

SIMATIC S7-1500 Advanced Controllers

Introduction

S7-1500

Overview

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- 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
- Can only be configured in 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 server (data access) and client as runtime option for the easy connection of SIMATIC S7-1500 to 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), camming and functions for controlling kinematics 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

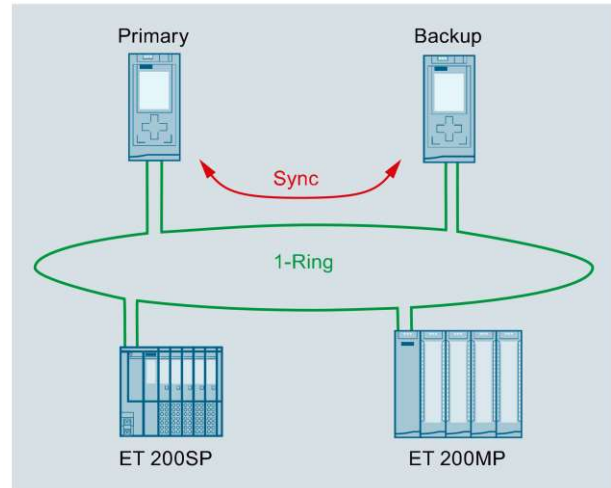
- Protection of personnel and machinery – within the framework of an integrated complete system
- Fail-safe SIMATIC S7-1500(T)F Controllers for processing standard and safety programs on the same controller. The fail-safe and standard user programs are created in the TIA Portal with the same editors; fail-safe data, for example, can therefore be evaluated like standard data in the standard user program. Due to this integration the system benefits and the comprehensive functionality of SIMATIC are also available for fail-safe applications.

Overview (continued)

Redundant systems



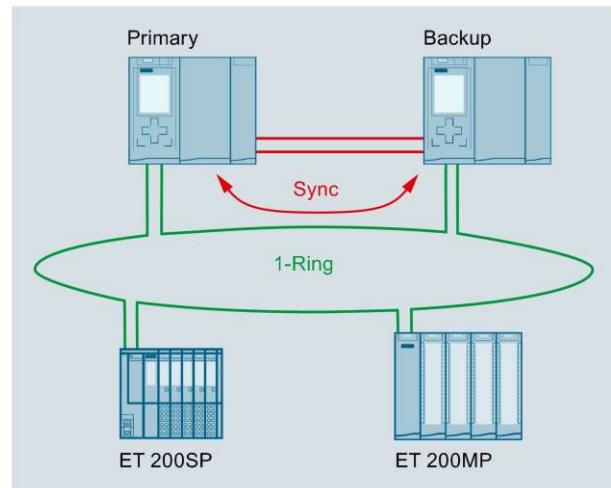
CPU 1513R-1 PN, CPU 1515R-2 PN



SIMATIC S7-1500H mode of operation



CPU 1517H-3 PN/FO



SIMATIC S7-1500H mode of operation

- Redundant S7-1500R/H CPUs for applications where availability of the controller is crucial.
- Both CPUs are connected with the I/O stations via a PROFINET-IO ring. Synchronization for the S7-1500R is via this ring, or via separate FOC synchronization cables for the S7-1500H. In the event of a CPU failure, the back-up CPU automatically assumes control of the process. No data is lost and the process can be continued extremely quickly. The PROFINET IO ring ensures that all nodes remain accessible in the event of a fieldbus interruption.
- The engineering corresponds to that of a standard CPU. The TIA Portal and redundant CPUs handle the synchronization of the programs and data. All without any additional overhead for the user.

SIMATIC S7-1500 Advanced Controllers

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Overview (continued)

Security Integrated

- Password-based know-how protection against unauthorized read-out 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 effort
- Integrated DIN rail in the S7-1500 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
 - System power supply modules for retentively storing the entire work memory on the controller
- 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

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/ASCII 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, motion control diagnostics and display of trace recordings 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	10 %...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
• Emission of radio frequency interference	Requirements of the EMC directive; interference emission according to EN 61000-6-4 Interference emission according to 61000-6-4 Interference emission of electromagnetic fields according to EN 61000-6-4
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

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.
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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

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 non-Siemens PROFINET IO controller
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call, Support
 - OPC UA Companion Specifications
- Central and distributed isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, output 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 non-Siemens PROFINET IO controller
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, output 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed isochronous mode
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, precise position gearing between axes, support for external encoders, output 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 non-Siemens 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
- UA server and client as runtime option for easy connection of the SIMATIC S7-1500 to third-party devices/systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, output 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

Overview CPU 1517-3 PN/DP



Overview CPU 1518-4 PN/DP



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- 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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed 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, output 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.

