the manual		
- with resistive load, max.	see additional description in the manual	2 A; see additional description in the manual		
Triac outputs				
• Size of motor starters according to NEMA, max.			5	4
Cable length				
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m
• unshielded, max.	600 m	600 m	600 m	600 m
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	No	No
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	No	No
Substitute values connectable	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	No	No
Diagnostic messages				
• Monitoring the supply voltage	Yes	Yes	No	No
• Wire-break	No	No	No	No
• Short-circuit	No	No	No	No
Diagnostics indication LED				
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	No	No
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No	No	No
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	Between channels: 3 100 V DC; between channels backplane bus: 3 100 V DC; between L+ and backplane bus: 707 V DC (type test)	Between channels: 3 100 V DC; between channels backplane bus: 3 100 V DC; between L+ and backplane bus: 707 V DC (type test)	3 100 V DC	3 100 V DC
Standards, approvals, certificates				
Suitable for safety functions	No	No	No	No
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C	60 °C

Technical specifications (continued)

Article number	6ES7522-5HF00-0AB0 S7-1500, DQ 8X230VAC/5A ST (RELAY)	6ES7522-5HH00-0AB0 S7-1500, DQ 16X230VAC/2A ST (RELAY)	6ES7522-5FF00-0AB0 S7-1500, DQ 8X230VAC/2A ST (TRIAC)	6ES7522-5FH00-0AB0 S7-1500, DQ 16X230VAC/1A ST (TRIAC)
Decentralized operation				
Prioritized startup	Yes	Yes	Yes	Yes
Dimensions				
Width	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	350 g	350 g	290 g	310 g

Article number	6ES7522-1BH10-0AA0 S7-1500, DQ 16X24VDC/0.5A BA	6ES7522-1BL10-0AA0 S7-1500, DQ 32X24VDC/0.5A BA
General information		
Product type designation	DQ 16x24VDC/0.5A BA	DQ 32x24VDC/0.5A BA
Product function		
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with		
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -
Operating mode		
• DQ	Yes	Yes
• DQ with energy-saving function	No	No
• PWM	No	No
• Oversampling	No	No
• MSO	Yes	Yes
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes; through internal protection with 7 A per group	Yes; through internal protection with 7 A per group
Digital outputs		
Type of digital output	Transistor	Transistor
Number of digital outputs	16	32
Current-sourcing	Yes	Yes
Digital outputs, parameterizable	No	No
Short-circuit protection	Yes	Yes
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)
Controlling a digital input	Yes	Yes
Switching capacity of the outputs		
• with resistive load, max.	0.5 A	0.5 A
• on lamp load, max.	5 W	5 W
Load resistance range		
• lower limit	48 Ω	48 Ω
• upper limit	12 kΩ	12 kΩ
Output voltage		
• Type of output voltage	DC	DC
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)

Technical specifications (continued)

Article number	**6ES7522-1BH10-0AA0** S7-1500, DQ 16X24VDC/0.5A BA	**6ES7522-1BL10-0AA0** S7-1500, DQ 32X24VDC/0.5A BA
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Output delay with resistive load		
• "0" to "1", max.	100 µs	100 µs
• "1" to "0", max.	500 µs	500 µs
Parallel switching of two outputs		
• for logic links	Yes	Yes
• for uprating	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz; According to IEC 60947-5-1, DC-13	0.5 Hz; According to IEC 60947-5-1, DC-13
• on lamp load, max.	10 Hz	10 Hz
Total current of the outputs		
• Current per channel, max.	0.5 A; see additional description in the manual	0.5 A; see additional description in the manual
• Current per group, max.	4 A; see additional description in the manual	4 A; see additional description in the manual
• Current per module, max.	8 A; see additional description in the manual	16 A; see additional description in the manual
Cable length		
• shielded, max.	1 000 m	1 000 m
• unshielded, max.	600 m	600 m
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	No
Interrupts/diagnostics/ status information		
Diagnostics function	No	No
Substitute values connectable	No	No
Alarms		
• Diagnostic alarm	No	No
Diagnostic messages		
• Monitoring the supply voltage	No	No
• Wire-break	No	No
• Short-circuit	No	No
• Group error	No	No
Diagnostics indication LED		
• RUN LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	No	No
• for module diagnostics	No	No
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	707 V DC (type test)	707 V DC (type test)
Standards, approvals, certificates		
Suitable for safety functions	No	No
Decentralized operation		
Prioritized startup	Yes	Yes

SM 522 digital output modules

Technical specifications (continued)

Article number	6ES7522-1BH10-0AA0	6ES7522-1BL10-0AA0
	S7-1500, DQ 16X24VDC/0.5A BA	S7-1500, DQ 32X24VDC/0.5A BA
Dimensions		
Width	25 mm	25 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	230 g	280 g
Other		
Note:	Supplied incl. 40-pole push-in front connectors	Supplied incl. 40-pole push-in front connectors

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Ordering data

	Article No.
SM 522 digital output modules	
Module width 35 mm	
8 outputs, 24 V DC; 2 A, isolated	**6ES7522-1BF00-0AB0**
16 outputs, 24 V DC; 0.5 A, isolated	**6ES7522-1BH01-0AB0**
32 outputs, 24 V DC; 0.5 A, isolated	**6ES7522-1BL01-0AB0**
8 relay outputs, 230 V AC, 5 A	**6ES7522-5HF00-0AB0**
16 relay outputs, 230 V AC, 2 A	**6ES7522-5HH00-0AB0**
8 outputs (triac), 230 V AC, 2 A	**6ES7522-5FF00-0AB0**
16 outputs (triac), 230 V AC, 1 A	**6ES7522-5FH00-0AB0**
16 outputs, 24 ... 48 V UC, 125 V DC, 0.5 A, isolated	**6ES7522-5EH00-0AB0**
Module width 25 mm; front connector (push-in) included in delivery package	
16 outputs, 24 V DC; 0.5 A, isolated	**6ES7522-1BH10-0AA0**
32 outputs, 24 V DC; 0.5 A, isolated	**6ES7522-1BL10-0AA0**
Accessories	
Front connectors	
For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
Potential bridges for front connectors	**6ES7592-3AA00-0AA0**
For 35 mm modules; 20 pieces; spare part	

	Article No.
DIN A4 labeling sheets	
For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-2AX00-0AA0**
For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-1AX00-0AA0**
U connector	**6ES7590-0AA00-0AA0**
5 units; spare part	
Universal front door for I/O modules	
For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**
For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-0AA0**
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	

Overview

- 16 digital inputs and 16 digital outputs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- For use in the tightest spaces: particularly economical, without parameters or diagnostic functions

Technical specifications

Article number	**6ES7523-1BL00-0AA0** S7-1500, DI/DQ 16X24CDV/ 16X24VDC/0.5A BA
General information	
Product type designation	DI 16x24VDC / DQ16x24VDC/0.5A BA
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -
Operating mode	
• DI	Yes
• Counter	No
• DQ	Yes
• DQ with energy-saving function	No
• PWM	No
• Oversampling	No
• MSI	Yes
• MSO	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes; through internal protection with 7 A per group
Digital inputs	
Number of digital inputs	16
Digital inputs, parameterizable	No
Source/sink input	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
Input current	
• for signal "1", typ.	2.7 mA

Article number	**6ES7523-1BL00-0AA0** S7-1500, DI/DQ 16X24CDV/ 16X24VDC/0.5A BA
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	No
for interrupt inputs	
- parameterizable	No
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	16
Current-sourcing	Yes
Digital outputs, parameterizable	No
Short-circuit protection	Yes
Limitation of inductive shutdown voltage to	L+ (-53 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	100 µs
• "1" to "0", max.	500 µs
Parallel switching of two outputs	
• for logic links	Yes
• for uprating	No
• for redundant control of a load	Yes

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Technical specifications (continued)

Article number	6ES7523-1BL00-0AA0 S7-1500, DI/DQ 16X24CDV/ 16X24VDC/0.5A BA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	0.5 A; see additional description in the manual
• Current per group, max.	4 A; see additional description in the manual
• Current per module, max.	8 A; see additional description in the manual
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/ status information	
Diagnostics function	No
Substitute values connectable	No
Alarms	
• Diagnostic alarm	No
• Hardware interrupt	No
Diagnostic messages	
• Monitoring the supply voltage	No
• Wire-break	No
• Short-circuit	No
• Group error	No

Article number	6ES7523-1BL00-0AA0 S7-1500, DI/DQ 16X24CDV/ 16X24VDC/0.5A BA
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	No
• for module diagnostics	No
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
Decentralized operation	
Prioritized startup	Yes
Dimensions	
Width	25 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	280 g
Other	
Note:	Supplied incl. 40-pole push-in front connectors

Ordering data

	Article No.
SM 523 digital input/output module Module width 25 mm; front connector (push-in) included in delivery package 16 inputs, 24 V DC, isolated; 16 outputs, 24 V DC; 0.5 A, isolated	**6ES7523-1BL00-0AA0**
Accessories	
Front connectors For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
DIN A4 labeling sheets For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, AI gray	**6ES7592-1AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**

	Article No.
Universal front door for I/O modules For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-0AA0**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

Overview

- 16 and 32-channel digital input modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	**6AG1521-1BH00-7AB0**	**6AG1521-1BL00-7AB0**	**6AG1521-1BH50-7AA0**	**6AG1521-1FH00-7AA0**
Based on	**6ES7521-1BH00-0AB0**	**6ES7521-1BL00-0AB0**	**6ES7521-1BH50-0AA0**	**6ES7521-1FH00-0AA0**
	SIPLUS S7-1500 DI 16X24VDC HF	SIPLUS S7-1500 DI 32X24VDC HF	SIPLUS S7-1500 DI 16X24VDC SRC BA	SIPLUS S7-1500 DI 16X230VAC BA
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• horizontal installation, max.	70 °C; = Tmax	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 16	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 8	70 °C; = Tmax; > +60 °C number of simultaneously controllable inputs max. 8
• vertical installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax	40 °C; = Tmax	40 °C; = Tmax
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

SIPLUS SM 521 digital input modules

Ordering data	Article No.
SIPLUS SM 521 digital input modules	
(Extended temperature range and exposure to media)	
16 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts	**6AG1521-1BH00-7AB0**
32 inputs, 24 V DC, isolated, parameterizable diagnostics and hardware interrupts	**6AG1521-1BL00-7AB0**
16 inputs, 24 V DC, isolated, input delay 3.2 ms	**6AG1521-1BH50-7AA0**
16 inputs, 230 V AC, isolated, input delay 20 ms	**6AG1521-1FH00-7AA0**

	Article No.
Accessories	See SIMATIC S7-1500 SM 521 digital input modules, page 4/64

Overview

- 8, 16 and 32-channel digital output modules
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information has been added.

Technical specifications

Article number	**6AG1522-1BF00-7AB0**	**6AG1522-1BH01-7AB0**	**6AG1522-1BL01-7AB0**	**6AG1522-5HF00-2AB0**	**6AG1522-5FF00-7AB0**
Based on	**6ES7522-1BF00-0AB0**	**6ES7522-1BH01-0AB0**	**6ES7522-1BL01-0AB0**	**6ES7522-5HF00-0AB0**	**6ES7522-5FF00-0AB0**
	SIPLUS S7-1500 DQ 8X24VDC/2A HF	SIPLUS S7-1500 DQ 16X24VDC/0.5A HF	SIPLUS S7-1500 DQ 32X24VDC/0.5A HF	SIPLUS S7-1500 DQ 8X230VAC/5A ST (RELAY)	SIPLUS S7-1500 DQ 8X230VAC/2A ST (TRIAC)
Ambient conditions					
Ambient temperature during operation					
• horizontal installation, min.	-40 °C; = Tmin	-40 °C; = Tmin	-40 °C; = Tmin	-25 °C; = Tmin	-40 °C; = Tmin
• horizontal installation, max.	70 °C; = Tmax; > +60 °C Number of simultaneously controllable outputs max. 8x 0.5 A, max. total current per group 2 A	70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. aggregate current 2 A per group	70 °C; = Tmax; see Derating BasedOn (e.g. manual), additionally Tmax > 60 °C max. aggregate current 2 A per group	60 °C; = Tmax	70 °C; = Tmax; > +60 °C number of simultaneously controllable outputs max. 8x 0.25 A, max. total current 2 A
• vertical installation, min.	-40 °C; = Tmin			-25 °C; = Tmin	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax			40 °C; = Tmax	40 °C; = Tmax
Extended ambient conditions					
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m)
Relative humidity					
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

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Technical specifications (continued)

Article number	6AG1522-1BF00-7AB0	6AG1522-1BH01-7AB0	6AG1522-1BL01-7AB0	6AG1522-5HF00-2AB0	6AG1522-5FF00-7AB0
Based on	6ES7522-1BF00-0AB0	6ES7522-1BH01-0AB0	6ES7522-1BL01-0AB0	6ES7522-5HF00-0AB0	6ES7522-5FF00-0AB0
	SIPLUS S7-1500 DQ 8X24VDC/2A HF	SIPLUS S7-1500 DQ 16X24VDC/0.5A HF	SIPLUS S7-1500 DQ 32X24VDC/0.5A HF	SIPLUS S7-1500 DQ 8X230VAC/5A ST (RELAY)	SIPLUS S7-1500 DQ 8X230VAC/2A ST (TRIAC)
Resistance					
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

	Article No.
SIPLUS SM 522 digital output modules	
(Extended temperature range and exposure to media)	
8 outputs, 24 V DC; 2 A, isolated	**6AG1522-1BF00-7AB0**
16 outputs, 24 V DC; 0.5 A, isolated	**6AG1522-1BH01-7AB0**
32 outputs, 24 V DC; 0.5 A, isolated	**6AG1522-1BL01-7AB0**
8 relay outputs, 230 V AC, 5 A	**6AG1522-5HF00-2AB0**
8 outputs (triac), 230 V AC, 2 A	**6AG1522-5FF00-7AB0**

	Article No.
Accessories	See SIMATIC S7-1500 SM 522 digital output modules, page 4/72

Overview

- 4 or 8-channel analog input modules
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

Technical specifications

Article number	**6ES7531-7QD00-0AB0** S7-1500, AI 4XU/I/RTD/TC ST	**6ES7531-7KF00-0AB0** S7-1500, AI 8XU/I/RTD/TC ST	**6ES7531-7NF10-0AB0** S7-1500, AI 8XU/I HS	**6ES7531-7NF00-0AB0** S7-1500, AI 8XU/I HF
General information				
Product type designation	AI 4xU/I/RTD/TC ST	AI 8xU/I/RTD/TC ST	AI 8xU/I HS	AI 8xU/I HF
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
• Measuring range scalable	No	No	No	No
• Scalable measured values	No	No	No	Yes
• Adjustment of measuring range	No	No	No	Yes
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13.0.2	V12 / V12	V14 / -	V14 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
Operating mode				
• Oversampling	No	No	Yes	No
• MSI	Yes	Yes	Yes	Yes
CiR – Configuration in RUN				
Reparameterization possible in RUN	Yes	Yes	Yes	Yes
Calibration possible in RUN	Yes	Yes	Yes	Yes
Supply voltage				
Type of supply voltage	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	**6ES7531-7QD00-0AB0** S7-1500, AI 4XU/I/RTD/TC ST	**6ES7531-7KF00-0AB0** S7-1500, AI 8XU/I/RTD/TC ST	**6ES7531-7NF10-0AB0** S7-1500, AI 8XU/I HS	**6ES7531-7NF00-0AB0** S7-1500, AI 8XU/I HF
Analog inputs				
Number of analog inputs	4	8	8	8
• For current measurement	4	8	8	8
• For voltage measurement	4	8	8	8
• For resistance/resistance thermometer measurement	2	4		
• For thermocouple measurement	4	8		
permissible input voltage for voltage input (destruction limit), max.	28.8 V	28.8 V	28.8 V	28.8 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA	40 mA	40 mA
Technical unit for temperature measurement adjustable	Yes; °C/°F/K	Yes; °C/°F/K		
Analog input with oversampling	No			
Standardization of measured values	No			
Input ranges (rated values), voltages				
• 0 to +5 V	No	No	No	No
• 0 to +10 V	No	No	No	No
• 1 V to 5 V	Yes	Yes	Yes	Yes
• -1 V to +1 V	Yes	Yes		
• -10 V to +10 V	Yes	Yes	Yes	Yes
• -2.5 V to +2.5 V	Yes	Yes	No	Yes
• -25 mV to +25 mV	No	No	No	No
• -250 mV to +250 mV	Yes	Yes	No	No
• -5 V to +5 V	Yes	Yes	Yes	Yes
• -50 mV to +50 mV	Yes	Yes	No	No
• -500 mV to +500 mV	Yes	Yes	No	No
• -80 mV to +80 mV	Yes	Yes	No	No
Input ranges (rated values), currents				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -20 mA to +20 mA	Yes	Yes	Yes	Yes
• 4 mA to 20 mA	Yes	Yes	Yes	Yes
Input ranges (rated values), thermocouples				
• Type B	Yes	Yes	No	No
• Type C	No	No	No	No
• Type E	Yes	Yes	No	No
• Type J	Yes	Yes	No	No
• Type K	Yes	Yes	No	No
• Type L	No	No	No	No
• Type N	Yes	Yes	No	No
• Type R	Yes	Yes	No	No
• Type S	Yes	Yes	No	No
• Type T	Yes	Yes	No	No
• Type U	No			
• Type TXK/TXK(L) to GOST	No	No	No	No

Technical specifications (continued)

Article number	**6ES7531-7QD00-0AB0** S7-1500, AI 4XU/I/RTD/TC ST	**6ES7531-7KF00-0AB0** S7-1500, AI 8XU/I/RTD/TC ST	**6ES7531-7NF10-0AB0** S7-1500, AI 8XU/I HS	**6ES7531-7NF00-0AB0** S7-1500, AI 8XU/I HF
Input ranges (rated values), resistance thermometer				
• Cu 10	No	No	No	No
• Cu 10 according to GOST	No	No	No	No
• Cu 50	No	No	No	No
• Cu 50 according to GOST	No	No	No	No
• Cu 100	No	No	No	No
• Cu 100 according to GOST	No	No	No	No
• Ni 10	No	No	No	No
• Ni 10 according to GOST	No	No	No	No
• Ni 100	Yes; Standard/climate	Yes; Standard/climate	No	No
• Ni 100 according to GOST	No	No	No	No
• Ni 1000	Yes; Standard/climate	Yes; Standard/climate	No	No
• Ni 1000 according to GOST	No	No	No	No
• LG-Ni 1000	Yes; Standard/climate	Yes; Standard/climate	No	No
• Ni 120	No	No	No	No
• Ni 120 according to GOST	No	No	No	No
• Ni 200	No		No	No
• Ni 200 according to GOST	No	No	No	No
• Ni 500	No	No	No	No
• Ni 500 according to GOST	No	No	No	No
• Pt 10	No	No	No	No
• Pt 10 according to GOST	No	No	No	No
• Pt 50	No	No	No	No
• Pt 50 according to GOST	No	No	No	No
• Pt 100	Yes; Standard/climate	Yes; Standard/climate	No	No
• Pt 100 according to GOST	No	No	No	No
• Pt 1000	Yes; Standard/climate	Yes; Standard/climate	No	No
• Pt 1000 according to GOST	No	No	No	No
• Pt 200	Yes; Standard/climate	Yes; Standard/climate	No	No
• Pt 200 according to GOST	No	No	No	No
• Pt 500	Yes; Standard/climate	Yes; Standard/climate	No	No
• Pt 500 according to GOST	No	No	No	No
Input ranges (rated values), resistors				
• 0 to 150 ohms	Yes	Yes	No	No
• 0 to 300 ohms	Yes	Yes	No	No
• 0 to 600 ohms	Yes	Yes	No	No
• 0 to 3000 ohms	No	No	No	No
• 0 to 6000 ohms	Yes	Yes	No	No
• PTC	Yes	Yes	No	No
Thermocouple (TC)				
Temperature compensation				
- parameterizable	Yes	Yes		
Cable length				
• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC	800 m; for U/I, 200 m for R/RTD, 50 m for TC	800 m	800 m

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Technical specifications (continued)

Article number	**6ES7531-7QD00-0AB0** S7-1500, AI 4XU/I/RTD/TC ST	**6ES7531-7KF00-0AB0** S7-1500, AI 8XU/I/RTD/TC ST	**6ES7531-7NF10-0AB0** S7-1500, AI 8XU/I HS	**6ES7531-7NF00-0AB0** S7-1500, AI 8XU/I HF
Analog value generation for the inputs				
Integration and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	24 bit; When using the function "Scaling of the measured values" or "Measuring range adaptation" (32-bit REAL format); 16 bits when using the S7 format (16-bit INTEGER)
• Integration time, parameterizable	Yes	Yes		Yes
• Integration time (ms)	2,5 / 16,67 / 20 / 100 ms	2,5 / 16,67 / 20 / 100 ms		Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms
• Basic conversion time, including integration time (ms)	9 / 23 / 27 / 107 ms	9 / 23 / 27 / 107 ms		Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms
- additional conversion time for wire-break monitoring	9 ms (to be considered in R/RTD/TC measurement)	9 ms (to be considered in R/RTD/TC measurement)		
- additional conversion time for resistance measurement	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms		
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10	400 / 60 / 50 / 10 Hz		400 / 60 / 50 / 10 Hz
• Basic execution time of the module (all channels released)				Corresponds to the channel with the highest basic conversion time
• Basic execution time of the module (all channels released)			62.5 µs; independent of number of activated channels	
Smoothing of measured values				
• parameterizable	Yes	Yes	Yes	Yes
Encoder				
Connection of signal encoders				
• for voltage measurement	Yes	Yes	Yes	Yes
• for current measurement as 2-wire transducer	Yes	Yes	Yes	Yes; with external transmitter supply
- Burden of 2-wire transmitter, max.	820 Ω	820 Ω	820 Ω	
• for current measurement as 4-wire transducer	Yes	Yes	Yes	Yes
• for resistance measurement with two-wire connection	Yes; Only for PTC	Yes; Only for PTC	No	No
• for resistance measurement with three-wire connection	Yes; All measuring ranges except PTC; internal compensation of the cable resistances	Yes; All measuring ranges except PTC; internal compensation of the cable resistances	No	No
• for resistance measurement with four-wire connection	Yes; All measuring ranges except PTC	Yes; All measuring ranges except PTC	No	No

Technical specifications (continued)

Article number	**6ES7531-7QD00-0AB0** S7-1500, AI 4XU/I/RTD/TC ST	**6ES7531-7KF00-0AB0** S7-1500, AI 8XU/I/RTD/TC ST	**6ES7531-7NF10-0AB0** S7-1500, AI 8XU/I HS	**6ES7531-7NF00-0AB0** S7-1500, AI 8XU/I HF
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (+/-)	0.1 %	0.1 %	0.2 %	0.05 %
• Current, relative to input range, (+/-)	0.1 %	0.1 %	0.2 %	0.05 %
• Resistance, relative to input range, (+/-)	0.1 %	0.1 %		
• Resistance thermometer, relative to input range, (+/-)	0.1 %; Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K	Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K		
• Thermocouple, relative to input range, (+/-)	0.1 %; Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K	Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K		
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB		80 dB; in the Standard operating mode, 40 dB in the Fast operating mode
• Common mode voltage, max.	10 V	10 V	10 V	60 V DC/30 V AC
• Common mode interference, min.	60 dB	60 dB	50 dB at 400 Hz; 60 dB at 60 / 50 / 10 Hz	80 dB
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	Yes	No
Filtering and processing time (TCI), min.			80 µs	
Bus cycle time (TDP), min.			250 µs	
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
Diagnostic messages				
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
• Wire-break	Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD	Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD	Yes; only for 1 ... 5 V and 4 ... 20 mA	Yes; only for 1 ... 5 V and 4 ... 20 mA
• Overflow/underflow	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	**6ES7531-7QD00-0AB0** S7-1500, AI 4XU/I/RTD/TC ST	**6ES7531-7KF00-0AB0** S7-1500, AI 8XU/I/RTD/TC ST	**6ES7531-7NF10-0AB0** S7-1500, AI 8XU/I HS	**6ES7531-7NF00-0AB0** S7-1500, AI 8XU/I HF
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C	40 °C
Decentralized operation				
Prioritized startup	No	No	Yes	Yes
Dimensions				
Width	25 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	210 g	310 g	300 g	280 g
Other				
Note:	Supplied incl. 40-pole push-in front connectors. Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 Ohms (±0.02%); resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermoelement: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K	Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 ohms ±0.02%; resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermocouple: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K		

Technical specifications (continued)

Article number	**6ES7531-7PF00-0AB0**
	S7-1500, AI 8 X U/R/RTD/TC HF
General information	
Product type designation	AI 8xU/R/RTD/TC HF
Product function	
• I&M data	Yes; I&M0 to I&M3
• Measuring range scalable	Yes
• Scalable measured values	No
• Adjustment of measuring range	No
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V14 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -
Operating mode	
• Oversampling	No
• MSI	Yes
CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Analog inputs	
Number of analog inputs	8; Plus one additional RTD (reference) channel
• For voltage measurement	8; Plus one additional RTD (reference) channel
• For resistance/resistance thermometer measurement	8; Plus one additional RTD (reference) channel
• For thermocouple measurement	8; Plus one additional RTD (reference) channel
permissible input voltage for voltage input (destruction limit), max.	20 V
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	No
• -1 V to +1 V	Yes
• -10 V to +10 V	No
• -2.5 V to +2.5 V	No
• -25 mV to +25 mV	Yes
• -250 mV to +250 mV	Yes
• -5 V to +5 V	No
• -50 mV to +50 mV	Yes
• -500 mV to +500 mV	Yes
• -80 mV to +80 mV	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	No
• -20 mA to +20 mA	No
• 4 mA to 20 mA	No

Article number	**6ES7531-7PF00-0AB0**
	S7-1500, AI 8 X U/R/RTD/TC HF
Input ranges (rated values), thermocouples	
• Type B	Yes
• Type C	Yes
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type L	No
• Type N	Yes
• Type R	Yes
• Type S	Yes
• Type T	Yes
• Type TXK/TXK(L) to GOST	Yes
Input ranges (rated values), resistance thermometer	
• Cu 10	Yes; Standard/climate
• Cu 10 according to GOST	Yes; Standard/climate
• Cu 50	Yes; Standard/climate
• Cu 50 according to GOST	Yes; Standard/climate
• Cu 100	Yes; Standard/climate
• Cu 100 according to GOST	Yes; Standard/climate
• Ni 10	Yes; Standard/climate
• Ni 10 according to GOST	Yes; Standard/climate
• Ni 100	Yes; Standard/climate
• Ni 100 according to GOST	Yes; Standard/climate
• Ni 1000	Yes; Standard/climate
• Ni 1000 according to GOST	Yes; Standard/climate
• LG-Ni 1000	Yes; Standard/climate
• Ni 120	Yes; Standard/climate
• Ni 120 according to GOST	Yes; Standard/climate
• Ni 200	Yes; Standard/climate
• Ni 200 according to GOST	Yes; Standard/climate
• Ni 500	Yes; Standard/climate
• Ni 500 according to GOST	Yes; Standard/climate
• Pt 10	Yes; Standard/climate
• Pt 10 according to GOST	Yes; Standard/climate
• Pt 50	Yes; Standard/climate
• Pt 50 according to GOST	Yes; Standard/climate
• Pt 100	Yes; Standard/climate
• Pt 100 according to GOST	Yes; Standard/climate
• Pt 1000	Yes; Standard/climate
• Pt 1000 according to GOST	Yes; Standard/climate
• Pt 200	Yes; Standard/climate
• Pt 200 according to GOST	Yes; Standard/climate
• Pt 500	Yes; Standard/climate
• Pt 500 according to GOST	Yes; Standard/climate
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes
• 0 to 300 ohms	Yes
• 0 to 600 ohms	Yes
• 0 to 3000 ohms	No
• 0 to 6000 ohms	Yes
• PTC	Yes
Thermocouple (TC)	
Temperature compensation	
- parameterizable	Yes
Cable length	
• shielded, max.	800 m; at U; 200 m at R/RTD/TC

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Technical specifications (continued)

Article number	6ES7531-7PF00-0AB0 S7-1500, AI 8 X U/R/RTD/TC HF
Analog value generation for the inputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	21 bit; For measuring mode RTC and TC when using the function "Scalable temperature measuring range" (32-bit REAL format); 16-bit for measuring mode R and U; 16 bits for all measuring modes when using the S7 format (16-bit INTEGER)
• Integration time, parameterizable	Yes
• Integration time (ms)	Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms
• Basic conversion time, including integration time (ms)	Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms
- additional conversion time for wire-break monitoring	Thermocouples, 150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni50, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100, Pt200: 4 ms; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt500, Pt1000: 13 ms
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10 Hz
• Basic execution time of the module (all channels released)	Corresponds to the channel with the highest basic conversion time
Smoothing of measured values	
• parameterizable	Yes
Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	No
• for current measurement as 4-wire transducer	No
• for resistance measurement with two-wire connection	Yes
• for resistance measurement with three-wire connection	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
• for resistance measurement with four-wire connection	Yes; All measuring ranges except PTC
Errors/accuracies	
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.05 %
• Resistance, relative to input range, (+/-)	0.05 %
• Resistance thermometer, relative to input range, (+/-)	Cuxxx Standard: ±0.3 K, Cuxxx Klima: ±0.2 K, Ptxxx Standard: ±0.5 K, Ptxxx Klima: ±0.2 K, Nixxx Standard: ±0.3 K, Nixxx Klima: ±0.15 K
• Thermocouple, relative to input range, (+/-)	Type B: > 600 °C ±1 K, Type E: > -200 °C ±0.5 K, Type J: > -210 °C ±0.5 K, Type K: > -200 °C ±1 K, Type N: > -200 °C ±1 K, Type R: > 0 °C ±1 K, Type S: > 0 °C ±1 K, Type T: > -200 °C ±0.5 K, Type C: ±2 K, Type TXK/TXK(L): ±0.5 K

Article number	6ES7531-7PF00-0AB0 S7-1500, AI 8 X U/R/RTD/TC HF
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	80 dB; in the Standard operating mode, 40 dB in the Fast operating mode
• Common mode voltage, max.	60 V DC/30 V AC
• Common mode interference, min.	80 dB
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; Only with TC, R, RTD
• Overflow/underflow	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; Red LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
Decentralized operation	
Prioritized startup	Yes
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	290 g
Other	
Note:	For the R/RDT three-wire measurement, the conductor compensation is made alternating with the measurement. This then requires two module cycles for a measured value.

Ordering data

	Article No.
SM 531 analog input modules	
4 x U/I/RTD/TC 4 analog inputs, ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/ 6000 ohms; 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7531-7QD00-0AB0**
8 x U/I HS 8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16 bit + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7531-7NF10-0AB0**
8 x U/I/RTD/TC 8 analog inputs ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/ 6000 ohms, 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7531-7KF00-0AB0**
8 x U/I HF 8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16 bit + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7531-7NF00-0AB0**
8 x U/R/RTD/TC 8 analog inputs, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, ±25 mV; thermocouples type B, E, J, K, N, R, S, T, TXK/TXK(L) according to GOST; resistance thermometers Cu 10, Cu 50, Cu 100, Ni 10, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, LG-Ni 1000, Pt 10, Pt 50, Pt 100, Pt 200, Pt500, Pt 1000; resistors 0...150/300/600/ 6000 ohms, PTC; 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7531-7PF00-0AB0**

	Article No.
Accessories	
Front connectors	
For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
DIN A4 labeling sheets	
For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-2AX00-0AA0**
For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-1AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**
Universal front door for I/O modules	
For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**
For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-0AA0**
Shielding set I/O	
For 35 mm modules; infeed element, shield bracket, and shield terminal; 5 units, spare part (one shield set supplied with the module).	**6ES7590-5CA00-0AA0**
For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module).	**6ES7590-5CA10-0XA0**
Shield terminal element 10 units; spare part	**6ES7590-5BA00-0AA0**
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SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

SM 532 analog output modules

Overview

- 2, 4 and 8-channel analog output modules
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

Technical specifications

Article number	**6ES7532-5NB00-0AB0** S7-1500, AQ 2XU/I ST	**6ES7532-5HD00-0AB0** S7-1500, AQ 4XU/I ST	**6ES7532-5HF00-0AB0** S7-1500, AQ 8XU/I HS	**6ES7532-5ND00-0AB0** S7-1500, AQ 4XU/I HF
General information				
Product type designation	AQ 2xU/I ST	AQ 4xU/I ST	AQ 8xU/I HS	AQ 4xU/I HF
Product function				
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
• Output range scalable	No	No	No	
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13.0.2	V12 / V12	V14 / -	V14 / -
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V2.3 / -	V2.3 / -	V2.3 / -
Operating mode				
• Oversampling	No	No	Yes	No
• MSO	Yes	Yes	Yes	Yes
CiR – Configuration in RUN				
Reparameterization possible in RUN	Yes	Yes	Yes	Yes
Calibration possible in RUN	Yes	Yes	Yes	Yes
Supply voltage				
Type of supply voltage	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes	Yes
Analog outputs				
Number of analog outputs	2	4	8	4
Cycle time (all channels), min.	3.2 ms; independent of number of activated channels	3.2 ms; independent of number of activated channels	125 µs; independent of number of activated channels	125 µs; independent of number of activated channels
Output ranges, voltage				
• 0 to 10 V	Yes	Yes	Yes	Yes
• 1 V to 5 V	Yes	Yes	Yes	Yes
• -5 V to +5 V	No	No	No	No
• -10 V to +10 V	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	6ES7532-5NB00-0AB0 S7-1500, AQ 2XU/I ST	6ES7532-5HD00-0AB0 S7-1500, AQ 4XU/I ST	6ES7532-5HF00-0AB0 S7-1500, AQ 8XU/I HS	6ES7532-5ND00-0AB0 S7-1500, AQ 4XU/I HF
Output ranges, current				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -20 mA to +20 mA	Yes	Yes	Yes	Yes
• 4 mA to 20 mA	Yes	Yes	Yes	Yes
Connection of actuators				
• for voltage output two-wire connection	Yes	Yes	Yes	Yes
• for voltage output four-wire connection	Yes	Yes	Yes	Yes
• for current output two-wire connection	Yes	Yes	Yes	Yes
Load impedance (in rated range of output)				
• with voltage outputs, min.	1 kΩ; 0.5 kOhm at 1 to 5 V	1 kΩ; 0.5 kOhm at 1 to 5 V	1 kΩ	1 kΩ; 0.5 kOhm at 1 to 5 V
• with voltage outputs, capacitive load, max.	1 µF	1 µF	100 nF	1 µF
• with current outputs, max.	750 Ω	750 Ω	500 Ω	750 Ω
• with current outputs, inductive load, max.	10 mH	10 mH	1 mH	10 mH
Cable length				
• shielded, max.	800 m; for current, 200 m for voltage	800 m; for current, 200 m for voltage	200 m	800 m; for current, 200 m for voltage
Analog value generation for the outputs				
Integration and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	16 bit	16 bit
• Conversion time (per channel)	0.5 ms	0.5 ms	50 µs; independent of number of activated channels	125 µs; independent of number of activated channels
Settling time				
• for resistive load	1.5 ms	1.5 ms	30 µs; see additional description in the manual	0.2 ms; see additional description in the manual
• for capacitive load	2.5 ms	2.5 ms	100 µs; see additional description in the manual	1.8 ms; see additional description in the manual
• for inductive load	2.5 ms	2.5 ms	100 µs; see additional description in the manual	2 ms; see additional description in the manual
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to output range, (+/-)	0.2 %	0.2 %	0.2 %	0.06 %
• Current, relative to output range, (+/-)	0.2 %	0.2 %	0.2 %	0.1 %
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	Yes	Yes
Execution and activation time (TCO), min.			100 µs	100 µs
Bus cycle time (TDP), min.			250 µs	250 µs
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	Yes	Yes
Substitute values connectable	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article number	**6ES7532-5NB00-0AB0**	**6ES7532-5HD00-0AB0**	**6ES7532-5HF00-0AB0**	**6ES7532-5ND00-0AB0**
	S7-1500, AQ 2XU/I ST	S7-1500, AQ 4XU/I ST	S7-1500, AQ 8XU/I HS	S7-1500, AQ 4XU/I HF
Diagnostic messages				
• Monitoring the supply voltage	Yes	Yes	Yes	Yes
• Wire-break	Yes; Only for output type "current"	Yes; Only for output type "current"	Yes; Only for output type "current"	Yes; Only for output type "current"
• Short-circuit	Yes; Only for output type "voltage"	Yes; Only for output type "voltage"	Yes; Only for output type "voltage"	Yes; Only for output type "voltage"
• Overflow/underflow	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
Potential separation				
Potential separation channels				
• between the channels and backplane bus	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C			
• horizontal installation, max.	60 °C			
• vertical installation, min.	0 °C			
• vertical installation, max.	40 °C			
Decentralized operation				
Prioritized startup	No	No	No	Yes
Dimensions				
Width	25 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	200 g	310 g	325 g	300 g
Other				
Note:	Supplied incl. 40-pole push-in front connectors			

Ordering data	Article No.
SM 532 analog output modules	
Module width 25 mm	
2 x U/I ST; 2 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7532-5NB00-0AB0**
Module width 35 mm	
4 x U/I ST; 4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7532-5HD00-0AB0**
8 x U/I HF; 8 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7532-5HF00-0AB0**
4 x U/I HF; 4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16-bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7532-5ND00-0AB0**

Accessories	Article No.
Front connectors	
For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
DIN A4 labeling sheets	
For 35 mm modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-2AX00-0AA0**
For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-1AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**
Universal front door for I/O modules	
For 35 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**
For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-0AA0**
Shielding set I/O	
For 35 mm modules; infeed element, shield bracket, and shield terminal; 5 units, spare part (one shield set supplied with the module).	**6ES7590-5CA00-0AA0**
For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module).	**6ES7590-5CA10-0XA0**
Shield connection clamp 10 units; spare part	**6ES7590-5BA00-0AA0**
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SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

SM 534 analog input/output modules

Overview

- 4 analog inuts/ 2 analog outputs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- For use in the tightest spaces

Technical specifications

Article number	**6ES7534-7QE00-0AB0** S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST
General information	
Product type designation	AI 4xU/I/RTD/TC / AQ 2xU/I ST
Product function	
• I&M data	Yes; I&M0 to I&M3
• Measuring range scalable	No
• Scalable measured values	No
• Adjustment of measuring range	No
• Output range scalable	No
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 / V13.0.2
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision	V1.0 / V5.1
• PROFINET as of GSD version/ GSD revision	V2.3 / -
Operating mode	
• Oversampling	No
• MSI	Yes
• MSO	Yes
CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes

Article number	**6ES7534-7QE00-0AB0** S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST
Analog inputs	
Number of analog inputs	4
• For current measurement	4
• For voltage measurement	4
• For resistance/resistance thermometer measurement	2
• For thermocouple measurement	4
permissible input voltage for voltage input (destruction limit), max.	28.8 V
permissible input current for current input (destruction limit), max.	40 mA
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Analog input with oversampling	No
Standardization of measured values	No
Input ranges (rated values), voltages	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	Yes
• -1 V to +1 V	Yes
• -10 V to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -25 mV to +25 mV	No
• -250 mV to +250 mV	Yes
• -5 V to +5 V	Yes
• -50 mV to +50 mV	Yes
• -500 mV to +500 mV	Yes
• -80 mV to +80 mV	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes

Technical specifications (continued)

Article number	**6ES7534-7QE00-0AB0** S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST
Input ranges (rated values), thermocouples	
• Type B	Yes
• Type C	No
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type L	No
• Type N	Yes
• Type R	Yes
• Type S	Yes
• Type T	Yes
• Type U	No
• Type TXK/TXK(L) to GOST	No
Input ranges (rated values), resistance thermometer	
• Cu 10	No
• Cu 10 according to GOST	No
• Cu 50	No
• Cu 50 according to GOST	No
• Cu 100	No
• Cu 100 according to GOST	No
• Ni 10	No
• Ni 10 according to GOST	No
• Ni 100	Yes; Standard/climate
• Ni 100 according to GOST	No
• Ni 1000	Yes; Standard/climate
• Ni 1000 according to GOST	No
• LG-Ni 1000	Yes; Standard/climate
• Ni 120	No
• Ni 120 according to GOST	No
• Ni 200	No
• Ni 200 according to GOST	No
• Ni 500	No
• Ni 500 according to GOST	No
• Pt 10	No
• Pt 10 according to GOST	No
• Pt 50	No
• Pt 50 according to GOST	No
• Pt 100	Yes; Standard/climate
• Pt 100 according to GOST	No
• Pt 1000	Yes; Standard/climate
• Pt 1000 according to GOST	No
• Pt 200	Yes; Standard/climate
• Pt 200 according to GOST	No
• Pt 500	Yes; Standard/climate
• Pt 500 according to GOST	No
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes
• 0 to 300 ohms	Yes
• 0 to 600 ohms	Yes
• 0 to 3000 ohms	No
• 0 to 6000 ohms	Yes
• PTC	Yes

Article number	**6ES7534-7QE00-0AB0** S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST
Thermocouple (TC)	
Temperature compensation	
- parameterizable	Yes
Cable length	
• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC
Analog outputs	
Number of analog outputs	2
Cycle time (all channels), min.	3.2 ms; ±0.5 ms, regardless of the number of activated channels
Output ranges, voltage	
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -5 V to +5 V	No
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for voltage output two-wire connection	Yes
• for voltage output four-wire connection	Yes
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ; 0.5 kOhm at 1 to 5 V
• with voltage outputs, capacitive load, max.	1 µF
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
Cable length	
• shielded, max.	800 m; for current, 200 m for voltage
Analog value generation for the inputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time (ms)	2,5 / 16,67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)	9 / 23 / 27 / 107 ms
- additional conversion time for wire-break monitoring	9 ms
- additional conversion time for resistance measurement	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10
Smoothing of measured values	
• parameterizable	Yes

Technical specifications (continued)

Article number	**6ES7534-7QE00-0AB0** S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST
Analog value generation for the outputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Conversion time (per channel)	0.5 ms
Settling time	
• for resistive load	1.5 ms
• for capacitive load	2.5 ms
• for inductive load	2.5 ms
Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes
- Burden of 2-wire transmitter, max.	820 Ω
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes; Only for PTC
• for resistance measurement with three-wire connection	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
• for resistance measurement with four-wire connection	Yes; All measuring ranges except PTC
Errors/accuracies	
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %
• Resistance, relative to input range, (+/-)	0.1 %
• Resistance thermometer, relative to input range, (+/-)	0.1 %; Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K
• Thermocouple, relative to input range, (+/-)	0.1 %; Type B: > 600 °C ±1.7 K, type E: > -200 °C ±0.7 K, type J: > -210 °C ±0.8 K, type K: > -200 °C ±1.2 K, type N: > -200 °C ±1.2 K, type R: > 0 °C ±1.9 K, type S: > 0 °C ±1.9 K, type T: > -200 °C ±0.8 K
• Voltage, relative to output range, (+/-)	0.2 %
• Current, relative to output range, (+/-)	0.2 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode voltage, max.	10 V
• Common mode interference, min.	60 dB
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No

Article number	**6ES7534-7QE00-0AB0** S7-1500, AI 4X U/I/RTD/TC/AQ 2X U/I ST
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; only for input type 1 ... 5 V, 4 ... 20 mA, TC, R, RTD and output type current
• Short-circuit	Yes; Only for output type "voltage"
• Overflow/underflow	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; Red LED
Potential separation	
Potential separation analog inputs	
• between the channels and backplane bus	Yes
Potential separation analog outputs	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
Decentralized operation	
Prioritized startup	No
Dimensions	
Width	25 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	250 g
Other	
Note:	Supplied incl. 40-pole push-in front connectors. Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 Ohms (±0.02%); resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermoelement: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K

Ordering data

	Article No.
SM 534 analog input/output module Module width 25 mm 4 analog inputs ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V, 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/ 6000 Ohm, 16 bit; 2 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6ES7534-7QE00-0AB0**

	Article No.
Accessories	
Front connectors For 25 mm modules; including cable ties and individual labeling strips; push-in terminal 40-pin; spare part	**6ES7592-1BM00-0XA0**
DIN A4 labeling sheets For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-1AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**
Universal front door for I/O modules For 25 mm modules; 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-0AA0**
Shielding set I/O For 25 mm modules; infeed element, shield bracket, and shield terminal; 4 units, spare part (one shield set supplied with the module).	**6ES7590-5CA10-0XA0**
Shield terminal element 10 units; spare part	**6ES7590-5BA00-0AA0**
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SIPLUS SM 531 analog input modules

Overview

- 8-channel analog input modules
- Optionally with extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- Even solves more complex automation tasks

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	**6AG1531-7NF10-7AB0**	**6AG1531-7KF00-7AB0**
Based on	**6ES7531-7NF10-0AB0**	**6ES7531-7KF00-0AB0**
	SIPLUS S7-1500 AI 8XU/I HS	SIPLUS S7-1500 AI 8XU/I/RTD/TC ST
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; > +60 °C max. 4x ±20 mA or 4x ±10 V permissible	70 °C; = Tmax; > +60 °C max. 2x ±20 mA or 4x ±10 V or 4x RTD permissible
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	40 °C; = Tmax	50 °C; = Tmax
Extended ambient conditions		

• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax
	at 1080 hPa ... 795 hPa
	(-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K)
	at 795 hPa ... 658 hPa
	(+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K)
	at 658 hPa ... 540 hPa
	(+3500 m ... +5000 m)
		Tmin ... Tmax
		at 1080 hPa ... 795 hPa
		(-1000 m ... +2000 m) //
		Tmin ... (Tmax - 10K)
		at 795 hPa ... 658 hPa
		(+2000 m ... +3500 m) //
		Tmin ... (Tmax - 20K)
		at 658 hPa ... 540 hPa
		(+3500 m ... +5000 m)