- 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
- 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 non-Siemens 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 facilitates data transfer at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed 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, output 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 MFP



- 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++ functions can be called and executed in the CPU runtime.
- In parallel to the CPU runtime, there is an additional C/C++ Runtime, in which call-independent, i.e. stand-alone, C/C++ applications can be executed.
- 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 non-Siemens 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 facilitates data transfer at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed isochronous mode on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, gearing between axes, output cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

Multi-functional platform

With the multi-functional platform (MFP), more functionality can be accommodated in a module. The computing power of the CPU 1518-4 PN/DP MFP allows the merging of previously separate applications on a common platform while continuing to meet the high S7-1500 demands with regard to maintenance and ruggedness.

This means that, in addition to the control function, it is also possible to process typical PC applications on the multi-functional platform, e.g. tasks that:

- require high-level language programming,
- are developed based on models, or
- have to be solved via databases.

Thus, in addition to the option of running C/C++ code in the standard STEP 7 program, the CPU 1518-4 PN/DP MFP multi-functional platform provides an additional second independent runtime environment in order to execute C/C++ applications in parallel to the STEP 7 program if required.

Control-independent applications, e.g. protocol converters, database applications and others, can be created in C/C++. This simplifies the creation or reuse of customer-specific, high-level language applications.

The CPU 1518-4 PN/DP MFP has the quantity structure and functionality of a CPU 1518-4 PN/DP with regard to the control unit. In addition to the user program created with STEP 7 in the TIA Portal, C/C++ functions formulated via the SIMATIC ODK 1500S can be integrated into the standard user program. By using SIMATIC ODK 1500S (ODK - Open Development Kit), higher-level programming language mechanisms, such as object orientation, can also be utilized. Furthermore, with the SIMATIC Target 1500S™ engineering package for Simulink®, it is also possible to integrate complex Simulink models to take advantage of the model-based development using MATLAB and Simulink®.

Note:

SIMATIC memory card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

Technical specifications

Article number	6ES7511-1AK02-0AB0 CPU 1511-1 PN, 150KB prog., 1MB data	6ES7513-1AL02-0AB0 CPU 1513-1 PN, 300KB prog., 1.5MB data	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB prog., 3MB data	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB prog., 5MB data
General information				
Product type designation	CPU 1511-1 PN	CPU 1513-1 PN	CPU 1515-2 PN	CPU 1516-3 PN/DP
Engineering with				
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/ integrated as of version 	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7511-1AK01-0AB0	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7513-1AL01-0AB0	V15.1 (FW V2.6)/V13 SP1 Update 4 (FW V1.8) or higher	V15.1 (FW V2.6)/V13 SP1 Update 4 (FW V1.8) or higher
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
Memory				
Work memory				
<ul style="list-style-type: none"> integrated (for program) integrated (for data) 	150 kbyte 1 Mbyte	300 kbyte 1.5 Mbyte	500 kbyte 3 Mbyte	1 Mbyte 5 Mbyte
Load memory				
<ul style="list-style-type: none"> 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				
<ul style="list-style-type: none"> Number 	2 048	2 048	2 048	2 048
IEC counter				
<ul style="list-style-type: none"> 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				
<ul style="list-style-type: none"> Number 	2 048	2 048	2 048	2 048
IEC timer				
<ul style="list-style-type: none"> 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				
<ul style="list-style-type: none"> Number, max. 	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area				
I/O address area				
<ul style="list-style-type: none"> Inputs Outputs 	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Time of day				
Clock				
<ul style="list-style-type: none"> Type 	Hardware clock	Hardware clock	Hardware clock	Hardware clock
1. Interface				
Interface types				
<ul style="list-style-type: none"> Number of ports integrated switch RJ 45 (Ethernet) 	2 Yes Yes; X1	2 Yes Yes; X1	2 Yes Yes; X1	2 Yes Yes; X1

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

Technical specifications (continued)

Article number	6ES7511-1AK02-0AB0 CPU 1511-1 PN, 150KB prog., 1MB data	6ES7513-1AL02-0AB0 CPU 1513-1 PN, 300KB prog., 1.5MB data	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB prog., 3MB data	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB prog., 5MB data
Protocols				
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4	Yes; IPv4
• 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; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
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
- PROFInergy	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	128; In total, up to 512 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	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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

Technical specifications (continued)

Article number	6ES7511-1AK02-0AB0 CPU 1511-1 PN, 150KB prog., 1MB data	6ES7513-1AL02-0AB0 CPU 1513-1 PN, 300KB prog., 1.5MB data	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB prog., 3MB data	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB 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 375 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; 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
- PROFinergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program	Yes; Per user program
2. Interface				
Interface types				
• Number of ports			1	1
• integrated switch			No	No
• RJ 45 (Ethernet)			Yes; X2	Yes; X2
Protocols				
• IP protocol			Yes; IPv4	Yes; IPv4
• PROFINET IO Controller			Yes	Yes
• PROFINET IO Device			Yes	Yes
• SIMATIC communication			Yes	Yes
• Open IE communication			Yes	Yes
• Web server			Yes	Yes
• Media redundancy			No	No

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Standard CPUs

Technical specifications (continued)

Article number	6ES7511-1AK02-0AB0 CPU 1511-1 PN, 150KB prog., 1MB data	6ES7513-1AL02-0AB0 CPU 1513-1 PN, 300KB prog., 1.5MB data	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB prog., 3MB data	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB 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
- MRPD			No	No
- PROFlenergy			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 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 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
- PROFlenergy			Yes	Yes
- Prioritized startup			No	No
- Shared device			Yes	Yes
- Number of IO Controllers with shared device, max.			4	4
- Asset management record			Yes; Per user program	Yes; Per user program
3. Interface				
Interface types				
• Number of ports				1
• RS 485				Yes; X3
Protocols				
• PROFIBUS DP master				Yes
• PROFIBUS DP slave				No
• SIMATIC communication				Yes

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Standard CPUs

Technical specifications (continued)

Article number	6ES7511-1AK02-0AB0 CPU 1511-1 PN, 150KB prog., 1MB data	6ES7513-1AL02-0AB0 CPU 1513-1 PN, 300KB prog., 1.5MB data	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB prog., 3MB data	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB prog., 5MB 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	192; via integrated interfaces of the CPU and connected CPs / CMs	256; 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
OPC UA				
• OPC UA client	Yes	Yes	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; Distributed and central; with minimum OB 6x cycle of 625 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 375 µs (distributed) and 1 ms (central)
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	800	2 400	2 400
• 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

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Technical specifications (continued)

Article number	6ES7511-1AK02-0AB0 CPU 1511-1 PN, 150KB prog., 1MB data	6ES7513-1AL02-0AB0 CPU 1513-1 PN, 300KB prog., 1.5MB data	6ES7515-2AM01-0AB0 CPU 1515-2 PN, 500KB prog., 3MB data	6ES7516-3AN01-0AB0 CPU 1516-3 PN/DP, 1MB prog., 5MB data
Altitude during operation relating to sea level				
<ul style="list-style-type: none"> Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
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				
<ul style="list-style-type: none"> User program protection/ password protection Copy protection Block protection 	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes
Access protection				
<ul style="list-style-type: none"> Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection 	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	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.	405 g	405 g	830 g	845 g
Article number	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB Prog./8MB data	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB Prog., 20MB data	6ES7518-4AX00-1AC0 CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA	
General information				
Product type designation	CPU 1517-3 PN/DP	CPU 1518-4 PN/DP	CPU 1518-4 PN/DP MFP	
Engineering with				
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/ integrated as of version 	V15.1 (FW V2.6) / V13 Update 3 (FW V1.6) or higher	V15.1 (FW V2.6) / V13 (FW V1.5) or higher	V15.1 (FW V2.6) / V15 (FW V2.5) or higher	
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	
Memory				
Work memory				
<ul style="list-style-type: none"> integrated (for program) integrated (for data) integrated (for CPU function library of CPU runtime) 	2 Mbyte 8 Mbyte	4 Mbyte 20 Mbyte	4 Mbyte 20 Mbyte 50 Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.	