Relative humidity		
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance		
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

	Article No.
SIPLUS SM 531 analog input modules	
(Extended temperature range and exposure to media)	
8 analog inputs, ±10 V, ±5 V, 1 ... 5 V or 0/4 ... 20 mA, ±20 mA, 16 bit + sign; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6AG1531-7NF10-7AB0**
8 analog inputs ±10 V, ±5 V, ±2.5 V, ±1 V, ±500 mV, ±250 mV, ±80 mV, ±50 mV, 1 ... 5 V , 0/4 ... 20 mA, ±20 mA, thermocouples type B, E, J, K, N, R, S, T, resistance thermometers Ni 100, Ni 1000, LG-Ni 1000, Pt 100, Pt 1000, Pt 250, Pt 500, resistors 0...150/300/600/6000 Ohm, 16 bit	**6AG1531-7KF00-7AB0**

	Article No.
Accessories	See SIMATIC S7-1500 SM 531 analog input modules, page 4/87

SIPLUS SM 532 analog output modules

Overview

- 4 and 8-channel analog output modules
- Optionally with extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	**6AG1532-5HD00-7AB0**	**6AG1532-5HF00-7AB0**
Based on	**6ES7532-5HD00-0AB0**	**6ES7532-5HF00-0AB0**
	SIPLUS S7-1500 AQ 4XU/I ST	SIPLUS S7-1500 AQ 8XU/I HS
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-25 °C; = Tmin	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; > +60 °C max. 4x ±10 V permissible	70 °C; = Tmax; > +60 °C max. 4x ±10 V permissible
• vertical installation, min.	-25 °C; = Tmin	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	40 °C; = Tmax	40 °C; = Tmax
Extended ambient conditions		

• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax
	at 1080 hPa ... 795 hPa
	(-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K)
	at 795 hPa ... 658 hPa
	(+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K)
	at 658 hPa ... 540 hPa
	(+3500 m ... +5000 m)
		Tmin ... Tmax
		at 1080 hPa ... 795 hPa
		(-1000 m ... +2000 m) //
		Tmin ... (Tmax - 10K)
		at 795 hPa ... 658 hPa
		(+2000 m ... +3500 m) //
		Tmin ... (Tmax - 20K)
		at 658 hPa ... 540 hPa
		(+3500 m ... +5000 m)

Relative humidity		
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance		
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

	Article No.
SIPLUS SM 532 analog output modules	
(Extended temperature range and exposure to media)	
4 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16 bit	**6AG1532-5HD00-7AB0**
8 analog outputs, ±10 V, 1 ... 5 V, 0 ... 10 V or ±20 mA, 0/4 ... 20 mA, 16 bit; incl. infeed element, shield bracket, shield terminal, labeling strips, U connector, printed front door	**6AG1532-5HF00-7AB0**

	Article No.
Accessories	See SIMATIC S7-1500 SM 532 analog output modules, page 4/91

TM Count 2x24V counter module

Overview

- 2-channel high-speed counter module
- With comprehensive parameterization options for an optimum adaptation to the task and reduction of control load
- Speed and time period measuring
- Storage and comparison functions
- Connection of 24 V encoders

Technical specifications

Article number	**6ES7550-1AA00-0AB0** S7-1500, TM COUNT 2X24V
General information	
Product type designation	TM Count 2x24V
Product function	
• I&M data	Yes; I&M 0
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V12 / V12
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFINET as of GSD version/ GSD revision	V2.3 / -
Installation type/mounting	
Rail mounting	Yes; S7-1500 mounting rail
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
Current consumption, max.	75 mA; without load
Encoder supply	
Number of outputs	1; A common 24V encoder supply for both channels
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	1 A; total current of all encoders/ channels
Power	
Power available from the backplane bus	1.3 W
Power loss	
Power loss, typ.	4 W

Article number	**6ES7550-1AA00-0AB0** S7-1500, TM COUNT 2X24V
Digital inputs	
Number of digital inputs	6; 3 per channel
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Gate start/stop	Yes
• Capture	Yes
• Synchronization	Yes
• Freely usable digital input	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
- at "0" to "1", min.	6 µs; for parameterization "none"
- at "1" to "0", min.	6 µs; for parameterization "none"
for counter/technological functions	
- parameterizable	Yes
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m

Technical specifications (continued)

Article number	**6ES7550-1AA00-0AB0**
	S7-1500, TM COUNT 2X24V
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	4; 2 per channel
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	L+ (-33 V)
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Switching tripped by comparison values	Yes
• Freely usable digital output	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; Per digital output
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; Per digital output
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	50 µs
• "1" to "0", max.	50 µs
Switching frequency	
• with resistive load, max.	10 kHz
• with inductive load, max.	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per module, max.	2 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	24 V
• Input frequency, max.	200 kHz
• Counting frequency, max.	800 kHz; with quadruple evaluation
• Cable length, shielded, max.	600 m; depending on input frequency, encoder and cable quality; max. 50 m at 200 kHz
• Signal filter, parameterizable	Yes
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
• Pulse encoder	Yes
• Pulse encoder with direction	Yes
• Pulse encoder with one impulse signal per count direction	Yes

Article number	**6ES7550-1AA00-0AB0**
	S7-1500, TM COUNT 2X24V
Encoder signal 24 V	
- permissible voltage at input, min.	-30 V
- permissible voltage at input, max.	30 V
Interface types	
• Input characteristic curve in accordance with IEC 61131, type 3	Yes
• Source/sink input	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Filtering and processing time (TCI), min.	130 µs
Bus cycle time (TDP), min.	250 µs
Interrupts/diagnostics/ status information	
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• A/B transition error at incremental encoder	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
Integrated Functions	
Number of counters	2
Counting frequency (counter) max.	800 kHz; with quadruple evaluation
Counting functions	
• Continuous counting	Yes
• Counter response parameterizable	Yes
• Hardware gate via digital input	Yes
• Software gate	Yes
• Event-controlled stop	Yes
• Synchronization via digital input	Yes
• Counting range, parameterizable	Yes
Comparator	
- Number of comparators	2; Per channel
- Direction dependency	Yes
- Can be changed from user program	Yes
Position detection	
• Incremental acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes

TM Count 2x24V counter module

Technical specifications (continued)

Article number	**6ES7550-1AA00-0AB0**
	S7-1500, TM COUNT 2X24V
Measuring functions	
• Measuring time, parameterizable	Yes
• Dynamic measurement period adjustment	Yes
• Number of thresholds, parameterizable	2
Measuring range	
- Frequency measurement, min.	0.04 Hz
- Frequency measurement, max.	800 kHz
- Cycle duration measurement, min.	1.25 µs
- Cycle duration measurement, max.	25 s
Accuracy	
- Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
- Cycle duration measurement	100 ppm; depending on measuring interval and signal evaluation
- Velocity measurement	100 ppm; depending on measuring interval and signal evaluation
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	No
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Please note derating for inductive loads
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Please note derating for inductive loads
Decentralized operation	
to SIMATIC S7-1500	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	250 g

Ordering data

	Article No.
TM Count 2x24V counter module With 2 channels, max. 200 kHz; for 24 V encoder	**6ES7550-1AA00-0AB0**
Accessories	
Front connectors For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
DIN A4 labeling sheets 10 sheets with 10 labeling strips each for I/O modules; perforated, Al grey	**6ES7592-2AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**
Universal front door for I/O modules 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**
Shielding set I/O Infeed element, shield bracket, and shield terminal; 5 units, spare part	**6ES7590-5CA00-0AA0**
Shield terminal element 10 units; spare part	**6ES7590-5BA00-0AA0**
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SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

Overview

- 2-channel counting and position detection module with RS 422 interface
- Extensive parameterization options for optimum task-specific adaptation
- Reduces load on controller due to preprocessing on the module
- Position detection with incremental and SSI absolute encoders
- Speed and time period measuring
- Storage and comparison functions
- Connection of encoders with RS 422 signals or 5V-TTL signals

Technical specifications

Article number	**6ES7551-1AB00-0AB0** S7-1500, TM POSINPUT 2
General information	
Product type designation	TM PosInput 2
Product function	
• I&M data	Yes; I&M 0
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V12 SP1 / V12 SP1
• STEP 7 configurable/integrated as of version	V5.5 SP3 / -
• PROFINET as of GSD version/ GSD revision	V2.3 / -
Installation type/mounting	
Rail mounting	Yes; S7-1500 mounting rail
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
Current consumption, max.	75 mA; without load
Encoder supply	
Number of outputs	4; One 5V and 24V encoder supply per channel
5 V encoder supply	
• 5 V	Yes; 5.2 V +/-2%
• short-circuit protection	Yes
• Output current, max.	300 mA; Per channel
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	300 mA; Per channel
Power	
Power available from the backplane bus	1.3 W
Power loss	
Power loss, typ.	5.5 W

Article number	**6ES7551-1AB00-0AB0** S7-1500, TM POSINPUT 2
Digital inputs	
Number of digital inputs	4; 2 per channel
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Gate start/stop	Yes; only for pulse and incremental encoders
• Capture	Yes
• Synchronization	Yes; only for pulse and incremental encoders
• Freely usable digital input	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
- at "0" to "1", min.	6 µs; for parameterization "none"
- at "1" to "0", min.	6 µs; for parameterization "none"
for counter/technological functions	
- parameterizable	Yes
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m

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Technical specifications (continued)

Article number	6ES7551-1AB00-0AB0 S7-1500, TM POSINPUT 2
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	4; 2 per channel
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	L+ (-33 V)
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Switching tripped by comparison values	Yes
• Freely usable digital output	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; Per digital output
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; Per digital output
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	50 µs
• "1" to "0", max.	50 µs
Switching frequency	
• with resistive load, max.	10 kHz
• with inductive load, max.	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per module, max.	2 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder signals, incremental encoder (symmetrical)	
• Input voltage	RS 422
• Input frequency, max.	1 MHz
• Counting frequency, max.	4 MHz; with quadruple evaluation
• Cable length, shielded, max.	32 m; at 1 MHz
• Signal filter, parameterizable	Yes
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
• Pulse encoder	Yes
• Pulse encoder with direction	Yes
• Pulse encoder with one impulse signal per count direction	Yes

Article number	6ES7551-1AB00-0AB0 S7-1500, TM POSINPUT 2
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	5 V TTL (push-pull encoders only)
• Input frequency, max.	1 MHz
• Counting frequency, max.	4 MHz; with quadruple evaluation
• Signal filter, parameterizable	Yes
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Incremental encoder with A/B tracks, 90° phase offset and zero track	Yes
• Pulse encoder	Yes
• Pulse encoder with direction	Yes
• Pulse encoder with one impulse signal per count direction	Yes
Encoder signals, absolute encoder (SSI)	
• Input signal	to RS-422
• Telegram length, parameterizable	10 ... 40 bit
• Clock frequency, max.	2 MHz; 125 kHz, 250 kHz, 500 kHz, 1 MHz, 1.5 MHz or 2 MHz
• Binary code	Yes
• Gray code	Yes
• Cable length, shielded, max.	320 m; Cable length, RS-422 SSI absolute encoders, Siemens type 6FX2001-5, 24 V supply: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 20 meters shielded, max. 1.5 MHz, 10 meters shielded, max.; 2 MHz, 8 meters shielded, max.
• Parity bit, parameterizable	Yes
• Monoflop time	16, 32, 48, 64 µs & automatic
• Multiturn	Yes
• Singleturn	Yes
Interface types	
• RS 422	Yes
• TTL 5 V	Yes; push-pull encoders only
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Filtering and processing time (TCI), min.	130 µs; only for pulse and incremental encoders
Bus cycle time (TDP), min.	250 µs
Interrupts/diagnostics/ status information	
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• A/B transition error at incremental encoder	Yes
• Telegram error at SSI encoder	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED

Technical specifications (continued)

Article number	**6ES7551-1AB00-0AB0**
	S7-1500, TM POSINPUT 2
Integrated Functions	
Number of counters	2
Counting frequency (counter) max.	4 MHz; with quadruple evaluation
Counting functions	
• Can be used with TO High_Speed_Counter	Yes; only for pulse and incremental encoders
• Continuous counting	Yes
• Counter response parameterizable	Yes
• Hardware gate via digital input	Yes
• Software gate	Yes
• Event-controlled stop	Yes
• Synchronization via digital input	Yes
• Counting range, parameterizable	Yes
Comparator	
- Number of comparators	2; Per channel
- Direction dependency	Yes
- Can be changed from user program	Yes
Position detection	
• Incremental acquisition	Yes
• Absolute acquisition	Yes
• Suitable for S7-1500 Motion Control	Yes
Measuring functions	
• Measuring time, parameterizable	Yes
• Dynamic measurement period adjustment	Yes
• Number of thresholds, parameterizable	2
Measuring range	
- Frequency measurement, min.	0.04 Hz
- Frequency measurement, max.	4 MHz
- Cycle duration measurement, min.	0.25 µs
- Cycle duration measurement, max.	25 s

Article number	**6ES7551-1AB00-0AB0**
	S7-1500, TM POSINPUT 2
Accuracy	
- Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
- Cycle duration measurement	100 ppm; depending on measuring interval and signal evaluation
- Velocity measurement	100 ppm; depending on measuring interval and signal evaluation
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	No
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Please note derating for inductive loads
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Please note derating for inductive loads
Decentralized operation	
to SIMATIC S7-1500	Yes
to standard PROFINET controller	Yes
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	325 g

Ordering data

	Article No.
TM PosInput 2 counting and position detecting module With 2 channels, max. 1 MHz counting frequency; for SSI encoders and incremental encoders with RS 422 or 5V TTL interface	**6ES7551-1AB00-0AB0**
Accessories	
Front connectors For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
DIN A4 labeling sheets 10 sheets with 10 labeling strips each for I/O modules; perforated, Al grey	**6ES7592-2AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**

	Article No.
Universal front door for I/O modules 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**
Shielding set I/O Infeed element, shield bracket, and shield terminal; 5 units, spare part	**6ES7590-5CA00-0AA0**
Shield terminal element 10 units; spare part	**6ES7590-5BA00-0AA0**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

Time-based IO module TM Timer DIDQ 16x24V

Overview

- 8 digital inputs, 16 digital outputs, of which up to 16 can be used in different configurations as technological, time-controlled channels
- Inputs for detecting the input edges with µs accuracy
- Outputs for outputting switching signals with µs accuracy
- 32x oversampling
- PWM output
- Counter function
- Outputs can be switched between 0.5 A standard and especially fast 0.1 A high-speed operation

Technical specifications

Article number	**6ES7552-1AA00-0AB0**
	S7-1500, TM TIMER DIDQ 16X24V
General information	
Product type designation	TM Timer DIDQ 16x24V
Product function	
• I&M data	Yes; I&M 0
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 Update 3
Installation type/mounting	
Rail mounting	Yes; S7-1500 mounting rail
Load voltage 1L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Load voltage 2L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes; against destruction
Input current	
from load voltage 1L+ (without load), max.	40 mA; without load
from load voltage 2L+ (without load), max.	30 mA; without load
Encoder supply	
Number of outputs	8; max. depending on parameterization
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	1.2 A; Total current of all encoders / channels, max. 0.5 A per output

Article number	**6ES7552-1AA00-0AB0**
	S7-1500, TM TIMER DIDQ 16X24V
Power	
Power available from the backplane bus	1.3 W
Power loss	
Power loss, typ.	5 W
Digital inputs	
Number of digital inputs	8; max. depending on parameterization
• in groups of	8
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Digital input with time stamp	Yes
- Number, max.	8
• Counter	Yes
- Number, max.	4
• Counter for incremental encoder	Yes
- Number, max.	4
• Digital input with oversampling	Yes
- Number, max.	8
• HW enable for digital input	Yes
- Number, max.	4
• HW enable for digital output	Yes
- Number, max.	4

Technical specifications (continued)

Article number	**6ES7552-1AA00-0AB0**
	S7-1500, TM TIMER DIDQ 16X24V
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-30 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
• Minimum pulse width for program reactions	3 µs for parameterization "none"
for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 ms
- at "0" to "1", min.	4 µs; for parameterization "none"
- at "1" to "0", min.	4 µs; for parameterization "none"
Cable length	
• shielded, max.	1 000 m; Depending on sensor, cable quality and rate of change
• unshielded, max.	600 m; Depending on sensor, cable quality and rate of change
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	16; max. depending on parameterization
• in groups of	8
Current-sinking	Yes; With High Speed output
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
Limitation of inductive shutdown voltage to	-0.8 V
Controlling a digital input	Yes
Digital output functions, parameterizable	
• Digital output with time stamp	Yes
- Number, max.	16
• PWM output	Yes
- Number, max.	16
• Digital output with oversampling	Yes
- Number, max.	16
Switching capacity of the outputs	
• with resistive load, max.	0.5 A; 0.1 A with High Speed output
• on lamp load, max.	5 W; 1 W with High Speed output
Load resistance range	
• lower limit	48 Ω; 240 ohm with High Speed output
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "0", max.	1 V; With High Speed output
• for signal "1", min.	23.2 V; L+ (-0.8 V)

Article number	**6ES7552-1AA00-0AB0**
	S7-1500, TM TIMER DIDQ 16X24V
Output current	
• for signal "1" rated value	0.5 A; 0.1 A with High Speed output, observe derating
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	1 µs; With High Speed output, 5 µs with Standard output
• "1" to "0", max.	1 µs; With High Speed output, 6 µs with Standard output
Switching frequency	
• with resistive load, max.	10 kHz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per group, max.	4 A
• Current per module, max.	8 A; Observe derating
Cable length	
• shielded, max.	1 000 m; Depending on load and cable quality
• unshielded, max.	600 m; Depending on load and cable quality
Encoder	
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Encoder signals, incremental encoder (asymmetrical)	
• Input voltage	24 V
• Input frequency, max.	50 kHz
• Counting frequency, max.	200 kHz; with quadruple evaluation
• Cable length, shielded, max.	600 m; Depending on input frequency, encoder and cable quality; max. 200 m at 50 kHz
• Incremental encoder with A/B tracks, 90° phase offset	Yes
• Pulse encoder	Yes
Encoder signal 24 V	
- permissible voltage at input, min.	-30 V
- permissible voltage at input, max.	30 V
Interface types	
• Input characteristic curve in accordance with IEC 61131, type 3	Yes

Time-based IO module TM Timer DIDQ 16x24V

Technical specifications (continued)

Article number	**6ES7552-1AA00-0AB0**
	S7-1500, TM TIMER DIDQ 16X24V
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Bus cycle time (TDP), min.	250 µs
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
Integrated Functions	
Number of counters	4
Counting frequency (counter) max.	200 kHz; with quadruple evaluation
Counting functions	
• Continuous counting	Yes
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Observe derating
Decentralized operation	
to SIMATIC S7-1500	Yes
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	320 g

Ordering data

	Article No.
Time-based IO module TM Timer DIDQ 16x24V	**6ES7552-1AA00-0AB0**
Max. 16 time-controlled inputs or outputs	
Accessories	
Front connector	
For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
DIN A4 labeling sheets	**6ES7592-2AX00-0AA0**
10 sheets with 10 labeling strips each for I/O modules; perforated, Al grey	
U connector	**6ES7590-0AA00-0AA0**
5 units; spare part	
Universal front door for I/O modules	**6ES7528-0AA00-7AA0**
5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	
Shielding set I/O	**6ES7590-5CA00-0AA0**
Infeed element, shield bracket, and shield terminal; 5 units, spare part:	
Note: Only shield bracket and shield terminal are required for the TM Timer DIDQ 16x24V	
Shield terminal element	**6ES7590-5BA00-0AA0**
10 units; spare part	
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	

Overview

- 4-channel interface module for PTO (Pulse Train Output)
- 3 signal interfaces can be configured for speed and direction:
  - 24 V asymmetrical up to 200 kHz
  - RS 422, 5 V symmetrical up to 1 MHz
  - TTL 5 V asymmetrical up to 200 kHz
- 3 signal types can be configured:
  - Pulse and direction
  - Pulses for forward movement and pulses for backwards movement
  - 2 phase-shifted signals, with simple or quadruple evaluation
- Supported technology objects:
  - Speed controlled axis (S7-1500, S7-1500T)
  - Positioning axis (S7-1200, S7-1500, S7-1500T)
  - Synchronous axis (S7-1500, S7-1500T)
  - Probe (S7-1500, S7-1500T)

Technical specifications

Article number	**6ES7553-1AA00-0AB0**
	S7-1500, TM PTO4
General information	
Product type designation	TM PTO 4
HW functional status	FS01
Number of channels	4; Axes
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V14 or higher
• STEP 7 configurable/integrated as of version	V5.5 SP3 with GSD file / -
• PROFINET as of GSD version/ GSD revision	GSDML V2.32
Installation type/mounting	
Rail mounting	Yes; S7-1500 mounting rail
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	19.2 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Input current	
Current consumption, max.	70 mA; without load
Power	
Power available from the backplane bus	1.3 W
Power loss	
Power loss, typ.	4 W

Article number	**6ES7553-1AA00-0AB0**
	S7-1500, TM PTO4
Address area	
Occupied address area	
• Inputs	18 byte; Per channel
• Outputs	10 byte; Per channel
Digital inputs	
Number of digital inputs	12; 3 per channel, of which 1 DIQ
Digital inputs, parameterizable	Yes
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
• Synchronization	Yes
• Probe	Yes
• Drive ready	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-5 ... +5 V
• for signal "1"	+11 to +30V
• permissible voltage at input, min.	-5 V
• permissible voltage at input, max.	30 V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
- at "0" to "1", min.	4 µs; for parameterization "none"
- at "1" to "0", min.	4 µs; for parameterization "none"
for counter/technological functions	
- parameterizable	Yes
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m

Technical specifications (continued)

Article number	**6ES7553-1AA00-0AB0**
	S7-1500, TM PTO4
Digital outputs	
Number of digital outputs	12; 3 per channel, of which 1 DIQ
Current-sinking	Yes; For DQn.0 and DQn.1 push-pull outputs
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes; electronic/thermal
• Response threshold, typ.	0.2 A for DQn.0 and DQn.1, 0.9 A for DIQn.2
Controlling a digital input	Yes
Digital output functions, parameterizable	
• PTO (pulse train output) signal interface	
- 24 V asymmetrical	Yes
- RS 422 symmetrical	No
- TTL (5 V) asymmetrical	No
• PTO (pulse train output) signal type	
- Pulse and direction	Yes
- Count up, count down	Yes
- Incremental encoder (A, B phase shift)	Yes
- Incremental encoder (A, B phase shift, quadruple)	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.1 A; 0.5 A for DIQn.2
• on lamp load, max.	1 W; 5 W for DIQn.2
Load resistance range	
• lower limit	240 Ω; 48 ohms for DIQn.2
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	23.2 V; L+ (-0.8 V), L+ (-1.3 V) for DIQn.2
Output current	
• for signal "1" rated value	0.1 A; 0.5 A for DIQn.2
• for signal "1" permissible range, max.	0.12 A; 0.6 A for DIQn.2
• for signal "1" minimum load current	2 mA
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", typ.	1 µs; 28 µs for DIQn.2
• "1" to "0", typ.	1 µs; 25 µs for DIQn.2
Switching frequency	
• with resistive load, max.	1 kHz; For DIQn.2
• with inductive load, max.	0.5 Hz; According to IEC 60947-5-1, DC-13, for DIQn.2
• on lamp load, max.	10 Hz; For DIQn.2
• For signal interface 24 V asymmetrical	200 kHz; With DQn.0 and DQn.1
Cable length	
• shielded, max.	600 m; Up to 10 kHz, 50 m at 200 kHz
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Bus cycle time (TDP), min.	250 µs; 375 µs if all 4 channels are used
Jitter, max.	1 µs

Article number	**6ES7553-1AA00-0AB0**
	S7-1500, TM PTO4
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Short-circuit	Yes; Thermal overload protection
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; Green LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	No
Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Observe derating
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Observe derating
Decentralized operation	
to SIMATIC S7-300	Yes; Via control and feedback interface
to SIMATIC S7-400	Yes; Via control and feedback interface
to SIMATIC S7-1200	Yes
to SIMATIC S7-1500	Yes
to standard PROFINET controller	Yes; Via control and feedback interface
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	300 g

Ordering data

	Article No.
Interface module for TM PTO 4 stepper drives 4 Pulse Train Output PTO channels; PTO: 24 V or RS 422; 2 DQ PTO, 2 DI 24 V, 1 DIQ 24 V per channel	**6ES7553-1AA00-0AB0**
Accessories	
Front connectors For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
DIN A4 labeling sheets 10 sheets with 10 labeling strips each for I/O modules; perforated, AI grey	**6ES7592-2AX00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**
Universal front door for I/O modules 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA00-7AA0**

	Article No.
Shielding set I/O Infeed element, shield bracket, and shield terminal; 5 units, spare part	**6ES7590-5CA00-0AA0**
Shield terminal element 10 units; spare part	**6ES7590-5BA00-0AA0**
SIMATIC Manual Collection SIMATIC Manual Collection on DVD in 5 languages, all manuals for S7-1200/1500/200/300/400,LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering SW, Runtime SW, PCS7, SIMATIC HMI, SIMATIC NET, SIMATIC IDENT	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current Manual Collection DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

SIWAREX WP521 ST, SIWAREX WP522 ST

Overview

SIWAREX WP521 ST

SIWAREX WP522 ST

SIWAREX WP521 ST / WP522 ST (ST = Standard) are versatile weighing modules for the SIMATIC S7-1500 Advanced Controller family. With these electronic weighing systems, simple weighing applications, such as platform or hopper scales, can be seamlessly integrated into the S7-1500 automation environment.