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Standard CPUs

Technical specifications (continued)

Article number	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB Prog./8MB data	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB Prog., 20MB data	6ES7518-4AX00-1AC0 CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA
Working memory for additional functions			512 Mbyte
<ul style="list-style-type: none"> Integrated (for C/C++ Runtime application) 			
Load memory			
<ul style="list-style-type: none"> Plug-in (SIMATIC memory card), max. 	32 Gbyte	32 Gbyte	32 Gbyte; The memory card must have at least 2 GB of space on it
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			
<ul style="list-style-type: none"> Number 	2 048	2 048	2 048
IEC counter			
<ul style="list-style-type: none"> Number 	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times			
<ul style="list-style-type: none"> Number 	2 048	2 048	2 048
IEC timer			
<ul style="list-style-type: none"> 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			
<ul style="list-style-type: none"> Number, max. 	16 kbyte	16 kbyte	16 kbyte
Address area			
I/O address area			
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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			
<ul style="list-style-type: none"> Type 	Hardware clock	Hardware clock	Hardware clock
1. Interface			
Interface types			
<ul style="list-style-type: none"> Number of ports integrated switch RJ 45 (Ethernet) 	2 Yes Yes; X1	2 Yes Yes; X1	2 Yes Yes; X1
Protocols			
<ul style="list-style-type: none"> IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy 	Yes; IPv4 Yes Yes Yes Yes Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; IPv4 Yes Yes Yes Yes Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; IPv4 Yes Yes Yes Yes Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0

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Standard CPUs

Technical specifications (continued)

Article number	6ES7517-3AP00-0AB0	6ES7518-4AP00-0AB0	6ES7518-4AX00-1AC0
	CPU 1517-3 PN/DP, 2MB Prog./8MB data	CPU 1518-4 PN/DP, 4MB Prog., 20MB data	CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA
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	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

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Standard CPUs

Technical specifications (continued)

Article number	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB Prog./8MB data	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB Prog., 20MB data	6ES7518-4AX00-1AC0 CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA
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; 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
- PROFinergy	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program
2. Interface			
Interface types			
• Number of ports	1	1	1
• integrated switch	No	No	No
• RJ 45 (Ethernet)	Yes; X2	Yes; X2	Yes; X2
Protocols			
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes	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
- MRPD	No	No	No
- PROFinergy	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	128
- 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	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

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Technical specifications (continued)

Article number	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB Prog./8MB data	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB Prog., 20MB data	6ES7518-4AX00-1AC0 CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA
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
- PROFinergy	Yes	Yes	Yes
- Prioritized startup	No	No	No
- Shared device	Yes	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program
3. Interface			
Interface types			
• Number of ports	1	1	1; C/C++ Runtime can also be reached via this port
• integrated switch		No	No
• RJ 45 (Ethernet)		Yes; X3	Yes; X3
• RS 485	Yes; X3		
Protocols			
• IP protocol		Yes; IPv4	Yes; IPv4
• 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
Protocols			
• PROFIBUS DP master		Yes	Yes
• PROFIBUS DP slave		No	No
• SIMATIC communication		Yes	Yes
Protocols			
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
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

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Technical specifications (continued)

Article number	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB Prog./8MB data	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB Prog., 20MB data	6ES7518-4AX00-1AC0 CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA
OPC UA			
• OPC UA client	Yes	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; Distributed and central: with minimum OB 6x cycle of 250 µs (distributed) and 1 ms (central)	Yes; Distributed and central: with minimum OB 6x cycle of 125 µs (distributed) and 1 ms (central)	Yes; Distributed and central: with minimum OB 6x cycle of 125 µs (distributed) and 1 ms (central)
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
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
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

Technical specifications (continued)

Article number	6ES7517-3AP00-0AB0 CPU 1517-3 PN/DP, 2MB Prog./8MB data	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP, 4MB Prog., 20MB data	6ES7518-4AX00-1AC0 CPU 1518-4 PN/DP MFP + C/C++ RT + OPC UA
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
Open Development interfaces			
• Size of ODK SO file, max.			9.8 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	2 117 g