Technical specifications

SIWAREX WP521 ST, WP522 ST	
Weighing modes	• Non-automatic scales, e.g. platform and hopper scales
Ports	• 1 x SIMATIC S7-1500 system bus • 1 x Ethernet (SIWATOOL, Modbus TCP/IP) • 1 x RS485 (Modbus RTU or remote display) per channel • 3 x digital outputs (24 V DC) per channel • 4 x digital outputs (24 V DC short-circuit proof) per channel
Functions	• 3 limits • Zeroing • Tare • Tare specification • Zero adjustment • Trace function for signal analysis • Internal restore point • SIMATIC S7-1500 integrated and/or stand-alone operation
Parameter assignment	• By means of function block in SIMATIC S7-1500 and HMI • Using SIWATOOL V7 • Using Modbus TCP/IP • Using Modbus RTU

SIWAREX WP521 ST, WP522 ST	
Remote display (see accessories)	
Connection	via RS 485
Display	Additional display for weight value
Measuring accuracy	
Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K (68 °F ± 10 K)	0.05%
Internal resolution	Up to ±4 million parts
Number of measurements/second	100 or 120 (selectable)
Filter	• Low-pass filter 0.05 ... 50 Hz • Average value filter
Weighing functions	
Zeroing	Per command
Tare	Per command
Tare specification	Per command

Technical specifications (continued)

SIWAREX WP521 ST, WP522 ST	
Compatible sensors	Analog load cells / full-bridge strain gauges (1-4 mV/V) in 4-wire or 6-wire system
Load cell powering	
Supply voltage (regulated via feedback)	4.85 V DC
Permissible load resistance	
• R_{Lmin}	> 40 Ω
• R_{Lmax}	< 4 100 Ω
With SIWAREX IS Ex interface	
• R_{Lmin}	> 50 Ω
• R_{Lmax}	< 4 100 Ω
Load cell characteristic	1 … 4 mV/V
Permissible range of the measurement signal (with 4 mV/V sensors)	-21.3 ... +21.3 mV
Max. distance of load cells	800 m (2 624 ft)
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface

SIWAREX WP521 ST, WP522 ST	
Certificates	• ATEX Zone 2 • UL • KCC • EAC • RCM • FM- IECEx
Auxiliary power supply	
Rated voltage	24 V DC
Max. power consumption WP521 ST / WP522 ST	120 mA / 200 mA
Max. power consumption SIMATIC Bus	35 mA @ 15 V
IP degree of protection according to DIN EN 60529; IEC 60529	IP20
Climatic requirements $T_{min(IND)}$ ··· $T_{max(IND)}$ (operating temperature)	
• Horizontal installation	-10 ... +60 °C (14 ... 140 °F)
• Vertical installation	-10 ... +40 °C (14 ... 104 °F)
EMC requirements	according to IEC 61000-6-2:2004; IEC 61000-6-4:2007+A1:2011
Dimensions (W x H x D)	35 x 147 x 129 mm (1.38 x 5.79 x 5.08 in)

Ordering data

	Article No.
Weighing module TM SIWAREX WP521 ST Single-channel, for platform or hopper scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set.	**7MH4980-1AA01**
Weighing module TM SIWAREX WP522 ST Double channel, for two separate platform or hopper scales with analog load cells / full-bridge strain gauges (1 - 4 mV/V), per channel 1 x LC, 4 x DQ, 3 x DI, 1 x RS 485, Ethernet port, including shielding set.	**7MH4980-2AA01**
SIMATIC S7-1500, front connector with screw-type terminals 40-pole, for 35 mm wide modules, including 4 jumper links and cable ties	**6ES7592-1AM00-0XB0**
SIMATIC S7-1500, front connector with push-in technology 40-pole, for 35 mm wide modules, including 4 jumper links and cable ties	**6ES7592-1BM00-0XB0**

	Article No.
Configuration package SIWAREX WP521 ST / WP522 ST on CD-ROM • "Ready for use" software for operating a scale with SIWAREX WP52x ST and a touch panel (in a variety of languages), including function block and HMI visualization • Service software SIWATOOL V7.0 • Device manuals (PDF files in a variety of languages)	**7MH4980-1AK01**
Ethernet cable patch cord 2 m (7 ft) For connecting SIWAREX WP52x ST to a PC (SIWATOOL V7 or Modbus TCP/IP)	**6XV1850-2GH20**

SIWAREX WP521 ST, SIWAREX WP522 ST

Ordering data	Article No.
Remote display (optional)	
The digital remote displays can be connected directly to the SIWAREX WP231 via the RS 485 interface. Suitable remote display: S102 Siebert Industrieelektronik GmbH Postfach 1180 D-66565 Eppelborn, Germany Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de Detailed information is available from the manufacturer.	
Accessories	
SIWAREX JB junction box, aluminum housing For connecting up to 4 load cells in parallel, and for connecting multiple junction boxes.	**7MH4710-1BA**
SIWAREX JB junction box, stainless steel housing For connecting up to 4 load cells in parallel.	**7MH4710-1EA**
SIWAREX JB junction box, stainless steel housing (ATEX) For connecting up to 4 load cells in parallel. (For zone allocation, see manual or type examination certificate)	**7MH4710-1EA01**
Ex interface SIWAREX IS For intrinsically-safe connection of load cells. With ATEX approval (not UL/FM). Suitable for SIWAREX electronic weighing system. Compatibility of load cells must be checked.	
• Short-circuit current < 199 mA DC	**7MH4710-5BA**
• Short-circuit current < 137 mA DC	**7MH4710-5CA**
Load cell cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) – CY For connecting SIWAREX electronic weighing systems to junction box (JB), extension box (EB) and Ex interface or between two extension boxes. For permanent installation. Occasional bending is possible. External diameter: approx. 10.8 mm (0.43 in) Permissible ambient temperature -40 ... +80 °C (-40 ... +176 °F). Sold by the meter.	
• Sheath color: orange	**7MH4702-8AG**
• For potentially explosive atmospheres. Sheath color: blue	**7MH4702-8AF**

Overview

- 2-channel high-speed counter module
- With comprehensive parameterization options for an optimum adaptation to the task and reduction of control load
- Speed and time period measuring
- Storage and comparison functions
- Connection of 24 V encoders

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	**6AG1550-1AA00-7AB0**
Based on	**6ES7550-1AA00-0AB0**
	SIPLUS S7-1500 TM COUNT 2X24V
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C; = Tmax; note derating for inductive loads; > +60 °C total current of the encoder supply max. 0.5 A, total current of the outputs max. 1 A
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	40 °C; Please note derating for inductive loads
Extended ambient conditions	
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

	Article No.
SIPLUS TM Count 2x24V counter module (Extended temperature range and exposure to media) With 2 channels, max. 200 kHz; for 24 V encoder	**6AG1550-1AA00-7AB0**
Accessories	See SIMATIC S7-1500, TM Count 2x24V counter module, page 4/102

CM PtP

Overview

- Modules for serial communication connections, scaled according to interface types, protocols, and performance
- 4 versions with different physical transmission characteristics:
  - RS 232C, max. 19.2 kbps
  - RS 232C, max.115.2 kbps
  - RS 422/RS 485, max. 19.2 kbps
  - RS 422/RS 485, max. 115.2 kbps
- Protocols supported
  - Freeport: User-parameterizable telegram format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU Master
  - Modbus RTU Slave
  - USS, implemented through instructions

Technical specifications

Article number	**6ES7540-1AD00-0AA0**	**6ES7541-1AD00-0AB0**	**6ES7540-1AB00-0AA0**	**6ES7541-1AB00-0AB0**
	S7-1500, CM PTP RS 232 BA	S7-1500, CM PTP RS 232 HF	S7-1500, CM PTP RS 422/485 BA	S7-1500, CM PTP RS 422/485 HF
General information				
Product type designation	CM PtP RS232 BA	CM PtP RS232 HF	CM PtP RS422/485 BA	CM PtP RS422/485 HF
Product function				
• I&M data	Yes; I&M 0	Yes; I&M 0	Yes; I&M 0	Yes; I&M 0
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V12 / V12	V12 / V12	V12 / V12	V12 / V12
• STEP 7 configurable/integrated as of version	V5.5 SP2 with GSD file	V5.5 SP2 with GSD file	V5.5 SP2 with GSD file	V5.5 SP2 with GSD file
• PROFIBUS as of GSD version/ GSD revision	- / -	- / -	- / -	- / -
• PROFINET as of GSD version/ GSD revision	V2.3	V2.3 / -	V2.3	V2.3 / -
Installation type/mounting				
Rail mounting	Yes; S7-1500 mounting rail	Yes; S7-1500 mounting rail	Yes; S7-1500 mounting rail	Yes; S7-1500 mounting rail
Supply voltage				
Type of supply voltage	system power supply	system power supply	system power supply	system power supply
Input current				
Current consumption (rated value)	35 mA; From the backplane bus	35 mA; From the backplane bus	33 mA; From the backplane bus	33 mA; From the backplane bus
Power				
Power available from the backplane bus	0.65 W	0.65 W	0.65 W	0.65 W
Power loss				
Power loss, typ.	0.6 W	0.6 W	0.6 W	0.6 W
1. Interface				
Interface types				
• RS 485			Yes	Yes
• RS 422			Yes	Yes
• RS 232	Yes	Yes		
RS 232				
• Transmission rate, max.	19.2 kbit/s	115.2 kbit/s		
• Cable length, max.	15 m	15 m		
• RS 232 auxiliary signals	RTS, CTS, DTR, DSR, RI, DCD	RTS, CTS, DTR, DSR, RI, DCD		
RS 485				
• Transmission rate, max.			19.2 kbit/s	115.2 kbit/s
• Cable length, max.			1 200 m	1 200 m

Technical specifications (continued)

Article number	6ES7540-1AD00-0AA0	6ES7541-1AD00-0AB0	6ES7540-1AB00-0AA0	6ES7541-1AB00-0AB0
	S7-1500, CM PTP RS 232 BA	S7-1500, CM PTP RS 232 HF	S7-1500, CM PTP RS 422/485 BA	S7-1500, CM PTP RS 422/485 HF
RS 422				
• Transmission rate, max.			19.2 kbit/s	115.2 kbit/s
• Cable length, max.			1 200 m	1 200 m
• 4-wire full duplex connection			Yes	Yes
• 4-wire multipoint connection			No	No
Integrated protocols				
Freeport				
- Telegram length, max.	1 kbyte	4 kbyte	1 kbyte	4 kbyte
- Bits per character	7 or 8	7 or 8	7 or 8	7 or 8
- Number of stop bits	1 or 2 bit	1 or 2 bit	1 or 2 bit	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any
3964 (R)				
- Telegram length, max.	1 kbyte	4 kbyte	1 kbyte	4 kbyte
- Bits per character	7 or 8	7 or 8	7 or 8	7 or 8
- Number of stop bits	1 or 2 bit	1 or 2 bit	1 or 2 bit	1 or 2 bit
- Parity	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any	None, even, odd, always 1, always 0, any
Modbus RTU master				
- Address area		1 to 247, extended 1 to 65535		1 to 247, extended 1 to 65535
- Number of slaves, max.		1		32
MODBUS RTU slave				
- Address area		1 to 247, extended 1 to 65535		1 to 247, extended 1 to 65535
Telegram buffer				
• Buffer memory for telegrams	2 kbyte	8 kbyte	2 kbyte	8 kbyte
• Number of telegrams which can be buffered	255	255	255	255
Interrupts/diagnostics/ status information				
Diagnostics function	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes	Yes	Yes	Yes
• Hardware interrupt	No	No	No	No
Diagnostic messages				
• Wire-break	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• Receive RxD	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
• Transmit TxD	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
Potential separation				
between backplane bus and interface	Yes	Yes	Yes	Yes
Isolation				
Isolation tested with	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)	707 V DC (type test)
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C	60 °C	60 °C	60 °C
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C	40 °C	40 °C	40 °C
Decentralized operation				
to SIMATIC S7-300	Yes	Yes	Yes	Yes
to SIMATIC S7-400	Yes	Yes	Yes	Yes
to SIMATIC S7-1500	Yes	Yes	Yes	Yes
to standard PROFINET controller	Yes	Yes	Yes	Yes
Fast Startup supported	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	6ES7540-1AD00-0AA0	6ES7541-1AD00-0AB0	6ES7540-1AB00-0AA0	6ES7541-1AB00-0AB0
	S7-1500, CM PTP RS 232 BA	S7-1500, CM PTP RS 232 HF	S7-1500, CM PTP RS 422/485 BA	S7-1500, CM PTP RS 422/485 HF
Dimensions				
Width	35 mm	35 mm	35 mm	35 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	127 mm	127 mm	127 mm	127 mm
Weights				
Weight, approx.	0.22 kg	0.22 kg	0.22 kg	0.22 kg

4

Ordering data

	Article No.
CM PtP RS 232 BA communication module Basic communication module with one RS 232 interface, Freeport, 3964(R) and USS protocols, 9-pin sub D connector, max. 19.2 kbps	**6ES7540-1AD00-0AA0**
CM PtP RS 232 HF communication module High Feature communication module with one RS 232 interface, Freeport, 3964(R), USS and Modbus RTU protocols, 9-pin sub D connector, max. 115.2 kbps	**6ES7541-1AD00-0AB0**
CM PtP RS 422/485 BA communication module Basic communication module with one RS 422/485 interface, Freeport, 3964(R) and USS protocols, 15-pin sub D socket, max. 19.2 kbps	**6ES7540-1AB00-0AA0**
CM PtP RS 422/485 HF communication module High Feature communication module with one RS 422/485 interface, Freeport, 3964(R), USS and Modbus RTU protocols, 15-pin sub D socket, max. 115.2 kbps	**6ES7541-1AB00-0AB0**

	Article No.
Accessories	
RS 232 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7902-1AB00-0AA0**
10 m	**6ES7902-1AC00-0AA0**
15 m	**6ES7902-1AD00-0AA0**
RS 422/485 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7902-3AB00-0AA0**
10 m	**6ES7902-3AC00-0AA0**
50 m	**6ES7902-3AG00-0AA0**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

Overview

DP-M	DP-S	FMS	PG/OP	S7	
●	●		●	●	

The CM 1542-5 communication module expands the SIMATIC S7-1500 Controller to include a PROFIBUS connection for communication with lower-level PROFIBUS devices in bandwidths from 9.6 kbps to 12 Mbps. The module can also be used to implement separate PROFIBUS lines, in other words, to control a number of different field devices via a number of PROFIBUS segments. The CM 1542-5 assumes all communication tasks, thus reducing the CPU workload.

The CM 1542-5 is suitable for S7 communication as well as for conventional PROFIBUS communication. This makes it possible to establish communication between the S7-1500 Controller and other devices, for example those from the SIMATIC S7-300/400 range.

- PROFIBUS DP master or DP slave with electrical interface for connecting the SIMATIC S7-1500 to PROFIBUS at up to 12 Mbps (including 45.45 kbps)
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
  - Open user communication (SEND/RECEIVE) via FDL
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Module replacement without a PG
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Technical specifications

Article number	**6GK7542-5DX00-0XE0**
Product type designation	CM 1542-5
Transmission rate	
Transfer rate	
• at the 1st interface acc. to PROFIBUS	9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	0
Number of electrical connections	
• at the 1st interface acc. to PROFIBUS	1
Type of electrical connection	
• at the 1st interface acc. to PROFIBUS	9-pin Sub-D socket (RS485)
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	15 V
Relative symmetrical tolerance at DC	
• at 15 V	3 %
Consumed current	
• from backplane bus at DC at 15 V typical	0.2 A
Power loss [W]	3 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 40 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1500 single width
Width	35 mm
Height	142 mm
Depth	129 mm
Net weight	0.4 kg
Mounting type	
• S7-1500 rail mounting	Yes
Product properties, functions, components general	
Number of units	
• per CPU maximum	8
• Note	depending on CPU type
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum	30
Amount of data	
• as user data per connection for open communication by means of SEND/RECEIVE blocks maximum	240 byte

Technical specifications (continued)

Article number	6GK7542-5DX00-0XE0
Product type designation	CM 1542-5
Performance data PROFIBUS DP	
Service as DP master	
• DPV1	Yes
Number of DP slaves on DP master usable	125
Amount of data	
• of the address area of the inputs as DP master total	8 192 byte
• of the address area of the outputs as DP master total	8 192 byte
• of the address area of the inputs per DP slave	244 byte
• of the address area of the outputs per DP slave	244 byte
Service as DP slave	
• DPV0	Yes
• DPV1	Yes
Amount of data	
• of the address area of the inputs as DP slave total	240 byte
• of the address area of the outputs as DP slave total	240 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	48
• Note	depending on the system upper limit
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	48
Performance data telecontrol	
Protocol is supported	
• TCP/IP	No
Configuration software	
• required	STEP 7 Professional V12 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via S7-1500 CPU
Product functions Time	
Product function pass on time synchronization	Yes

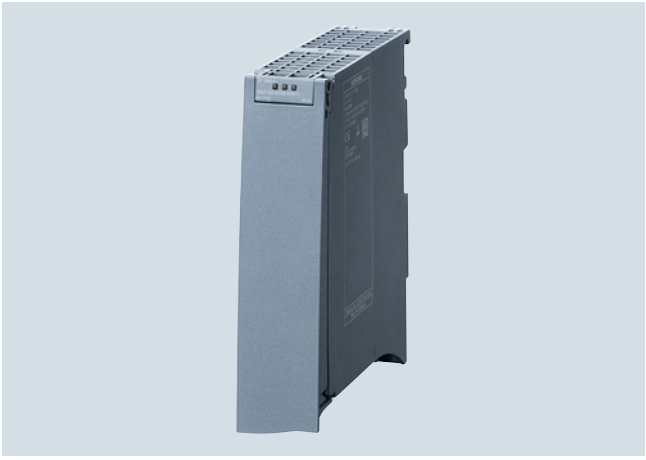
Ordering data

	Article No.
CM 1542-5 communication module	
Communication module for electrical connection of SIMATIC S7-1500 to PROFIBUS as DP master or DP slave; S7 and PG/OP communication, data record routing, time synchronization, diagnostics	**6GK7542-5DX00-0XE0**
Accessories	
PROFIBUS FastConnect RS 485 connector	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbps	
• Without PG interface	**6ES7972-0BA52-0XA0**
• With PG interface	**6ES7972-0BB52-0XA0**
PROFIBUS FC Standard Cable	
2-wire bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	**6XV1830-0EH10**
PROFIBUS FastConnect Stripping Tool	
Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	**6GK1905-6AA00**
PROFIBUS bus terminal 12M	
Bus terminal for connection of PROFIBUS nodes up to 12 Mbps with connecting cable	**6GK1500-0AA10**

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●		

The CP 1542-5 communications processor expands the SIMATIC S7-1500 Controller to include a PROFIBUS connection for communication with lower-level PROFIBUS devices in bandwidths from 9.6 kbps to 12 Mbps. The processor also allows the implementation of separate PROFIBUS lines; in other words, the control of multiple field devices via several PROFIBUS segments. The CP 1542-5 handles all communication tasks, thus reducing the CPU load.