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

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Ordering data	Article No.	Ordering data	Article No.		
CPU 1511-1 PN 150 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6ES7511-1AK02-0AB0	SIMATIC S7-1500 DIN rail Fixed lengths, with grounding elements <ul style="list-style-type: none"> • 160 mm • 245 mm • 482 mm • 530 mm • 830 mm For cutting to length by customer, without drill holes; grounding elements must be ordered separately <ul style="list-style-type: none"> • 2 000 mm 			
CPU 1513-1 PN 300 KB work memory for program, 1.5 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6ES7513-1AL02-0AB0				
CPU 1515-2 PN 500 KB work memory for program, 3 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface; SIMATIC memory card required	6ES7515-2AM01-0AB0				
CPU 1516-3 PN/DP 1 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC memory card required	6ES7516-3AN01-0AB0				
CPU 1517-3 PN/DP 2 MB work memory for program, 8 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC memory card required	6ES7517-3AP00-0AB0				
CPU 1518-4 PN/DP 4 MB work memory for program, 20 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6ES7518-4AP00-0AB0				
CPU 1518-4 PN/DP MFP CPU 1518-4 PN/DP MFP, including C/C++ Runtime and OPC UA runtime license	6ES7518-4AX00-1AC0				
Accessories SIMATIC memory card 4 MB 12 MB 24 MB 256 MB 2 GB 32 GB	6ES7954-8LC03-0AA0 6ES7954-8LE03-0AA0 6ES7954-8LF03-0AA0 6ES7954-8LL03-0AA0 6ES7954-8LP02-0AA0 6ES7954-8LT03-0AA0				
				PE connection element for DIN rail 2 000 mm 20 units	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 6ES7590-1AJ30-0AA0 6ES7590-1BC00-0AA0 6ES7590-5AA00-0AA0
				Power supply For supplying the backplane bus of the S7-1500 controller 24 V DC input voltage, power 25 W 24/48/60 V DC input voltage, power 60 W 24/48/60 V DC input voltage, power 60 W, buffering functionality 120/230 V AC input voltage, power 60 W	6ES7505-0KA00-0AB0 6ES7505-0RA00-0AB0 6ES7505-0RB00-0AB0 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/3 A 24 V DC/8 A	6EP1332-4BA00 6EP1333-4BA00		
		Power supply connector Spare part; for connecting the 24 V DC supply voltage <ul style="list-style-type: none"> • 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 With PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0 6ES7972-0BB70-0XA0		
		PROFIBUS FC Standard Cable GP Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0EH10		
		PROFIBUS FC Robust Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0JH10		
		PROFIBUS FC Flexible Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1831-2K		

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

Ordering data	Article No.	Article No.	
PROFIBUS FC Trailing Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m Sheath color: Petrol Sheath color: Violet	6XV1830-3EH10 6XV1831-2L	IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug 180/90 with marine approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1840-4AH10
PROFIBUS FC Food Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0GH10	IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	6GK1901-1GA00
PROFIBUS FC Ground Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-3FH10	Display For CPU 1511-1 PN and CPU 1513-1 PN; spare part For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP and CPU 1518-4 PN/DP; spare part	6ES7591-1AA01-0AA0 6ES7591-1BA01-0AA0
PROFIBUS FC FRNC Cable GP 2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0LH10	Front cover for PROFIBUS DP interface For CPU 1517-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part	6ES7591-8AA00-0AA0
PROFIBUS FastConnect stripping tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	6GK1905-6AA00	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	6ES7511-1CK02-4YB5
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 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0		
IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 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 RJ45 outlet/IE FC RJ45 plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1840-3AH10		

SIMATIC S7-1500 Advanced Controllers

Central processing units

Standard CPUs

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Ordering data	Article No.	Ordering data	Article No.
STEP 7 Professional V15.1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1 (64-bit) Windows 7 Enterprise SP1 (64-bit) Windows 7 Ultimate SP1 (64-bit) Windows 10 Home Version 1709, 1803 Windows 10 Professional Version 1709, 1803 Windows 10 Enterprise Version 1709, 1803 Windows 10 Enterprise 2016 LTSC Windows 10 IoT Enterprise 2015 LTSC Windows 10 IoT Enterprise 2016 LTSC Windows Server 2012 R2 StdE (full installation) Windows Server 2016 Standard (full installation) Type of delivery: en, de, fr, it, es, zh STEP 7 Professional V15.1, floating license STEP 7 Professional V15.1, floating license, software download incl. license key ¹⁾ Email address required for delivery		SIMATIC Target 1500S for Simulink V3.0 Download incl. license key ¹⁾ Email address required for delivery Upgrade of SIMATIC Target 1500S for Simulink V2.0 to V3.0, download incl. license key ¹⁾ Email address required for delivery	6ES7823-1BE02-0YA5 6ES7823-1BE02-0YE5
		SIMATIC Target + ODK 1500S bundle Download incl. license key ¹⁾ Email address required for delivery	6ES7823-1BE12-0YA0
		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
SIMATIC ODK 1500S Open Development Kit for support in developing high-level language applications for SIMATIC S7-1500 Advanced Controllers; supplied on DVD, license key (floating license) on USB flash drive Open Development Kit for support in developing high-level language applications for SIMATIC S7-1500 Advanced Controllers; software download including license key (floating license) ¹⁾ Email address required for delivery Open Development Kit for support in developing high-level language applications for SIMATIC S7-1500 Advanced Controllers; upgrade for existing installations as from V1.0; software download including license key (floating license) ¹⁾ Email address required for delivery	6ES7806-2CD03-0YA0 6ES7806-2CD03-0YG0 6ES7806-2CD03-0YK0		