- PROFIBUS DP master or DP slave with electrical interface for connecting the SIMATIC S7-1500 to PROFIBUS at up to 12 Mbps (including 45.45 kbps)

Communication services:

- PROFIBUS DP
- PG/OP communication
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Module replacement without a PG

Technical specifications

Article number	**6GK7542-5FX00-0XE0**
Product type designation	CP 1542-5
Transmission rate	
Transfer rate	
• at the 1st interface acc. to PROFIBUS	9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	0
Number of electrical connections	
• at the 1st interface acc. to PROFIBUS	1
Type of electrical connection	
• at the 1st interface acc. to PROFIBUS	9-pin Sub-D socket (RS485)
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	15 V
Relative symmetrical tolerance at DC	
• at 15 V	3 %
Consumed current	
• from backplane bus at DC at 15 V typical	0.1 A
Power loss [W]	1.5 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 40 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1500 single width
Width	35 mm
Height	142 mm
Depth	129 mm
Net weight	0.27 kg
Mounting type	
• S7-1500 rail mounting	Yes
Product properties, functions, components general	
Number of units	
• per CPU maximum	8
• Note	depending on CPU type

Technical specifications (continued)

Article number	6GK7542-5FX00-0XE0
Product type designation	CP 1542-5
Performance data PROFIBUS DP	
Service as DP master	
• DPV1	Yes
Number of DP slaves on DP master usable	32
Amount of data	
• of the address area of the inputs as DP master total	2 048 byte
• of the address area of the outputs as DP master total	2 048 byte
• of the address area of the inputs per DP slave	244 byte
• of the address area of the outputs per DP slave	244 byte
Service as DP slave	
• DPV0	Yes
• DPV1	Yes
Amount of data	
• of the address area of the inputs as DP slave total	240 byte
• of the address area of the outputs as DP slave total	240 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	16
• Note	depending on the system upper limit
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	16
Performance data telecontrol	
Protocol is supported	
• TCP/IP	No
Configuration software	
• required	STEP 7 Professional V12 SP1 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via S7-1500 CPU
Product functions Time	
Product function pass on time synchronization	Yes

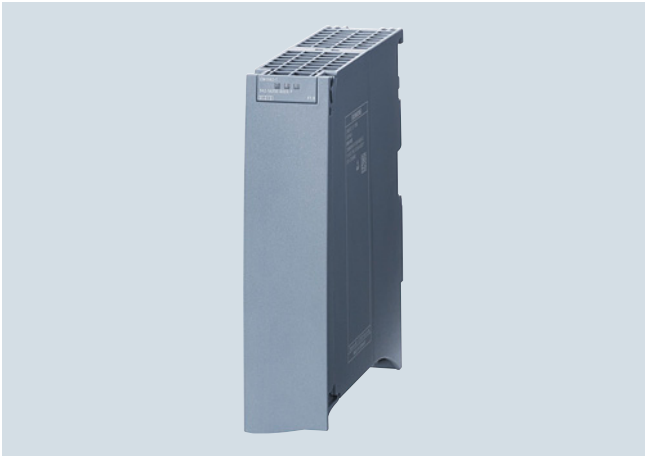
Ordering data

	Article No.
CP 1542-5 communications processor	
Communication module for electrical connection of SIMATIC S7-1500 to PROFIBUS as DP master or DP slave; PG/OP communication, time synchronization, diagnostics; smaller quantity structure	**6GK7542-5FX00-0XE0**
Accessories	
PROFIBUS FastConnect RS 485 connector	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbps	
• Without programming device interface	**6ES7972-0BA52-0XA0**
• With programming device interface	**6ES7972-0BB52-0XA0**
PROFIBUS FC Standard Cable	
2-wire bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	**6XV1830-0EH10**
PROFIBUS FastConnect Stripping Tool	
Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	**6GK1905-6AA00**
PROFIBUS bus terminal 12M	
Bus terminal for connection of PROFIBUS stations for up to 12 Mbps with connecting cable	**6GK1500-0AA10**

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●	●	●	●	●	●	●

G_IK10_XX_10383

Communication module for connecting a SIMATIC S7-1500 to PROFINET networks as PROFINET IO controller or PROFINET IO device.

The CM 1542-1 supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication;
  - Web diagnostics by means of access to the web server of the S7-1500 system
  - Static IP routing with up to 1 Mbps via IPv4 to other CM 1543-1 / CM 1542-1 units in a S7-1500 system, e.g., for web server accesses without real-time capability

Technical specifications

Article number	**6GK7542-1AX00-0XE0**
Product type designation	CM 1542-1
Transmission rate	
Transfer rate	
• at the 1st interface	10 ... 100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	2
Type of electrical connection	
• at the 1st interface acc. to Industrial Ethernet	RJ45 port
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	15 V
Relative symmetrical tolerance at DC	
• at 15 V	3 %
Consumed current	
• from backplane bus at DC at 15 V typical	0.22 A
Power loss [W]	3.3 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 40 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1500 single width
Width	35 mm
Height	142 mm
Depth	129 mm
Net weight	0.4 kg
Mounting type	
• S7-1500 rail mounting	Yes

Technical specifications (continued)

Article number	6GK7542-1AX00-0XE0
Product type designation	CM 1542-1
Product properties, functions, components general	
Number of units	
• per CPU maximum	8
• Note	depending on CPU type
Performance data open communication	
Number of possible connections for open communication	
• by means of T blocks maximum	64; depending on the system upper limit
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Number of Multicast stations	6
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	64
• Note	depending on the system upper limit
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	64
Performance data PROFINET communication as PN IO-Controller	
Product function PROFINET IO controller	Yes
Number of PN IO devices on PROFINET IO controller usable total	128
Number of PN IO IRT devices on PROFINET IO controller usable	64
Number of external PN IO lines with PROFINET per rack	10
Amount of data	
• as user data for input variables as PROFINET IO controller maximum	8 Kibyte
• as user data for input variables as PROFINET IO controller maximum	8 Kibyte
• as user data for input variables per PN IO device as PROFINET IO controller maximum	1 433 byte
• as user data for output variables per PN IO device as PROFINET IO controller maximum	1 433 byte
• as user data for input variables per PN IO device for each sub-module as PROFINET IO controller maximum	256 byte
• as user data for output variables per PN IO device for each sub-module as PROFINET IO controller maximum	256 byte

Article number	6GK7542-1AX00-0XE0
Product type designation	CM 1542-1
Performance data telecontrol	
Protocol is supported	
• TCP/IP	Yes
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 Professional V13 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via S7-1500 CPU
Product functions switch	
Product feature Switch	Yes
Product function	
• switch-managed	No
• with IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Product function	
• switch-off of non-required services	Yes
• Blocking of communication via physical ports	No
• log file for unauthorized access	No
Product functions Time	
Product function SICLOCK support	Yes
Product function pass on time synchronization	Yes
Protocol is supported	
• NTP	Yes

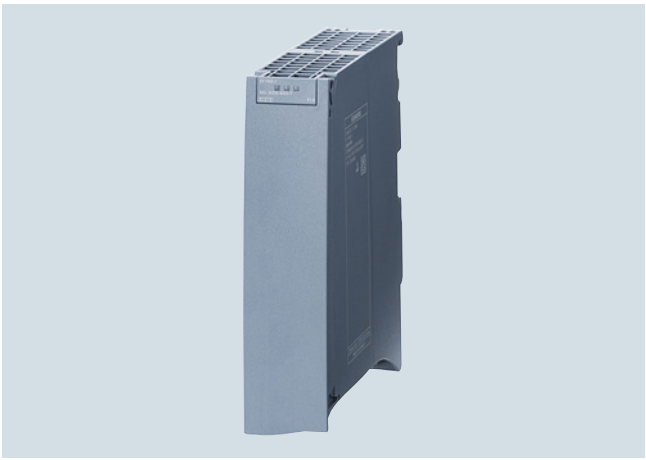
Ordering data

	Article No.
CM 1542-1 communication module For connecting SIMATIC S7-1500 to PROFINET IO, TCP/IP, ISO-on-TCP, UDP, S7 communication, IP broadcast/multicast, SNMPV1, time synchronization via NTP; 2 x RJ45 interface with 10/100 Mbps	**6GK7542-1AX00-0XE0**
Accessories	
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
IE FC TP Standard Cable GP 4 x 2 8-wire, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 modular outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**

	Article No.
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
SCALANCE X308-2 Industrial Ethernet switch 2 x 1000 Mbps SC ports, optical (multimode, glass), up to 750 m 1 x 10/100/1000 Mbps RJ45 port, electrical 7 x 10/100 Mbps RJ45 ports, electrical	**6GK5308-2FL10-2AA3**

4

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●			●	●	●	●

G_IK10_XX_10363

The SIMATIC CP 1543-1 communications processor securely connects the new SIMATIC S7-1500 Controller to Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data encryption protocols such as FTPS and SNMPv3, the communications processor protects individual S7-1500 stations or even entire automation cells against unauthorized access.

The CP can also be used for linking the S7-1500 station into an IPv6-based network. All functions are configured by means of STEP 7 Professional V12 (TIA Portal) or higher.

The CP 1543-1 supports the following communications services:

- PG/OP communication
- S7 communication
- Open user communication (SEND/RECEIVE, FETCH/WRITE)
- IT communication
  - FTP functions (File Transfer Protocol FTP/FTPS) for file management and access to data blocks in the CPU (client and server function)
  - Access (read and write modes) to csv files stored on the memory card of the CPU via FTP(S)
  - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)
  - Static IP routing with up to 1 Mbps via IPv4 to other CM 1543-1 or CM 1542-1 units in a S7-1500 system, e.g., for web server accesses without real-time capability. Securing a cell by activating the security function in the CP 1543-1 automatically deactivates IP routing.
- Security functions
  - Stateful Packet Inspection (layers 3 and 4) firewall
  - Secure communication via VPN (IPsec)
  - Secure access to the web server of the CPU via the HTTPS protocol
  - Secure file transfer using FTPS
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information
  - Encrypted email communication via SMTPS (Port 587)
  - Open communication over TCP/IP
- Integration of the S7-1500 into IPv6-based networks; An IPv6-compliant IP address can be used for the following communication services:
  - FETCH/WRITE access (CP as server)
  - FTP server mode
  - FTP client mode with addressing by program block
  - Email transfer with addressing by program block

Technical specifications

Article number	**6GK7543-1AX00-0XE0**
Product type designation	CP 1543-1
Transmission rate	
Transfer rate	
• at the 1st interface	10 ... 1 000 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	1
Type of electrical connection	
• at the 1st interface acc. to Industrial Ethernet	RJ45 port
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	15 V
Relative symmetrical tolerance at DC	
• at 15 V	3 %
Consumed current	
• from backplane bus at DC at 15 V typical	0.35 A
Power loss [W]	5.3 W

Article number	**6GK7543-1AX00-0XE0**
Product type designation	CP 1543-1
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 40 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1500 single width
Width	35 mm
Height	142 mm
Depth	129 mm
Net weight	0.35 kg
Mounting type	
• S7-1500 rail mounting	Yes

Technical specifications (continued)

Article number	**6GK7543-1AX00-0XE0**
Product type designation	CP 1543-1
Product properties, functions, components general	
Number of units	
• per CPU maximum	8
• Note	depending on CPU type
Performance data open communication	
Number of possible connections for open communication	
• by means of T blocks maximum	118; depending on the system upper limit
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Number of Multicast stations	118
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	118
• Note	depending on the system upper limit
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	118
Performance data IT functions	
Number of possible connections	
• as client by means of FTP maximum	32
• as server by means of FTP maximum	16
• as server by means of HTTP maximum	4
• as e-mail client maximum	1
Amount of data as user data for email maximum	64 Kibyte
Performance data telecontrol	
Protocol is supported	
• TCP/IP	Yes
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	No
Configuration software	
• required	STEP 7 Professional V12 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes; yes, via S7-1500 CPU

Article number	**6GK7543-1AX00-0XE0**
Product type designation	CP 1543-1
Product functions Routing	
Product function	
• Static IP routing	Yes
• Static IP routing IPv6	No
• dynamic IP routing	No
• dynamic IP routing IPv6	No
Protocol is supported	
• RIP v1	No
• RIPv2	No
• RIPnG for IPv6	No
• OSPFv2	No
• OSPFv3 for IPv6	No
• VRRP	No
• VRRP for IPv6	No
• BGP	No
• PPP	No
• PPoE via DSL	No
Product functions Security	
Firewall version	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections with VPN connection	16
Product function	
• password protection for Web applications	No
• ACL - IP-based	No
• ACL - IP-based for PLC/routing	No
• switch-off of non-required services	Yes
• Blocking of communication via physical ports	No
• log file for unauthorized access	Yes
Product functions Time	
Product function SICLOCK support	Yes
Product function pass on time synchronization	Yes
Protocol is supported	
• NTP	Yes

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Ordering data	Article No.
CP 1543-1 communications processor For connecting SIMATIC S7-1500 to Industrial Ethernet via TCP/IP, ISO and UDP and security functions (VPN, firewall); 1 x RJ45 interface with 10/100/1000 Mbps; SNMPV1/V3; time synchronization via NTP, FTP, email, IPv4/IPv6	**6GK7543-1AX00-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**

	Article No.
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Standard Cable GP 4 x 2 8-wire, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 modular outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
Industrial Ethernet switch SCALANCE X204-2 Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet switch SCALANCE X308-2 2 x 1000 Mbps multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1000 Mbps RJ45 port, 7 x 10/100 Mbps RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

Note:

You can find order information for software for communication with PC systems in the Catalog IK PI or in the Industry Mall.

Overview

- SINAUT communication module TIM 1531 IRC with four interfaces as a stand-alone unit for SIMATIC S7-1500 for use in wide area networks (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS/UMTS/LTE router, GPRS/UMTS/LTE modem or wireless devices
- Wired communication via Ethernet, DSL, dial-up modems or dedicated line modem
- Message frame memory for seamless recording of data and support of redundant communication paths
- Easy configuration in the TIA Portal

Ordering data

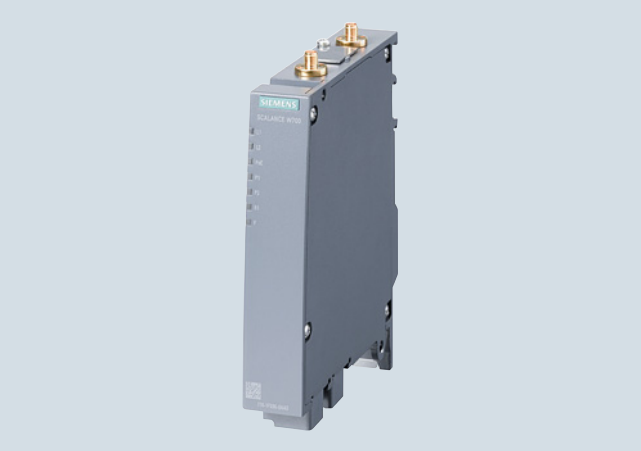
	Article No.
TIM 1531 IRC communication module TIM 1531 IRC communication module for SIMATIC S7-1500, S7-400, S7-300 with SINAUT ST7 with three RJ45 interfaces for communication via IP-based networks (WAN/LAN) and an RS 232/RS 485-interface for communication via classical WAN networks	**6GK7543-1MX00-0XE0**
Accessories	
STEP 7 Professional V14 SP1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64-bit), Windows 8.1 Professional(64-bit), Windows 8.1 Enterprise (64-bit), WIndows 10 Professional Version 1607, WIndows 10 Enterprise Version 1607, WIndows 10 Enterprise 2016 LTSB, WIndows 10 Enterprise 2015 LTSB, Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (Vollinstallation), Windows Server 2016 Standard (full installation) Type of delivery: English, German, Chinese, Italian, French, Spanish	
STEP 7 Professional V14 SP1, floating license	**6ES7822-1AA04-0YA5**
STEP 7 Professional V14 SP1, floating license, software download incl. license key [1] Email address required for delivery	**6ES7822-1AE04-0YA5**
STEP 7 Professional V14 SP1, trial license	**6ES7822-1AA04-0YA7**

	Article No.
SIMATIC PM 1507 Stabilized power supply for SIMATIC S7-1500 Input: 120/230 V AC Output: 24 V DC	
• Output current 3 A	**6EP1332-4BA00**
• Output current 8 A	**6EP1333-4BA00**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement/terminal contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**

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

SCALANCE W774 RJ45 for use in control cabinet

Overview



- Access points in SIMATIC design suitable for applications where the device is to be mounted in the control cabinet

Technical specifications

Article number	**6GK5774-1FX00-0AA0** **6GK5774-1FX00-0AB0** [1]
Product type designation	SCALANCE W774-1 RJ45
Transmission rate	
• Transfer rate with WLAN maximum	300 Mbit/s
• Transfer rate for Industrial Ethernet	10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	2
• for power supply	1
• for redundant voltage supply	1
Type of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	4-pole screw terminal, PoE
design of the removable storage	
• C-PLUG	Yes
• KEY-PLUG	Yes
Interfaces wireless	
Number of radio cards permanently installed	1
Transmission mode for multiple input multiple output (MIMO)	2x2
Number of spatial streams	2
Number of electrical connections for external antenna(s)	2
Type of electrical connection for external antenna(s)	R-SMA (socket)
Product feature external antenna can be mounted directly on device	Yes

Article number	**6GK5774-1FX00-0AA0** **6GK5774-1FX00-0AB0** [1]
Product type designation	SCALANCE W774-1 RJ45
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1	
• from terminal block	19.2 V
Supply voltage 2	
• from terminal block	28.8 V
Supply voltage	
• from Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af	48 V
Consumed current	
• at DC at 24 V typical	0.25 A
• with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	0.125 A
Power loss [W]	
• at DC at 24 V typical	6 W
• with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	6 W
Permitted ambient conditions	
Ambient temperature	
• during operation	-20 ... +60 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity at 25 °C without condensation during operation maximum	97 %
Ambient condition for operation	When used under hazardous conditions (Zone 2), the SCALANCE W774-1 RJ45 or W734-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529.
Protection class IP	IP30

[1] Wireless approval in the USA

Technical specifications (continued)

Article number	**6GK5774-1FX00-0AA0** **6GK5774-1FX00-0AB0** [1]
Product type designation	SCALANCE W774-1 RJ45
Design, dimensions and weight	
Width	26 mm
Height	156 mm
Depth	127 mm
Width of the enclosure without antenna	26 mm
Height of the enclosure without antenna	147 mm
Depth of the enclosure without antenna	127 mm
Net weight	0.52 kg
Mounting type	wall mounting only if flat mounted
• S7-300 rail mounting	Yes
• S7-1500 rail mounting	Yes
• 35 mm DIN rail mounting	Yes
• wall mounting	Yes
Wireless frequencies	
Operating frequency	
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz
Product properties, functions, components general	
Product function Access Point Mode	Yes
Product function Client Mode	Yes
Number of SSIDs	4
Product function	
• iPCF Access Point	Yes; Only in combination with the 'KEY-PLUG W780 iFeatures'
• iPCF client	Yes; Only in combination with the 'KEY-PLUG W740 iFeatures'
• iPCF-MC Access Point	No
• iPCF-MC client	Yes; Only in combination with the 'KEY-PLUG W740 iFeatures'
Number of iPCF-capable radio modules	1
Product function iREF	Yes
Number of iREF-capable radio modules	1
Product function iPRP	Yes; In combination with the 'KEY-PLUG W780 iFeatures' only
Product functions management, configuration	
Number of manageable IP addresses in client	8
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• configuration with STEP 7 in the TIA Portal	Yes
• operation with IWLAN controller	No
• operation with Enterasys WLAN controller	No
• forced roaming on IP down with IWLAN	Yes
• forced roaming on link down with IWLAN	Yes
• WDS	Yes

Article number	**6GK5774-1FX00-0AA0** **6GK5774-1FX00-0AB0** [1]
Product type designation	SCALANCE W774-1 RJ45
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	Yes
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function	
• PROFINET IO diagnosis	Yes
• Link Check	No
• connection monitoring IP-Alive	No
• localization via Aeroscout	Yes
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions VLAN	
Product function	
• function VLAN with IWLAN	Yes
Product functions DHCP	
Product function	
• DHCP client	Yes
• in Client Mode DHCP server via LAN	Yes
• DHCP Option 82	Yes
Product functions Redundancy	
Protocol is supported	
• STP/RSTP	Yes
• MSTP	Yes
• RSTP	Yes
Product functions Security	
Product function	
• ACL - MAC-based	Yes
• Management security, ACL-IP based	Yes
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	No
• access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
• RADIUS	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• SIMATIC Time	Yes

[1] Wireless approval in the USA

SCALANCE W774 RJ45 for use in control cabinet

Technical specifications (continued)

Article number	**6GK5774-1FX00-0AA0** **6GK5774-1FX00-0AB0** [1]
Product type designation	SCALANCE W774-1 RJ45
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1 CSA C22.2 No. 60950-1
Certificate of suitability	
• EC declaration of conformity	Yes
• CE marking	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	No
• Railway application in accordance with EN 50155	No
• NEMA TS2	No
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af	Yes
• Power-over-Ethernet according to IEEE802.3at for type 2	Yes
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	Yes
• Bureau Veritas (BV)	Yes
• DNV GL	Yes
• Lloyds Register of Shipping (LRS)	Yes
• Nippon Kaiji Kyokai (NK)	Yes
• Polski Rejestr Statkow (PRS)	Yes
• Royal Institution of Naval Architects (RINA)	Yes
Accessories	
accessories	24 V DC screw terminal included in scope of delivery

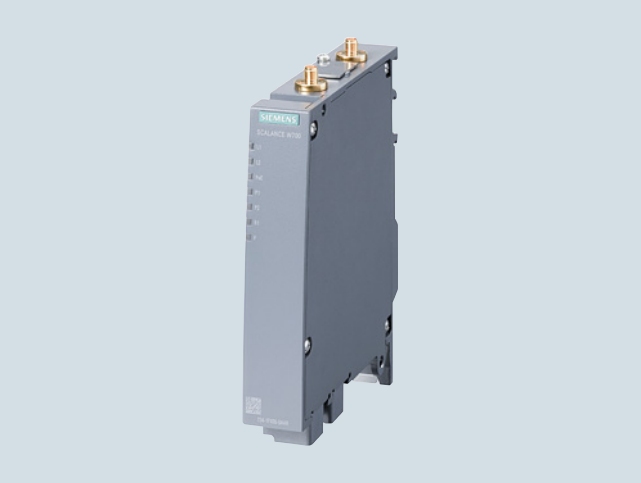
[1] Wireless approval in the USA

Ordering data

	Article No.
SCALANCE W774 access points IWLAN access points with built-in wireless interface for establishing wireless connections with iFeatures; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20°C to +60°C); scope of delivery: Mounting hardware, 4-pin screw terminal for 24V DC; manual on CD-ROM; German/English	
SCALANCE W774-1 RJ45 IWLAN Access Point with one built-in wireless interface	
• National approvals for operation outside the USA	**6GK5774-1FX00-0AA0**
• National approvals for operation within the USA [1]	**6GK5774-1FX00-0AB0**
Accessories	
KEY-PLUG W780 iFeatures Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W access points with PLUG compartment	**6GK5907-8PA00**
C-PLUG Swap medium for simple replacement of devices if a fault occurs; for storing configuration data; can be used in SIMATIC NET products with PLUG compartment	**6GK1900-0AB00**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC Standard Cable GP 2 x 2 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
Antennas and miscellaneous IWLAN accessories	See Catalog IK PI or Industry Mall

[1] Please note national approvals under http://www.siemens.com/wireless-approvals

Overview



ET 200MP station with SCALANCE W734 RJ45

- Client modules in SIMATIC design suitable for applications where the device is to be mounted in the control cabinet

Technical specifications

Article number	**6GK5734-1FX00-0AA0** **6GK5734-1FX00-0AB0** [1]
Product type designation	SCALANCE W734-1 RJ45
Transmission rate	
• Transfer rate with WLAN maximum	300 Mbit/s
• Transfer rate for Industrial Ethernet	10 Mbit/s, 100 Mbit/s, 10 Mbit/s, 100 Mbit/s
Interfaces	
Number of electrical connections	
• for network components or terminal equipment	2
• for power supply	1
• for redundant voltage supply	1
Type of electrical connection	
• for network components or terminal equipment	RJ45 socket
• for power supply	4-pole screw terminal, PoE
design of the removable storage	
• C-PLUG	Yes
• KEY-PLUG	Yes
Interfaces wireless	
Number of radio cards permanently installed	1
Transmission mode for multiple input multiple output (MIMO)	2x2
Number of spatial streams	2
Number of electrical connections for external antenna(s)	2
Type of electrical connection for external antenna(s)	R-SMA (socket)
Product feature external antenna can be mounted directly on device	Yes