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

SIMATIC S7-1500 Advanced Controllers

Central processing units

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 non-Siemens PROFINET I/O 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/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 non-Siemens PROFINET I/O 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 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 non-Siemens 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS standard CPUs

Overview SIPLUS CPU 1518-4 PN/DP



Overview SIPLUS CPU 1518-4 PN/DP MFP



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- 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 non-Siemens 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.

- CPU with an extremely large program and data memory in the S7-1500 controller product range for demanding applications with demanding 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++ functions can be called and executed in the CPU runtime.
- In parallel to the CPU runtime, there is an additional C/C++ Runtime, in which call-independent, i.e. stand-alone, C/C++ applications can be executed.
- 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 non-Siemens 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 facilitates data transfer 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, gearing between axes, output cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS standard CPUs

Overview SIPLUS CPU 1518-4 PN/DP MFP (continued)

Multi-functional platform

With the multi-functional platform (MFP), more functionality can be accommodated in a module. The computing power of the CPU 1518-4 PN/DP MFP allows the merging of previously separate applications on a common platform, and continues to meet the high demands of the S7-1500 in respect of ease of maintenance and ruggedness.

This means that, in addition to the control function, it is also possible to process typical PC applications on the multi-functional platform, e.g. tasks that:

- require high-level language programming,
- are developed based on models, or
- have to be solved via databases.

Thus, in addition to the option of running C/C++ code in the standard STEP 7 program, the CPU 1518-4 PN/DP MFP multi-functional platform provides an additional second independent runtime environment in order to execute C/C++ applications in parallel to the STEP 7 program if required.

Control-independent applications, e.g. protocol converters, database applications and others, can be created in C/C++. This simplifies the creation or reuse of customer-specific,

high-level language applications.

The CPU 1518-4 PN/DP MFP has the quantity structure and functionality of a CPU 1518-4 PN/DP with regard to the control unit. In addition to the user program created with STEP 7 in the TIA Portal, C/C++ functions formulated via the SIMATIC ODK 1500S can be integrated into the standard user program.

By using SIMATIC ODK 1500S (ODK - Open Development Kit), higher-level programming language mechanisms, such as object orientation, can also be utilized.

Furthermore, with the SIMATIC Target 1500S™ engineering package for Simulink®, it is also possible to integrate complex Simulink models to take advantage of the model-based development using MATLAB and Simulink®.

Note:

SIPLIC 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 has been added.

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Technical specifications

Article number	6AG1511-1AK02-2AB0	6AG1511-1AK01-7AB0	6AG1513-1AL02-2AB0	6AG1513-1AL01-7AB0
Based on	6ES7511-1AK02-0AB0	6ES7511-1AK01-0AB0	6ES7513-1AL02-0AB0	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 (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost); start-up @ -20 °C	-40 °C; = Tmin (incl. condensation/frost)	-40 °C; = Tmin (incl. condensation/frost); start-up @ -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	-40 °C; = Tmin; Startup @ -20 °C	-40 °C; = Tmin	-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
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	5 000 m	5 000 m	5 000 m	5 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 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

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS standard CPUs

Technical specifications (continued)

Article number	6AG1511-1AK02-2AB0	6AG1511-1AK01-7AB0	6AG1513-1AL02-2AB0	6AG1513-1AL01-7AB0
Based on	6ES7511-1AK02-0AB0 SIPLUS S7-1500 CPU 1511-1 PN	6ES7511-1AK01-0AB0 SIPLUS S7-1500 CPU 1511-1 PN	6ES7513-1AL02-0AB0 SIPLUS S7-1500 CPU 1513-1 PN	6ES7513-1AL01-0AB0 SIPLUS S7-1500 CPU 1513-1 PN
Resistance				
Coolants and lubricants				
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems				
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to 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 acc. to EN 60068-2-52 (severity degree 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 acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to 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; *	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust; *
Use on ships/at sea				
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
Remark				
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating				
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS standard CPUs