Article number	**6GK5734-1FX00-0AA0** **6GK5734-1FX00-0AB0** [1]
Product type designation	SCALANCE W734-1 RJ45
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1	
• from terminal block	19.2 V
Supply voltage 2	
• from terminal block	28.8 V
Supply voltage	
• from Power-over-Ethernet acc. to IEEE802.3at for type 1 and IEEE802.3af	48 V
Consumed current	
• at DC at 24 V typical	0.25 A
• with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	0.125 A
Power loss [W]	
• at DC at 24 V typical	6 W
• with Power-over-Ethernet according to IEEE802.3at for type 1 and IEEE802.3af typical	6 W
Permitted ambient conditions	
Ambient temperature	
• during operation	-20 ... +60 °C
• during storage	-40 ... +85 °C
• during transport	-40 ... +85 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Ambient condition for operation	When used under hazardous conditions (Zone 2), the SCALANCE W774-1 RJ45 or W734-1 RJ45 product must be installed in an enclosure. To comply with EN 50021, this enclosure must meet the requirements of at least IP 54 in compliance with EN 60529.
Protection class IP	IP30

[1] Wireless approval in the USA

Technical specifications (continued)

Article number	**6GK5734-1FX00-0AA0** **6GK5734-1FX00-0AB0** [1]
Product type designation	SCALANCE W734-1 RJ45
Design, dimensions and weight	
Width	26 mm
Height	156 mm
Depth	127 mm
Width of the enclosure without antenna	26 mm
Height of the enclosure without antenna	147 mm
Depth of the enclosure without antenna	127 mm
Net weight	0.52 kg
Mounting type	wall mounting only if flat mounted
• S7-300 rail mounting	Yes
• S7-1500 rail mounting	Yes
• 35 mm DIN rail mounting	Yes
• wall mounting	Yes
Wireless frequencies	
Operating frequency	
• for WLAN in 2.4 GHz frequency band	2.41 ... 2.48 GHz
• for WLAN in 5 GHz frequency band	4.9 ... 5.8 GHz
Product properties, functions, components general	
Product function Access Point Mode	No
Product function Client Mode	Yes
Product function	
• iPCF client	Yes; Only in combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'
• iPCF-MC Access Point	No
• iPCF-MC client	Yes; Only in combination with 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures'
Number of iPCF-capable radio modules	1
Product function iPRP	Yes; In combination with the 'KEY-PLUG W780 iFeatures' or 'KEY-PLUG W740 iFeatures' only
Product functions management, configuration	
Number of manageable IP addresses in client	8
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• configuration with STEP 7 in the TIA Portal	Yes
• WDS	No
Protocol is supported	
• Address Resolution Protocol (ARP)	Yes
• ICMP	Yes
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• DCP	Yes
• LLDP	No

Article number	**6GK5734-1FX00-0AA0** **6GK5734-1FX00-0AB0** [1]
Product type designation	SCALANCE W734-1 RJ45
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 – higher-level designation/ location designation	Yes
Product functions Diagnosis	
Product function	
• PROFINET IO diagnosis	Yes
• Link Check	No
• connection monitoring IP-Alive	No
• SysLog	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
Product functions VLAN	
Product function	
• function VLAN with IWLAN	No
Product functions DHCP	
Product function	
• DHCP client	Yes
• in Client Mode DHCP server via LAN	Yes
• DHCP Option 82	Yes
Product functions Redundancy	
Protocol is supported	
• STP/RSTP	Yes
• MSTP	Yes
• RSTP	Yes
Product functions Security	
Product function	
• ACL - MAC-based	Yes
• Management security, ACL-IP based	Yes
• IEEE 802.1x (radius)	Yes
• NAT/NAPT	Yes
• access protection according to IEEE802.11i	Yes
• WPA/WPA2	Yes
• TKIP/AES	Yes
Protocol is supported	
• SSH	Yes
• RADIUS	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
• SNTP	Yes
• SIMATIC Time	Yes

[1] Wireless approval in the USA

Technical specifications (continued)

Article number	**6GK5734-1FX00-0AA0** **6GK5734-1FX00-0AB0** [1]
Product type designation	SCALANCE W734-1 RJ45
Standards, specifications, approvals	
Standard	
• for FM	FM 3611: Class I, Division 2, Groups A,B,C,D, T4 / Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-15:2005, EN 60079-0:2006, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety from CSA and UL	UL 60950-1 CSA C22.2 No. 60950-1
Certificate of suitability	
• EC declaration of conformity	Yes
• CE marking	Yes
• C-Tick	Yes
• CCC	No
• E1 approval	No
• Railway application in accordance with EN 50155	No
• NEMA TS2	No
• IEC 61375	No
• IEC 61850-3	No
• NEMA4X	No
• Power-over-Ethernet according IEEE802.3at for type 1 and IEEE802.3af	Yes
• Power-over-Ethernet according to IEEE802.3at for type 2	Yes
Standard for wireless communication	
• IEEE 802.11a	Yes
• IEEE 802.11b	Yes
• IEEE 802.11e	Yes
• IEEE 802.11g	Yes
• IEEE 802.11h	Yes
• IEEE 802.11i	Yes
• IEEE 802.11n	Yes
Wireless approval	You will find the current list of countries at: www.siemens.com/wireless-approvals
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	Yes
• Bureau Veritas (BV)	Yes
• DNV GL	Yes
• Lloyds Register of Shipping (LRS)	Yes
• Nippon Kaiji Kyokai (NK)	Yes
• Polski Rejestr Statkow (PRS)	Yes
• Royal Institution of Naval Architects (RINA)	Yes
Accessories	
accessories	24 V DC screw terminal included in scope of delivery

[1] Wireless approval in the USA

Ordering data

	Article No.
SCALANCE W734 Client Modules IWLAN Ethernet client modules with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20°C to +60°C); scope of delivery: Mounting hardware, 4-pin screw terminal for 24V DC; manual on CD-ROM; German/English	
SCALANCE W734-1 RJ45 For managing the wireless connection of up to eight linked devices with Industrial Ethernet connection	
• National approvals for operation outside the USA	**6GK5734-1FX00-0AA0**
• National approvals for operation within the USA [1]	**6GK5734-1FX00-0AB0**
Accessories	
KEY-PLUG W740 iFeatures Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W client modules with PLUG compartment	**6GK5907-4PA00**
C-PLUG Swap medium for simple replacement of devices if a fault occurs; for storing configuration data; can be used in SIMATIC NET products with PLUG compartment	**6GK1900-0AB00**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC Standard Cable GP 2 x 2 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m minimum order 20 m	**6XV1840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
Antennas and miscellaneous IWLAN accessories	See Catalog IK PI or Industry Mall

[1] Please note national approvals under http://www.siemens.com/wireless-approvals

SIPLUS CM PtP

4

Overview

- Modules for serial communication connections, scaled according to interface types, protocols, and performance
- 4 versions with different physical transmission characteristics:
  - RS 232C, max. 19.2 kbps
  - RS 232C, max.115.2 kbps
  - RS 422/RS 485, max. 19.2 kbps
  - RS 422/RS 485, max. 115.2 kbps
- Protocols supported
  - Freeport: User-parameterizable telegram format for universal communication
  - 3964(R) for improved transmission reliability
  - Modbus RTU Master
  - Modbus RTU Slave
  - USS, implemented through instructions

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Technical specifications

Article number	**6AG1540-1AD00-7AA0**	**6AG1541-1AD00-7AB0**	**6AG1540-1AB00-7AA0**	**6AG1541-1AB00-7AB0**
Based on	**6ES7540-1AD00-0AA0**	**6ES7541-1AD00-0AB0**	**6ES7540-1AB00-0AA0**	**6ES7541-1AB00-0AB0**
	SIPLUS S7-1500 CM PTP RS 232 BA	SIPLUS S7-1500 CM PTP RS 232 HF	SIPLUS S7-1500 CM PTP RS 422/485 BA	SIPLUS S7-1500 CM PTP RS 422/485 HF
Ambient conditions				
Ambient temperature during operation				
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• horizontal installation, max.	70 °C	70 °C	70 °C	70 °C
• vertical installation, min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• vertical installation, max.	40 °C	40 °C	40 °C	40 °C
Extended ambient conditions				
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity				
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)

Technical specifications (continued)

Article number	6AG1540-1AD00-7AA0	6AG1541-1AD00-7AB0	6AG1540-1AB00-7AA0	6AG1541-1AB00-7AB0
Based on	6ES7540-1AD00-0AA0	6ES7541-1AD00-0AB0	6ES7540-1AB00-0AA0	6ES7541-1AB00-0AB0
	SIPLUS S7-1500 CM PTP RS 232 BA	SIPLUS S7-1500 CM PTP RS 232 HF	SIPLUS S7-1500 CM PTP RS 422/485 BA	SIPLUS S7-1500 CM PTP RS 422/485 HF
Resistance				
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

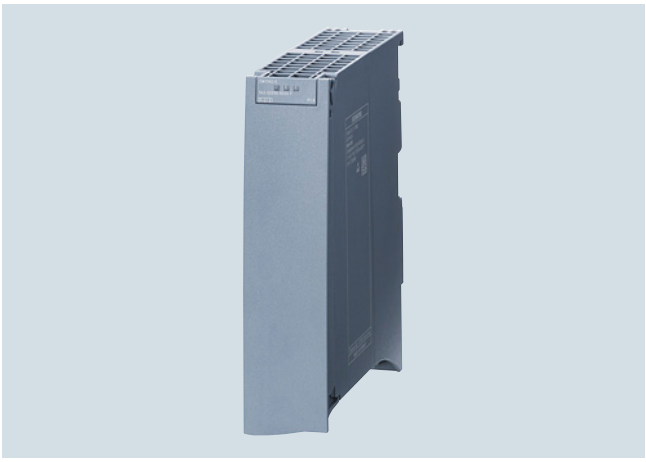
Ordering data

	Article No.
SIPLUS CM PtP RS 232 BA communication module (Extended temperature range and exposure to media) Basic communication module with 1 interface RS 232, Freeport, 3964(R) and USS protocols, 9-pin sub D connector, max. 19.2 kbps	**6AG1540-1AD00-7AA0**
SIPLUS CM PtP RS 232 HF communication module (Extended temperature range and exposure to media) High Feature communication module with 1 interface RS 232, Freeport, 3964(R), USS and Modbus RTU protocols, 9-pin sub D connector, max. 115.2 kbps	**6AG1541-1AD00-7AB0**
SIPLUS CM PtP RS 422/485 BA communication module (Extended temperature range and exposure to media) Basic communication module with 1 interface RS 422/485, Freeport, 3964(R) and USS protocols, 15-pin sub D socket, max. 19.2 kbps	**6AG1540-1AB00-7AA0**
SIPLUS CM PtP RS 422/485 HF communication module (Extended temperature range and exposure to media) High Feature communication module with 1 interface RS 422/485, Freeport, 3964(R), USS and Modbus RTU protocols, 15-pin sub D socket, max. 115.2 kbps	**6AG1541-1AB00-7AB0**

	Article No.
Accessories	See SIMATIC S7-1500, CM PtP communication module, page 4/118

SIPLUS NET CM 1542-5

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

The CM 1542-5 communication module expands the SIMATIC S7-1500 Controller to include a PROFIBUS connection for communication with lower-level PROFIBUS devices in bandwidths from 9.6 kbps to 12 Mbps. The module can also be used to implement separate PROFIBUS lines, in other words, to control a number of different field devices via a number of PROFIBUS segments. The CM 1542-5 handles all communication tasks, thus reducing the CPU load.

Apart from classic PROFIBUS communication; the CM 1542-5 is also suitable for S7 communication. This makes it possible to establish communication between the S7-1500 Controller and other devices, for example those from the SIMATIC S7-300/400 range.

- PROFIBUS DP master or DP slave with electrical interface for connecting the SIMATIC S7-1500 to PROFIBUS at up to 12 Mbps (including 45.45 kbps)
- Communications services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
- Time synchronization
- Simple programming and configuration over PROFIBUS
- Cross-network PG communication using S7 routing
- Module replacement without a PG
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Ordering data

	Article No.
SIPLUS CM 1542-5 communication module	
(Extended temperature range and exposure to media)	
Communication module for electrical connection of SIMATIC S7-1500 to PROFIBUS as a DP master or DP slave	**6AG1542-5DX00-7XE0**
Accessories	See SIMATIC S7-1500, CM 1542-5 communication module, page 4/120

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●			●	●	●	●

The SIMATIC CP 1543-1 communications processor securely connects the new SIMATIC S7-1500 Controller to Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data encryption protocols such as FTPS and SNMPv3, the communications processor protects individual S7-1500 stations or even entire automation cells against unauthorized access.

The CP can also be used for linking the S7-1500 station into an IPv6-based network. All functions are configured by means of STEP 7 Professional V12 (TIA Portal) or higher.

The CP 1543-1 supports the following communications services:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE, FETCH/WRITE)
- IT communication
  - FTP functions (File Transfer Protocol FTP/FTPS) for file management and access to data blocks in the CPU (client and server function)
  - Sending emails via SMTP or ESMTP with "SMTP-Auth" for authentication on an email server (also with IPv6)
- Security functions
  - Stateful Packet Inspection (layers 3 and 4) firewall
  - Secure communication via VPN (IPsec)
  - Secure access to the web server of the CPU via the HTTPS protocol
  - Secure file transfer using FTPS
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information
- Integration of the S7-1500 into IPv6-based networks; An IPv6-compliant IP address can be used for the following communication services:
  - FETCH/WRITE access (CP as server)
  - FTP server mode
  - FTP client mode with addressing by program block
  - Email transfer with addressing by program block

Note

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Ordering data

	Article No.
SIPLUS CP 1543-1 communications processor (Extended temperature range and exposure to media) For connection of SIMATIC S7-1500 to Industrial Ethernet via TCP/IP, ISO and UDP and Security functions; 1 x RJ45 interface with 10/100/1000 Mbps; electronic manual on DVD	**6AG1543-1AX00-2XE0**
Accessories	See SIMATIC S7-1500, SIMATIC CP 1543-1 communications processor, page 4/128

Front connectors

Overview

- Uniform, 40-pin front connector, suitable for SIMATIC S7-1500 I/O modules
- Versions for 25 mm wide or 35 mm wide modules
- With screw-type or push-in terminals
- Connectable wire cross-sections: 0.25 mm^2 to 1.5 mm^2 (AWG 24 to 16)
- Front connector for 35 mm modules to be ordered separately; front connector for 25 mm modules included in scope of supply of modules

Design

- 40 terminals, arranged in two rows, numbered consecutively from 1 to 40
- Direct assignment of terminal to LED and labeling simplifies wiring, commissioning, and troubleshooting
- Holders for four potential bridges for simple and flexible creation of potential groups;
  four units are supplied with the front connector
  (optionally available as spare parts in packs of 20)
- Integrated shielding concept for analog modules and technology modules;
  allows space-saving installation without tools and ensures high ruggedness and EMC stability;
  components supplied with analog modules
- Cable ties for mechanical fixing of the cable bundle and for strain relief;
  1 unit supplied with front connector

Ordering data

	Article No.
Front connectors	
For 35 mm modules; including four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
For 25 mm modules; including cable ties and individual labeling strips; push-in, 40-pin; spare part	**6ES7592-1BM00-0XA0**
Potential bridges for front connectors	**6ES7592-3AA00-0AA0**
For 35 mm modules; 20 pieces; spare part	

Overview

With two cabling systems, SIMATIC TOP connect ensures efficient wiring of the input and output module of the SIMATIC S7-1500: Fully modular connection for fast and clearly arranged connecting to sensors and actuators in the field, and flexible connection for simple wiring inside the control cabinet.

With the TIA Selection Tool, you can select suitable system cabling for the individual I/O modules with a simple mouse click. Suitable components for the respective I/O module are always offered. These can be transferred to the order list and then ordered in the Industry Mall.

More information can be found on the Internet at

http://www.siemens.com/tia-selection-tool

Design

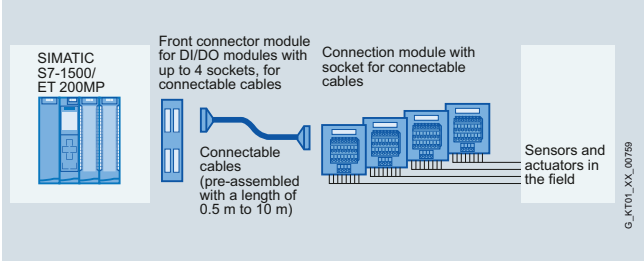
Two cabling variants are available for a wide range of control cabinet concepts:

Fully modular connection

The system consists of:

- Front connector module
- Connecting cable
- Connection modules in the following versions: Basic module, signal module and function module

Connection errors are thus practically excluded and installation overhead is significantly reduced. Systematic connection of the SIMATIC system. The assembly overhead for the connecting cables is drastically reduced thanks to the use of pre-assembled or easily assembled cables sold by the meter.



SIMATIC TOP connect for S7-1500/ ET200 MP, fully modular connection

Flexible connection

Flexible connection with front connectors is available with 20 (Pin1 – 20) or 40 wired single wires.

These are available in lengths from 2.5 m to 10.0 m.

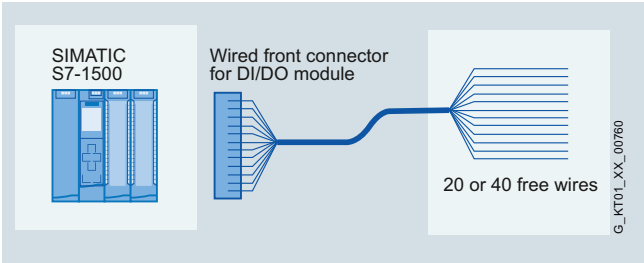
The single wires are available in different versions:

- Wire type H05V-K is used for industrial applications
- The UL/CSA-approved wire is available for export to North America
- The halogen-free version is used where low smoke gas density in the event of fire is required, e.g. in building automation

The blue wires are numbered sequentially and can be routed direct to each element in the control cabinet. The numbering of the single wires corresponds to the coding of the front connector contacts.

In comparison to conventional single wiring, there is a cost saving of 50% for assembly, since the single wires that have already been checked on the connector are fixed.

Thus no complex pre-assembly of up to two times 20 single wires per module is necessary.



SIMATIC TOP connect for S7-1500/ ET200 MP, flexible connection

Overview

The fully modular connection for connecting to the digital I/O modules of the SIMATIC S7-1500 or ET 200MP consists of modified front connectors, called front connector modules, pre-assembled connecting cables of various lengths, and connection modules. Suitable components can be selected for the application in question and joined by means of simple plugs. The connection modules are used instead of conventional terminal blocks and act as the interface to the sensors and actuators.

Benefits

- Easy plugging in of front connector module, connecting cable and connection module
- Fast and low-cost wiring
- In the case of digital signals, the supply voltage can be connected to the front connector module or the connection module
- Reduction in wiring errors, clear control cabinet wiring
- Byte-by-byte, or four-bye distribution of the signals in the case of digital signals
- Each component can be replaced individually
- Every cable length can be configured without cutting, or pre-assembled cables can be used

Design

Front connector module

Modified front connectors, called front connector modules, are available for connecting to the I/O modules. These are plugged into the I/O module to be wired instead of the front connector. The front connector modules are available in many different versions for digital I/O modules, analog I/O modules and for the 24 V, 2-ampère module. The connecting cables are plugged into these front connector modules.

Connecting cable

The connecting cable is available in two different versions.

As a pre-assembled 16-pole or 50-pole round cable (shielded or unshielded) up to a length of 10 m, or as a 16-pole round-sheath ribbon cable (with or without shield), which can be easily assembled by the user; or as 2 x 16-pole round-sheath ribbon cables (without shield).

When assembled, there are one or two insulation displacement connectors (female ribbon connectors) at both ends of the cable.

The round-sheath ribbon cable is assembled by the user with the aid of pliers (can be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connecting cable connects the front connector module with the connection module.

Connection module

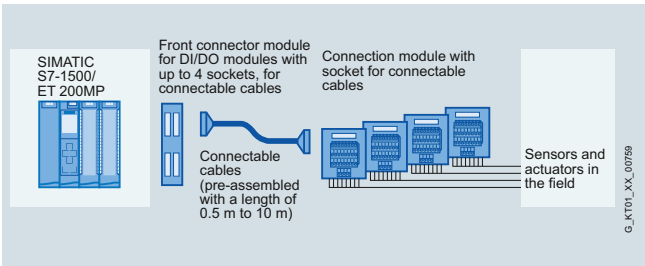
The system has digital and analog connection modules for connecting the I/O signals. These are snapped onto the standard mounting rail. The connection modules with basic or signal functionality are available in 1-byte or 4-byte versions.

Connection modules are available for two different connection methods: with push-in or screw-type terminals. The potential can be fed in at the connection module or at the front connector module.

If other voltage or power levels are required in the field, the connection module for TPRo or TPOo output signals is used. For the TPRo connection module, relays are used for the implementation. For the TPOo connection module, optocouplers are used for the implementation. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC or 110 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that simply converts the 230/110 V AC signal to 24 V DC. This means that there is always the same voltage level on the module side.

Use with optocouplers for the TPRo relay modules

If higher switching frequencies of the relay connection module are required for the output signals, the relay can simply be replaced with an optocoupler (note technical specifications) in order to increase the switching frequency here.



SIMATIC TOP connect for S7-1500/ ET200 MP, fully modular connection

Technical specifications Front connector modules

Rated operating voltage	**24 V DC**
Max. permissible operating voltage	60 V DC
Max. permissible continuous current • per connector pin	1 A
Max. permissible total current	2 A/byte
Permissible ambient temperature	0 to +60 °C
Test voltage	0.5 kV, 50 Hz, 60 sec.
Clearance and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2

Wiring rules for the front connector modules

SIMATIC TOP connect front connector module, connection for potential infeed		
	Push-in	Screw terminals
	Modules up to 4 connections	
Connectable cable cross-sections		
• Solid conductors	No	
• Flexible cables with/without wire end ferrule	0.25 to 1.5 mm^2	
Number of cables per connection	1 or a combination of 2 wires up to 1.5 mm^2 (total) in a common wire end ferrule	
Max. diameter of the cable insulation	3.1 mm	
Stripped length of the cables		
• Without insulating collar	6 mm	
• With insulating collar	-	
Wire end ferrules according to DIN 46228		
• Without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm^2	-	
• with insulating collar 1.5 mm^2	-	
Blade width of the screwdriver	3.5 mm (cylindrical design)	
Tightening torque for connecting the cables	-	0.4 Nm to 0.7 Nm

Technical specifications Connecting cable

Technical specifications of connecting cable from SIMATIC S7 to connection module	
Operating voltage	60 V DC
Continuous current per signal conductor	1 A
Max. aggregate current	4 A/byte
Operating temperature	0 to +60 °C
Outer diameter of pre-assembled round cable in mm unshielded/ shielded (16-pole)	Approx. 6.5/7.0
Outer diameter of round-sheath ribbon cable in mm 16-pole/2 x 16-pole	Approx. 9.5/11.5

Ordering data

Front connector modules

	Article No.
Front connector module for digital modules for the connection of 16-pin connecting cables	
Power supply via	
• Push-in	**6ES7921-5AH20-0AA0**
• Screw terminals	**6ES7921-5AB20-0AA0**
Front connector module for digital modules for the connection of 50-pin connecting cables	
Power supply via	
• Push-in	**6ES7921-5CH20-0AA0**
• Screw terminals	**6ES7921-5CB20-0AA0**
Front connector module for 2 A digital modules for the connection of 16-pin connecting cables	
Power supply via	
• Push-in	**6ES7921-5AJ00-0AA0**
• Screw terminals	**6ES7921-5AD00-0AA0**
Front connector module for analog modules for the connection of 16-pin connecting cables	**6ES7921-5AK20-0AA0**
Front connector module for analog modules for the connection of 50-pin connecting cables	**6ES7921-5CK20-0AA0**

4

4

Ordering data

Connecting cables

	Article No.
Connecting cables for SIMATIC S7-300/S7-1500	
Pre-assembled round cable	
16-pin, 0.14 mm²	
Unshielded	
• 0.5 m	**6ES7923-0BA50-0CB0**
• 1.0 m	**6ES7923-0BB00-0CB0**
• 1.5 m	**6ES7923-0BB50-0CB0**
• 2.0 m	**6ES7923-0BC00-0CB0**
• 2.5 m	**6ES7923-0BC50-0CB0**
• 3.0 m	**6ES7923-0BD00-0CB0**
• 4.0 m	**6ES7923-0BE00-0CB0**
• 5.0 m	**6ES7923-0BF00-0CB0**
• 6.5 m	**6ES7923-0BG50-0CB0**
• 8.0 m	**6ES7923-0BJ00-0CB0**
• 10.0 m	**6ES7923-0CB00-0CB0**
Shielded	
• 1.0 m	**6ES7923-0BB00-0DB0**
• 2.0 m	**6ES7923-0BC00-0DB0**
• 2.5 m	**6ES7923-0BC50-0DB0**
• 3.0 m	**6ES7923-0BD00-0DB0**
• 4.0 m	**6ES7923-0BE00-0DB0**
• 5.0 m	**6ES7923-0BF00-0DB0**
• 6.5 m	**6ES7923-0BG50-0DB0**
• 8.0 m	**6ES7923-0BJ00-0DB0**
• 10.0 m	**6ES7923-0CB00-0DB0**
Version 4 x 16 to 1 x 50-pin, 0.14 mm²	
Unshielded	
• 0.5 m	**6ES7923-5BA50-0EB0**
• 1.0 m	**6ES7923-5BB00-0EB0**
• 1.5 m	**6ES7923-5BB50-0EB0**
• 2.0 m	**6ES7923-5BC00-0EB0**
• 2.5 m	**6ES7923-5BC50-0EB0**
• 3.0 m	**6ES7923-5BD00-0EB0**
• 4.0 m	**6ES7923-5BE00-0EB0**
• 5.0 m	**6ES7923-5BF00-0EB0**
• 6.5 m	**6ES7923-5BG50-0EB0**
• 8.0 m	**6ES7923-5BJ00-0EB0**
• 10.0 m	**6ES7923-5CB00-0EB0**
Round-sheath ribbon cable	
16-pin, 0.14 mm²	
Unshielded	
• 30 m	**6ES7923-0CD00-0AA0**
• 60 m	**6ES7923-0CG00-0AA0**
Shielded	
• 30 m	**6ES7923-0CD00-0BA0**
• 60 m	**6ES7923-0CG00-0BA0**
Round-sheath ribbon cable	
2 x 16-pin, 0.14 mm²	
Unshielded	
• 30 m	**6ES7923-2CD00-0AA0**
• 60 m	**6ES7923-2CG00-0AA0**
Connector (female ribbon connector)	**6ES7921-3BE10-0AA0**
16-pin, insulation displacement system, with strain relief devices; packing unit: 8 connectors and 8 cable grips	

	Article No.
Connecting cables for S7-1500	
Pre-assembled round cable	
50-pin, 0.14 mm²	
Unshielded	
• 0.5 m	**6ES7923-5BA50-0CB0**
• 1.0 m	**6ES7923-5BB00-0CB0**
• 1.5 m	**6ES7923-5BB50-0CB0**
• 2.0 m	**6ES7923-5BC00-0CB0**
• 2.5 m	**6ES7923-5BC50-0CB0**
• 3.0 m	**6ES7923-5BD00-0CB0**
• 4.0 m	**6ES7923-5BE00-0CB0**
• 5.0 m	**6ES7923-5BF00-0CB0**
• 6.5 m	**6ES7923-5BG50-0CB0**
• 8.0 m	**6ES7923-5BJ00-0CB0**
• 10.0 m	**6ES7923-5CB00-0CB0**
Shielded	
• 1.0 m	**6ES7923-5BB00-0DB0**
• 2.0 m	**6ES7923-5BC00-0DB0**
• 2.5 m	**6ES7923-5BC50-0DB0**
• 3.0 m	**6ES7923-5BD00-0DB0**
• 4.0 m	**6ES7923-5BE00-0DB0**
• 5.0 m	**6ES7923-5BF00-0DB0**
• 6.5 m	**6ES7923-5BG50-0DB0**
• 8.0 m	**6ES7923-5BJ00-0DB0**
• 10.0 m	**6ES7923-5CB00-0DB0**
Accessories	
Manual pliers	**6ES7928-0AA00-0AA0**
For preparing the connectors (female ribbon connector)	

Ordering data

Connection modules

	Article No.
Connection module TP1	
For 1-wire connection, for 16-pin connecting cables	
• Push-in terminals without LEDs	**6ES7924-0AA20-0AC0**
• Screw-type terminals without LEDs	**6ES7924-0AA20-0AA0**
• Push-in terminals with LEDs	**6ES7924-0AA20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-0AA20-0BA0**
For 1-wire connection, for 50-pin connecting cables	
• Push-in terminals without LEDs	**6ES7924-2AA20-0AC0**
• Push-in terminals with LEDs	**6ES7924-2AA20-0BC0**
• Screw-type terminals without LEDs	**6ES7924-2AA20-0AA0**
• Screw-type terminals with LEDs	**6ES7924-2AA20-0BA0**
Connection module TP3	
For 3-wire connection, for 16-pin connecting cables	
• Push-in terminals without LEDs	**6ES7924-0CA20-0AC0**
• Screw-type terminals without LEDs	**6ES7924-0CA20-0AA0**
• Push-in terminals with LEDs	**6ES7924-0CA20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-0CA20-0BA0**
• Push-in terminals with LEDs and one isolating terminal per channel	**6ES7924-0CH20-0BC0**
• Screw-type terminals with LEDs and one isolating terminal per channel	**6ES7924-0CH20-0BA0**
• Push-in terminals with LED and fuse per channel	**6ES7924-0CL20-0BC0**
• Screw-type terminals with LED and fuse per channel	**6ES7924-0CL20-0BA0**
For 3-wire connection, for 50-pin connecting cables	
• Push-in terminals without LEDs	**6ES7924-2CA20-0AC0**
• Screw-type terminals without LEDs	**6ES7924-2CA20-0AA0**
• Push-in terminals with LEDs	**6ES7924-2CA20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-2CA20-0BA0**
Connection module TPRo	
Relay module for 8 outputs, relay as normally open contact	
• Push-in terminals with LEDs	**6ES7924-0BD20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-0BD20-0BA0**
Connection module TPRi	
Relay module for 8 outputs (110 V AC), relay as normally open contact	
• Push-in terminals with LEDs	**6ES7924-0BG20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-0BG20-0BA0**
Connection module TPRi	
Relay module for 8 outputs (230 V AC), relay as normally open contact	
• Push-in terminals with LEDs	**6ES7924-0BE20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-0BE20-0BA0**
Connection module TPOo	
Optocoupler module for 8 outputs (max. 24 V DC/4 A)	
• Push-in terminals with LEDs	**6ES7924-0BF20-0BC0**
• Screw-type terminals with LEDs	**6ES7924-0BF20-0BA0**

	Article No.
Connection module for digital output modules 2 A	
Connection module TP2	
• Push-in terminals without LEDs	**6ES7924-0BB20-0AC0**
• Screw-type terminals without LEDs	**6ES7924-0BB20-0AA0**
Connection module for analog modules (for S7-1500 only)	
Connection module TPA, 16-pin	
• Push-in terminals without LEDs	**6ES7924-0CC20-0AC0**
• Screw-type terminals without LEDs	**6ES7924-0CC20-0AA0**
Connection module TPA, 50-pin	
• Push-in terminals without LEDs	**6ES7924-2CC20-0AC0**
• Screw-type terminals without LEDs	**6ES7924-2CC20-0AA0**
Accessories	
ID labels for connection modules in S7-1500 design	
ID labels, insertable PU = 340 units	**3RT1900-1SB20**
Shield plate for analog connection module	
PU = 4 units (for connection of 16-pin connecting cable)	**6ES7928-1AA20-4AA0**
PU = 4 units (for connection of 16-pin connecting cable) (for S7-1500 only)	**6ES7928-1BA20-4AA0**
Shield connection clamp	
For shield plate at SIMATIC end, PU = 10 units	**6ES7590-5BA00-0AA0**
For shield plate at field end, 2 x 2 ... 6 mm	**6ES7390-5AB00-0AA0**
For shield plate at field end, 3 ... 8 mm	**6ES7390-5BA00-0AA0**
For shield plate at field end, 4 ... 13 mm	**6ES7390-5CA00-0AA0**

4

Overview

Can be used for SIMATIC S7-1500 and ET 200MP digital modules (24 V DC)

The front connectors with single wires replace the SIMATIC standard connectors

- 6ES7592-1AM00-0XB0

Technical specifications

Front connector with single wires for 16 channels (pins 1-20)	
Rated operating voltage	24 V DC
Permissible continuous current with simultaneous load of all wires, max.	1.5 A
Permissible ambient temperature	0 to 60 °C
Wire type	H05V-K, UL 1007/1569; CSA TR64, or halogen-free
Number of single wires	20
Wire cross-section	0.5 mm^2; Cu
Bundle diameter in mm	approx. 15
Wire color	Blue, RAL 5010
Designation of wires	Numbered from 1 to 20 (front connector contact = wire number)
Assembly	Screw contacts

Front connector with single wires for 32 channels (pins 1-40)	
Rated operating voltage	24 V DC
Permissible continuous current with simultaneous load of all wires, max.	1.5 A
Permissible ambient temperature	0 to 60 °C
Wire type	H05V-K, UL 1007/1569; CSA TR64, or halogen-free
Number of single wires	40
Wire cross-section	0.5 mm^2; Cu
Bundle diameter in mm	approx. 17
Wire color	Blue, RAL 5010
Designation of wires	Numbered from 1 to 40 (front connector contact = wire number)
Assembly	Screw contacts

Ordering data

	Article No.
Front connector with single wires for 32 channels (pins 1-40)	
Wire type H05V-K (0.5 mm^2 with screw connection)	
• 2.5 m	**6ES7922-5BC50-0AC0**
• 3.2 m	**6ES7922-5BD20-0AC0**
• 5.0 m	**6ES7922-5BF00-0AC0**
• 6.5 m	**6ES7922-5BG50-0AC0**
• 8.0 m	**6ES7922-5BJ00-0AC0**
• 10.0 m	**6ES7922-5CB00-0AC0**
Wire type H05Z-K, halogen-free (0.5 mm^2 with screw connection)	
• 2.5 m	**6ES7922-5BC50-0HC0**
• 3.2 m	**6ES7922-5BD20-0HC0**
• 5.0 m	**6ES7922-5BF00-0HC0**
• 6.5 m	**6ES7922-5BG50-0HC0**
• 8.0 m	**6ES7922-5BJ00-0HC0**
• 10.0 m	**6ES7922-5CB00-0HC0**
Wire type UL/CSA-certified (0.5 mm^2 with screw connection)	
• 3.2 m	**6ES7922-5BD20-0UC0**
• 5.0 m	**6ES7922-5BF00-0UC0**
• 6.5 m	**6ES7922-5BG50-0UC0**
Front connector with single wires for 16 channels (pins 1-20)	
Wire type H05V-K (0.5 mm^2 with screw connection)	
• 2.5 m	**6ES7922-5BC50-0AB0**
• 3.2 m	**6ES7922-5BD20-0AB0**
• 5.0 m	**6ES7922-5BF00-0AB0**
• 6.5 m	**6ES7922-5BG50-0AB0**
• 8.0 m	**6ES7922-5BJ00-0AB0**
• 10.0 m	**6ES7922-5CB00-0AB0**
Wire type H05Z-K, halogen-free (0.5 mm^2 with screw connection)	
• 2.5 m	**6ES7922-5BC50-0HB0**
• 3.2 m	**6ES7922-5BD20-0HB0**
• 5.0 m	**6ES7922-5BF00-0HB0**
• 6.5 m	**6ES7922-5BG50-0HB0**
• 8.0 m	**6ES7922-5BJ00-0HB0**
• 10.0 m	**6ES7922-5CB00-0HB0**
Wire type UL/CSA-certified (0.5 mm^2 with screw connection)	
• 3.2 m	**6ES7922-5BD20-0UB0**
• 5.0 m	**6ES7922-5BF00-0UB0**
• 6.5 m	**6ES7922-5BG50-0UB0**

Overview

Fail-safe digital input module:

F-DI 16x24VDC PROFISAFE

Important properties:

- 16-channel fail-safe digital input module for ET 200MP/S7-1500
- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 4 internal sensor supplies (incl. test function) onboard
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- LED display for error, operation, supply voltage and status
- Clear module labeling
  - Plain text identification of the module type
  - Complete Article No.
  - 2D matrix code (article and serial number)
  - Connection diagram
  - Hardware and firmware version
- Optional labeling accessories
  - Labeling sheets, yellow
- The modules support PROFIsafe in both PROFIBUS and PROFINET configurations. Can be used with all fail-safe SIMATIC S7-1500 F-CPUs in the central configuration, as well as ET 200MP distributed I/O with all other SIMATIC S7 F-CPUs.

Technical specifications

Article number	**6ES7526-1BH00-0AB0** ET 200MP, F-DI 16X24VDC
General information	
Product type designation	F-DI 16x24VDC
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 with HSP0086
Operating mode	
• DI	Yes
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Encoder supply	
Number of outputs	4
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.8 A)
24 V encoder supply	
• 24 V	Yes; min. L+ (-1.5 V)
• Short-circuit protection	Yes
• Output current, max.	300 mA; Max. 100 mA when mounted vertically
Digital inputs	
Number of digital inputs	16
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+15 to +30V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	Yes
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	No
• Short-circuit	Yes
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; Red LED

Technical specifications (continued)

Article number	**6ES7526-1BH00-0AB0** ET 200MP, F-DI 16X24VDC
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 5.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	280 g

Ordering data

	Article No.
F digital input module	
16 inputs, 24 V DC, PROFISAFE	**6ES7526-1BH00-0AB0**
Accessories	
Coding elements	**6ES7592-6EF00-1AA0**
E-coding element type F for ET 200 MP-module F-DI/F-DQ; 5 units, spare part	
Front connectors	
Incl. four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
DIN A4 labeling sheets	**6ES7592-2CX00-0AA0**
For 35-mm F-modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, yellow	
U connector	**6ES7590-0AA00-0AA0**
5 units; spare part	
Front door for F-I/O modules	
5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA10-7AA0**
STEP 7 Safety Advanced V14 SP1	
Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1	
Floating license for 1 user, software and documentation on DVD; license key on USB flash drive	**6ES7833-1FA14-0YA5**
Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery	**6ES7833-1FA14-0YH5**
S7 Distributed Safety V5.4 programming tool	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200MP, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher	
Floating license for 1 user	**6ES7833-1FC02-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FC02-0YH5**

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

Overview

Digital fail-safe digital output module:
F-DQ 8x24VDC 2A PPM PROFISAFE

Important properties:

- 8-channel digital fail-safe output module for ET 200MP/S7-1500
- Fail-safe 2-channel activation (parameterizable PM/PP switching) of actuators
- Actuators can be controlled up to 2 A
- Certified up to SIL 3 (IEC 61508), PL e (ISO 13849)
- LED display for error, operation, supply voltage and status
- Clear module labeling
  - Plain text identification of the module type
  - Complete Article No.
  - 2D matrix code (article and serial number)
  - Connection diagram
  - Hardware and firmware version
- Optional labeling accessories
  - Labeling sheets, yellow
- The module supports PROFIsafe in both PROFIBUS and PROFINET configurations.
- Can be used with all fail-safe SIMATIC S7-1500 F-CPUs in the central configuration, as well as ET 200MP distributed I/O with all other SIMATIC S7 F-CPUs.

Technical specifications

Article number	**6ES7526-2BF00-0AB0**
	ET 200MP, F-DQ 8X24VDC 2A PPM
General information	
Product type designation	F-DQ 8x24VDC/2A PPM
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/ integrated as of version	V13 SP1 with HSP0086
Operating mode	
• DQ	Yes
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Digital outputs	
Number of digital outputs	8
Current-sinking	Yes
Current-sourcing	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	PM-switching: -24 V + (-47 V), PP-switching: -24 V
Switching capacity of the outputs	
• with resistive load, max.	2 A
• on lamp load, max.	10 W
Load resistance range	
• lower limit	12 Ω
• upper limit	2 000 Ω
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	24 V; L+ (-0.5 V)
Output current	
• for signal "1" rated value	2 A
• for signal "0" residual current, max.	0.5 mA; Current-sourcing, or current sourcing and sinking switches individually, current sinking: max. 1 mA
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	0.1 Hz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	2 A
Total current of the outputs (per module)	
horizontal installation	
- up to 40 °C, max.	16 A
- up to 60 °C, max.	8 A
vertical installation	
- up to 40 °C, max.	8 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	500 m

F digital output modules

Technical specifications (continued)

Article number	6ES7526-2BF00-0AB0 ET 200MP, F-DQ 8X24VDC 2A PPM
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Substitute values connectable	No
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
• Short-circuit	Yes
• Group error	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• Monitoring of the supply voltage (PWR-LED)	Yes
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; Red LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	707 V DC (type test)
Standards, approvals, certificates	
Suitable for safety functions	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
- Low demand mode: PFDavg in accordance with SIL3	< 6.00E-05
- High demand/continuous mode: PFH in accordance with SIL3	< 2.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	300 g

Ordering data

	Article No.
F digital output module	
8 outputs, 24 V DC, 2 A, PROFISAFE, p/m-switching	**6ES7526-2BF00-0AB0**
Accessories	
Coding elements	**6ES7592-6EF00-1AA0**
E-coding element type F for ET 200 MP-module F-DI/F-DQ; 5 units, spare part	
Front connectors	
Incl. four potential bridges, cable ties and individual labeling strips, 40-pin	
• Screw terminals	**6ES7592-1AM00-0XB0**
• Push-in	**6ES7592-1BM00-0XB0**
DIN A4 labeling sheets	**6ES7592-2CX00-0AA0**
For 35-mm F-modules; 10 sheets with 10 labeling strips each for I/O modules; perforated, yellow	
U connector	**6ES7590-0AA00-0AA0**
5 units; spare part	
Front door for F-I/O modules	
5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	**6ES7528-0AA10-7AA0**
STEP 7 Safety Advanced V14 SP1	
Task: Engineering tool for configuring and programming fail-safe user programs for SIMATIC S7-1200 FC, S7-1500F, S7-1500F Software Controller, S7-300F, S7-400F, WinAC RTX F, ET 200SP F Controller and the fail-safe ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V14 SP1	
Floating license for 1 user, software and documentation on DVD; license key on USB flash drive	**6ES7833-1FA14-0YA5**
Floating license for 1 user, software, documentation and license key for download[1]; email address required for delivery	**6ES7833-1FA14-0YH5**
S7 Distributed Safety V5.4 programming tool	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200MP, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher	
Floating license for 1 user	**6ES7833-1FC02-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FC02-0YH5**

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

Overview

The design and functionality of the SIMATIC PM 1507 single-phase load power supply (PM = power module) with automatic range selection of the input voltage makes it an optimal match to the SIMATIC S7-1500 PLC. It supplies the S7-1500 system components such as CPU, system power supply (PS), I/O circuits of the input and output modules and, if necessary, the sensors and actuators with 24 V DC.

Technical specifications

Article number	**6EP1332-4BA00**	**6EP1333-4BA00**
Product	S7-1500 PM1507	S7-1500 PM1507
Power supply, type	24 V/3 A	24 V/8 A
Input		
Input	1-phase AC	1-phase AC
Supply voltage		
• 1 at AC Rated value	120 V	120 V
• 2 at AC Rated value	230 V	230 V
• Note	Automatic range selection	Automatic range selection
Input voltage		
• 1 at AC	85 ... 132 V	85 ... 132 V
• 2 at AC	170 ... 264 V	170 ... 264 V
Wide-range input	No	No
Overvoltage resistance	2.3 × V_{in} rated, 1.3 ms	2.3 × V_{in} rated, 1.3 ms
Mains buffering at $I_{out\ rated}$, min.	20 ms; at V_{in} = 93/187 V	20 ms; at V_{in} = 93/187 V
Rated line frequency 1	50 Hz	50 Hz
Rated line frequency 2	60 Hz	60 Hz
Rated line range	45 ... 65 Hz	45 ... 65 Hz
Input current		
• at rated input voltage 120 V	1.4 A	3.7 A
• at rated input voltage 230 V	0.8 A	1.7 A
Switch-on current limiting (+25 °C), max.	23 A	62 A
Duration of inrush current limiting at 25 °C		
• maximum	3 ms	3 ms
I^2t, max.	1.3 $A^2 \cdot s$	12 $A^2 \cdot s$
Built-in incoming fuse	T 3,15 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)
Protection in the mains power input (IEC 898)	Recommended miniature circuit breaker: 10 A characteristic B or 6 A characteristic C	Recommended miniature circuit breaker: 16 A characteristic B or 10 A characteristic C

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Technical specifications (continued)

Article number	6EP1332-4BA00	6EP1333-4BA00
Product	S7-1500 PM1507	S7-1500 PM1507
Power supply, type	24 V/3 A	24 V/8 A
Output		
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage V_{out} DC	24 V	24 V
Total tolerance, static ±	1 %	1 %
Static mains compensation, approx.	0.1 %	0.1 %
Static load balancing, approx.	0.1 %	0.1 %
Residual ripple peak-peak, max.	50 mV	50 mV
Spikes peak-peak, max. (bandwidth: 20 MHz)	150 mV	150 mV
Product function Output voltage adjustable	No	No
Status display	LED green for 24 V OK; LED red for error; LED yellow for stand-by	LED green for 24 V OK; LED red for error; LED yellow for stand-by
On/off behavior	No overshoot of Vout (soft start)	No overshoot of Vout (soft start)
Startup delay, max.	1.5 s	1.5 s
Voltage rise, typ.	10 ms	10 ms
Rated current value Iout rated	3 A	8 A
Current range	0 ... 3 A	0 ... 8 A
Supplied active power typical	72 W	192 W
Short-term overload current		
• on short-circuiting during the start-up typical	12 A	35 A
• at short-circuit during operation typical	12 A	35 A
Duration of overloading capability for excess current		
• on short-circuiting during the start-up	70 ms	70 ms
• at short-circuit during operation	70 ms	70 ms
Parallel switching for enhanced performance	No	No
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$, approx.	87 %	90 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$, approx.	11 W	21 W
Closed-loop control		
Dynamic mains compensation ($V_{in\ rated}$ ±15 %), max.	0.1 %	0.1 %
Dynamic load smoothing (I_{out}: 50/100/50 %), U_{out} ± typ.	1 %	2 %
Dynamic load smoothing (I_{out}: 10/90/10 %), U_{out} ± typ.	3 %	3 %
Load step setting time 10 to 90%, typ.	5 ms	5 ms
Load step setting time 90 to 10%, typ.	5 ms	5 ms
Setting time maximum	5 ms	5 ms
Protection and monitoring		
Output overvoltage protection	Additional control loop, limitation (closed loop control) at < 28.8 V	Additional control loop, limitation (closed loop control) at < 28.8 V
Current limitation	3.15 ... 3.6 A	8.4 ... 9.6 A
Current limitation, typ.	3.4 A	9 A
Property of the output Short-circuit proof	Yes	Yes
Short-circuit protection	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart
Overload/short-circuit indicator	-	-
Safety		
Primary/secondary isolation	Yes	Yes
Galvanic isolation	Safety extra-low output voltage U_{out} acc. to EN 60950-1 and EN 50178 and EN 61131-2	Safety extra-low output voltage U_{out} acc. to EN 60950-1 and EN 50178 and EN 61131-2
Protection class	Class I	Class I
Leakage current		
• maximum	3.5 mA	3.5 mA
• typical	0.4 mA	1.3 mA

Technical specifications (continued)

Article number	6EP1332-4BA00	6EP1333-4BA00
Product	S7-1500 PM1507	S7-1500 PM1507
Power supply, type	24 V/3 A	24 V/8 A
CE mark	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	IECEx Ex nA nC IIC T4 Gc; ATEX (EX) II 3G Ex nA nC IIC T4 Gc; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455	IECEx Ex nA nC IIC T3 Gc; ATEX (EX) II 3G Ex nA nC IIC T3 Gc; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T3, File E330455
FM approval	Class I, Div. 2, Group ABCD, T4	Class I, Div. 2, Group ABCD, T4
CB approval	Yes	Yes
Marine approval	GL, ABS, BV, DNV	GL, ABS, BV, DNV
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature		
• during operation	0 ... 60 °C	0 ... 60 °C
- Note	with natural convection	with natural convection
• during transport	-40 ... +85 °C	-40 ... +85 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C
Humidity class according to EN 60721	Climate class 3K3, no condensation	Climate class 3K3, no condensation
Mechanics		
Connection technology	Screw-/spring clamp connection	Screw-/spring clamp connection
Connections		
• Supply input	L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm^2	L, N, PE: 1 screw terminal each for 0.5 ... 2.5 mm^2
• Output	L+, M: 2 spring-loaded terminals each for 0.5 to 2.5 mm^2	L+, M: 2 spring-loaded terminals each for 0.5 to 2.5 mm^2
Product function		
• removable terminal at input	Yes	Yes
• removable terminal at output	Yes	Yes
Width of the enclosure	50 mm	75 mm
Height of the enclosure	147 mm	147 mm
Depth of the enclosure	129 mm	129 mm
Weight, approx.	0.45 kg	0.74 kg
Product feature of the enclosure housing for side-by-side mounting	Yes	Yes
Installation	Can be mounted onto S7-1500 rail	Can be mounted onto S7-1500 rail
MTBF at 40 °C	1 611 993 h	1 362 918 h
Other information	Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified)	Specifications at rated input voltage and ambient temperature +25 °C (unless otherwise specified)

Ordering data

	Article No.
SIMATIC PM 1507	
Stabilized power supply for SIMATIC S7-1500 Input: 120/230 V AC Output: 24 V DC	
• Output current 3 A	**6EP1332-4BA00**
• Output current 8 A	**6EP1333-4BA00**

	Article No.
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units per packing unit	

System power supplies

Overview

- System power supplies for the SIMATIC S7-1500
- For conversion of AC or DC line voltages to the operating voltages required for the internal electronics
- 25 or 60 W output power
- Can be used for S7-1500 or ET 200MP
- Engineering and configuration via STEP 7 V12 and higher (PS 60W 24/48/60V DC HF: from STEP 7 V14 SP1)
- In addition with PS 60W 24/48/60V DC HF: Retentive storage of CPU work memory (data) for all S7-1500 CPUs

Technical specifications

Article number	**6ES7505-0KA00-0AB0** S7-1500, PS 25W 24V DC	**6ES7505-0RA00-0AB0** S7-1500, PS 60W 24/48/60V DC	**6ES7505-0RB00-0AB0** S7-1500, PS 60W 24/48/60V DC HF	**6ES7507-0RA00-0AB0** S7-1500, PS 60W 120/230V AC/DC
General information				
Product type designation	PS 25W 24VDC	PS 60W 24/48/60V DC	PS 60W 24/48/60V DC HF	PS 60W 120/230V AC/DC
HW functional status	E01	E01	E01	E01
Firmware version	V1.0.0	V1.0.0	V1.0.0	V1.0.0
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V12 / V12	V12 / V12	V14 SP1	V12 / V12
• STEP 7 configurable/integrated as of version	V5.5 SP3 or higher	V5.5 SP3 or higher		V5.5 SP3 or higher
Supply voltage				
Rated value (DC)	24 V	24 V / 48 V / 60 V	24 V / 48 V / 60 V	120 V / 230 V
permissible range, lower limit (DC)	Static 19.2 V, dynamic 18.5 V	Static 19.2 V, dynamic 18.5 V	Static 19.2 V, dynamic 18.5 V	88 V
permissible range, upper limit (DC)	Static 28.8 V, dynamic 30.2 V	Static 72 V, dynamic 75.5 V	Static 72 V, dynamic 75.5 V	300 V
Rated value (AC)				120 V / 230 V
permissible range, lower limit (AC)				85 V
permissible range, upper limit (AC)				264 V
Reverse polarity protection	Yes	Yes	Yes	
Short-circuit protection	Yes	Yes	Yes	Yes
Line frequency				
• Rated value 50 Hz				Yes
• permissible range, lower limit				47 Hz
• permissible range, upper limit				63 Hz
Mains buffering				
• Mains/voltage failure stored energy time	20 ms	20 ms	20 ms	20 ms
Input current				
Rated value at 24 V DC	1.3 A	3 A	3 A	
Rated value at 48 V DC		1.5 A	1.5 A	
Rated value at 60 V DC		1.2 A	1.2 A	
Rated value at 120 V DC				0.6 A
Rated value at 230 V DC				0.3 A
Rated value at 120 V AC				0.6 A
Rated value at 230 V AC				0.34 A
Output current				
Short-circuit protection	Yes	Yes	Yes	Yes

Technical specifications (continued)

Article number	**6ES7505-0KA00-0AB0** S7-1500, PS 25W 24V DC	**6ES7505-0RA00-0AB0** S7-1500, PS 60W 24/48/60V DC	**6ES7505-0RB00-0AB0** S7-1500, PS 60W 24/48/60V DC HF	**6ES7507-0RA00-0AB0** S7-1500, PS 60W 120/230V AC/DC
Power				
Infeed power to the backplane bus	25 W	60 W	60 W	60 W
Power loss				
Power loss at nominal rating conditions	6.2 W	12 W	12 W	12 W
Interrupts/diagnostics/ status information				
Status indicator	Yes	Yes	Yes	Yes
Potential separation				
primary/secondary	Yes	Yes; Electrical isolation for 230 V AC (reinforced isolation)		Yes
Isolation				
Isolation tested with	707 V DC (type test)	2 500 V DC/2 s (routine test)	2 500 V DC/2 s (routine test)	2 500 V DC/2 s (routine test)
EMC				
Interference immunity against voltage surge				
• on the supply lines acc. to IEC 61000-4-5	Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required	Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required	Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required	Yes; +/- 1 kV (acc. to IEC 61000-4-5; 1995; surge symm.), +/- 2 kV (acc. to IEC 61000-4-5; 1995; surge asymm.), no external protective circuit required
Degree and class of protection				
Degree of protection acc. to EN 60529	IP20	IP20	IP20	IP20
Protection class	3; with protective conductor	1; with protective conductor	1; with protective conductor	1; with protective conductor
Dimensions				
Width	35 mm	70 mm	105 mm	70 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Weights				
Weight, approx.	350 g	600 g	865 g	600 g

Ordering data

	Article No.
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
24/48/60 V DC input voltage, power 60 W, buffering functionality	**6ES7505-0RB00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**

	Article No.
Accessories	
SIMATIC S7-1500 mounting rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 245 mm	**6ES7590-1AC40-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**
PE connection element for mounting rail 2000 mm	**6ES7590-5AA00-0AA0**
Spare part, 20 units	
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units	

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Overview

The design and functionality of the SIMATIC PM 1507 single-phase load power supply (PM = power module) with automatic range selection of the input voltage makes it an optimal match to the SIMATIC S7-1500 PLC. It supplies the S7-1500 system components such as CPU, system power supply (PS), I/O circuits of the input and output modules and, if necessary, the sensors and actuators with 24 V DC.

Note

SIPLUS extreme products are based on Siemens standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Article No.	**6AG1332-4BA00-7AA0**	**6AG1333-4BA00-7AA0**
Article number based on	**6EP1332-4BA00**	**6EP1333-4BA00**
Ambient temperature range	-40 ... +70 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical specifications	The technical specifications of the standard product apply, except for the ambient conditions.	
Ambient conditions		
Extended range of environmental conditions		

• with reference to ambient temperature, air pressure and altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	

Relative humidity		
• with condensation, max.	100 %; RH incl. bedewing/frost (no commissioning in bedewed state)	
Resistance		
• to biologically active substances/ compliance with EN 60721-3-3	Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation.	
• to chemically active substances/ compliance with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must remain in place on the unused interfaces during operation.	
• to mechanically active substances, compliance with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation.	

Ordering data

	Article No.
SIPLUS S7-1500 PM 1507	
(Extended temperature range and exposure to media)	
Input 120/230 V AC, output 24 V DC, 3 A	**6AG1332-4BA00-7AA0**
Input 120/230 V AC, output 24 V DC, 8 A	**6AG1333-4BA00-7AA0**

	Article No.
Accessories	See SIMATIC PM 1507, 1-phase, 24 V DC (for S7-1500 and ET200MP), page 4/153

Overview

- System power supplies for the SIMATIC S7-1500
- For conversion of AC or DC line voltages to the operating voltages required for the internal electronics
- 25 or 60 W output power
- Can be used for S7-1500 or ET 200MP
- Configuration via STEP 7 V12

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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Technical specifications

Article number	**6AG1505-0KA00-7AB0**	**6AG1505-0RA00-7AB0**	**6AG1507-0RA00-7AB0**
Based on	**6ES7505-0KA00-0AB0**	**6ES7505-0RA00-0AB0**	**6ES7507-0RA00-0AB0**
	SIPLUS S7-1500 PS 25W 24V DC	SIPLUS S7-1500 PS 60W 24/48/60V DC	SIPLUS S7-1500 PS 60W 120/230V AC/DC
Ambient conditions			
Ambient temperature during operation			
• min.	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C	-40 °C; = Tmin; Startup @ -25 °C
• max.	70 °C; = Tmax; for vertical mounting position Tmax = +40 °C	70 °C; = Tmax; > +60 °C max. power input 30 W; for vertical mounting position Tmax = +40 °C	70 °C; = Tmax; for vertical mounting position Tmax = +40 °C
Ambient temperature during storage/transportation			
• min.		-40 °C	
• max.		70 °C	
Extended ambient conditions			

• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax
	at 1080 hPa ... 795 hPa
	(-1000 m ... +2000 m) //
	Tmin ... (Tmax - 10K)
	at 795 hPa ... 658 hPa
	(+2000 m ... +3500 m) //
	Tmin ... (Tmax - 20K)
	at 658 hPa ... 540 hPa
	(+3500 m ... +5000 m)
		Tmin ... Tmax
		at 1080 hPa ... 795 hPa
		(-1000 m ... +2000 m) //
		Tmin ... (Tmax - 10K)
		at 795 hPa ... 658 hPa
		(+2000 m ... +3500 m) //
		Tmin ... (Tmax - 20K)
		at 658 hPa ... 540 hPa
		(+3500 m ... +5000 m)
			Tmin ... Tmax
			at 1080 hPa ... 795 hPa
			(-1000 m ... +2000 m)

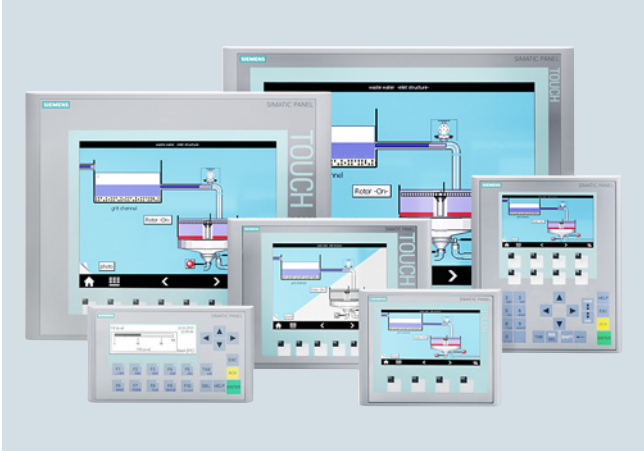
Relative humidity			
- With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance			
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

SIPLUS system power supplies

Ordering data	Article No.
SIPLUS S7-1500 system power supply	
(Extended temperature range and exposure to media)	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6AG1505-0KA00-7AB0**
24/48/60 V DC input voltage, power 60 W	**6AG1505-0RA00-7AB0**
120/230 V AC input voltage, power 60 W	**6AG1507-0RA00-7AB0**

	Article No.
Accessories	See SIMATIC S7-1500, system power supplies, page 4/155

Overview



Basic Panels 2nd Generation

SIMATIC HMI Basic Panels (2nd Generation) with their fully developed HMI basic functions are the ideal entry level series for simple HMI applications.

The device family offers panels with 4", 7", 9" and 12" widescreen displays, as well as combined key and touch operation.

The innovative high-resolution widescreen displays with 64 000 colors are also suitable for upright installation, and they can be dimmed down to 100%. The innovative operator interface with improved usability opens up a diverse range of options thanks to new controls and graphics. The new USB interface enables the connection of keyboard, mouse or barcode scanner, and supports the simple archiving of data on a USB flash drive as well as the manual backup and restoring of the complete panel.

The integrated Ethernet or RS 485/422 interface (version-specific) enables simple connection to the controller.

For more information, see chapter 3, page 3/170.

Basic Panels 1st Generation

- Ideal entry-level series from 3" to 15" for operating and monitoring compact machines and systems
- Clear process representation thanks to use of pixel-graphics displays
- Intuitive operation using touch and tactile function keys
- Equipped with all the necessary basic functions such as alarm logging, recipe management, plots, vector graphics, and language switching
- Simple connection to the controller via integral Ethernet interface or separate version with RS 485/422
- Faster commissioning thanks to integrated diagnostics viewer and IP setting for SIMATIC S7-1200 and S7-1500 PLCs

For more information, see chapter 3, page 3/171.

SIPLUS Basic Panels and Comfort Panels

Overview (continued)

SIMATIC HMI Comfort Panels - Standard devices

- Excellent HMI functionality for demanding applications
- Widescreen TFT displays with 4", 7", 9", 12", 15", 19" and 22" diagonals (all 16 million colors) with up to 40% more visualization area as compared to the predecessor devices
- Integrated high-end functionality with archives, scripts, PDF/Word/Excel viewer, Internet Explorer, Media Player and web Server
- Dimmable displays from 0 to 100% via PROFIenergy, via the HMI project or via a controller
- Modern industrial design, cast aluminum fronts for 7" upwards
- Upright installation for all touch devices
- Optimal selection option: seven touch and five key versions are available
- Data security in the event of a power failure for the device and for the SIMATIC HMI Memory Card
- Innovative service and commissioning concept through second SD card (automatic backup)
- Maximum performance with short screen refresh times
- Suitable for extremely harsh industrial environments thanks to extended approvals such as ATEX 2/22 and marine approvals
- Wide range of communication options: PROFIBUS and PROFINET onboard; 2 x PROFINET with integrated switch for 7" models or larger; plus 1 x PROFINET with Gigabit support for 15" models or larger
- All versions can be used as an OPC UA client or as an OPC DA server
- Key-operated devices with LED in every function key and new text input mechanism, similar to the keypads of mobile phones
- All keys have a service life of 2 million operations
- Configuring with the WinCC engineering software of the TIA Portal

Note:

A 7" and 15" Comfort Outdoor version will be available soon. For more information, please go to:
http://www.siemens.com/hmi

For more Information, see chapter 3, page 3/172.

SIPLUS Basic Panels and Comfort Panels

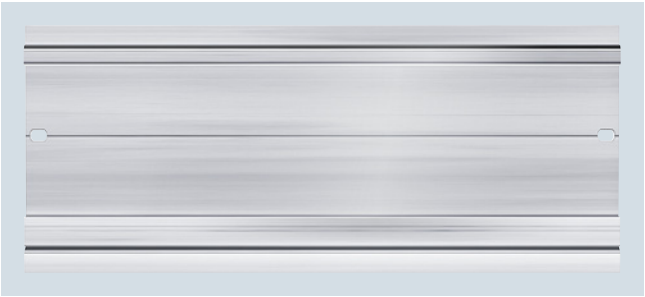
Overview

SIPLUS extreme products are based on SIMATIC standard products.

For SIPLUS technical documentation, see:
http://www.siemens.com/siplus-extreme

For more information, see chapter 3, page 3/174.

Overview



- Aluminum mounting rail for mounting the SIMATIC S7-1500 or ET 200MP
- With integrated DIN rail for snapping on a wide range of standard components
- Attachment of modules with a single screw
- Installation by screwing to the control cabinet wall.
- Entire length of rail can be used

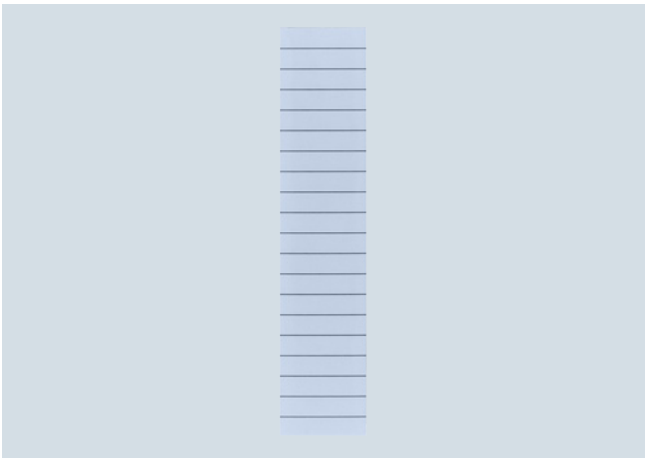
Ordering data

	Article No.
SIMATIC S7-1500 DIN rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 245 mm	**6ES7590-1AC40-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**
PE connection element for DIN rail 2000 mm	**6ES7590-5AA00-0AA0**
20 units	
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	

4

Labeling sheets

Overview



- Film sheets for the application-specific, automatic labeling of I/O modules of the SIMATIC S7-1500 using standard laser printers
- Printing direct from the TIA Portal possible
  - No double entry of symbols and/or addresses
  - Saves time and avoids typing errors
- Plain color films, tear-resistant, dirt-repellent
- Simple handling:
  - Perforated labeling sheets in DIN A4 format for easy separation of the labeling strips.
  - Detached strips can be inserted directly into the I/O modules.
- Different colors to differentiate module types; yellow reserved for fail-safe systems

Ordering data

	Article No.
DIN A4 labeling sheet	
For 35 mm module; 10 sheets with 10 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-2AX00-0AA0**
For 25 mm modules; 10 sheets with 20 labeling strips each for I/O modules; perforated, Al gray	**6ES7592-1AX00-0AA0**
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	

Overview

Front doors

- Versions:
  - Universal front doors for digital and analog I/O modules
  - Universal front doors for the interface module IM155-5 PN ST
- Included in the scope of delivery of the respective modules. Can be ordered as a spare part in a set consisting of five universal (unlabeled) front doors.
- Front doors for I/O modules: Universal labeling sheets and cabling diagrams are included. Cabling diagrams can be detached from preperforated sheets and inserted inside the door.

U connector

- To interconnect the modules (self-assembling backplane bus)
- Implementation of a rugged, interference-free station setup through
  - Consistent separation of supply voltage of modules and data signals
  - Fully shielded, gold-plated contacts for the data bus
- Included in the scope of delivery of each module. Available as spare part in sets of 5.

Shielding

- Components for implementing the integrated shielding concept of the S7-1500:
  - 24 V DC infeed element for supplying the analog module: strict separation of infeed and analog signals ensures high EMC stability.
  - Shield bracket for insertion in the front connector: allows a low-impedance connection and optimally dissipates interference.
  - Universal shield terminal: connects the cable shield with the shield bracket and is simultaneously used for mechanical fixing.
- Included in the scope of delivery of the analog modules. Available as a spare part in two versions:
  - Shielding set, comprising infeed element, shield bracket, and shield terminal (pack of 5 units each)
  - Individual shield terminals (pack of 20)
- No tool required for assembly/disassembly

Spare parts

Ordering data	Article No.
Universal front door for IM 155-5 PN ST 5 front doors; spare part	**6ES7528-0AA70-7AA0**
Universal front door for I/O modules 5 front doors; with 5 labeling strips (front) and 5 cabling diagrams per front door; spare part	
• For 35 mm modules	**6ES7528-0AA00-7AA0**
• For 25 mm modules	**6ES7528-0AA00-0AA0**
U connector 5 units; spare part	**6ES7590-0AA00-0AA0**
Shielding set I/O Infeed element, shield bracket, and shield terminal; 5 units, spare part	
• For 35 mm modules	**6ES7590-5CA00-0AA0**
• For 25 mm modules	**6ES7590-5CA10-0XA0**
Shield terminal element 10 units; spare part	**6ES7590-5BA00-0AA0**

	Article No.
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**