Technical specifications (continued)

Article number	6AG1516-3AN01-2AB0	6AG1516-3AN01-7AB0	6AG1518-4AP00-4AB0
Based on	6ES7516-3AN01-0AB0	6ES7516-3AN01-0AB0	6ES7518-4AP00-1AB0
	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 (incl. condensation/frost); start-up @ -20 °C	-40 °C; = Tmin (incl. condensation/frost); start-up @ -20 °C	0 °C; = Tmin (incl. condensation/frost)
• 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; = Tmin
• 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
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	5 000 m	5 000 m	5 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) / / Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 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			
Coolants and lubricants			
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems			
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea			
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
Remark			
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating			
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	Yes; Type 1 protection	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS standard CPUs

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Ordering data	Article No.	Ordering data	Article No.
SIPLUS CPU 1511-1 PN (Extended temperature range and exposure to media) 150 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required Temperature range -40 ... +60 °C Temperature range -40 ... +70 °C (startup -20 °C)	6AG1511-1AK02-2AB0 6AG1511-1AK01-7AB0	SIPLUS CPU 1518-4 PN/DP (Exposure to media) 3 MB work memory for program, 10 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6AG1518-4AP00-4AB0
SIPLUS CPU 1513-1 PN (Extended temperature range and exposure to media) 300 KB work memory for program, 1.5 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required Temperature range -40 ... +60 °C Temperature range -40 ... +70 °C (startup -20 °C)	6AG1513-1AL02-2AB0 6AG1513-1AL01-7AB0	SIPLUS CPU 1518-4 PN/DP MFP (Exposure to media) 4 MB work memory for program, 20 MB for data, 50 MB for CPU function library in the CPU runtime, 500 MB for C/C++ Runtime application, PROFINET IRT interface with 2-port switch, PROFINET RT interface, Ethernet interface, PROFIBUS interface; C/C++ Runtime and OPC UA runtime license included; SIMATIC memory card required	6AG1518-4AX00-4AC0
SIPLUS CPU 1516-3 PN/DP (Extended temperature range and exposure to media) 1 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC memory card required Temperature range -40 ... +60 °C (startup -20 °C) Temperature range -40 ... +70 °C (startup -20 °C)	6AG1516-3AN01-2AB0 6AG1516-3AN01-7AB0	System power supply (Extended temperature range and exposure to media) 24 V DC input voltage, power 25 W 24/48/60 V DC input voltage, power 60 W 120/230 V AC input voltage, power 60 W	6AG1505-0KA00-7AB0 6AG1505-0RA00-7AB0 6AG1507-0RA00-7AB0
		Load power supply (Extended temperature range and exposure to media) 24 V DC/3 A 24 V DC/8 A	6AG1332-4BA00-7AA0 6AG1333-4BA00-7AA0
		Display (Extended temperature range and exposure to media) For SIPLUS CPU 1511-1 PN and CPU 1513-1 PN; spare part For SIPLUS CPU 1516-3 PN/DP, SIPLUS CPU 1518-4 PN/DP and SIPLUS CPU 1518-4 PN/DP MFP; spare part	6AG1591-1AA01-2AA0 6AG1591-1BA01-2AA0
		Other accessories	See SIMATIC S7-1500, standard CPUs, page 4/22

SIMATIC S7-1500 Advanced Controllers

Central processing units

Compact CPUs

Overview CPU 1511C-1 PN



- The compact CPU with integral digital and analog inputs and outputs in the product spectrum of the S7-1500 controllers
- 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 non-Siemens PROFINET IO controller
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Isochronous mode (distributed)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, output 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 product spectrum of the S7-1500 controllers
- 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 non-Siemens PROFINET IO controller
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Isochronous mode (distributed)
- Integrated motion control functionalities for controlling speed-controlled and positioning axes, support for external encoders, output 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Compact CPUs

Technical specifications

Article number	6ES7511-1CK01-0AB0	6ES7512-1CK01-0AB0
	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	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7511-1CK00-0AB0	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7512-1CK00-0AB0
Display		
Screen diagonal [cm]	3.45 cm	3.45 cm
Supply voltage		
Type of supply voltage	24 V DC	24 V DC
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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Compact CPUs

Technical specifications (continued)

Article number	6ES7511-1CK01-0AB0	6ES7512-1CK01-0AB0
	CPU 1511C-1 PN, 175 KB Prog, 1 MB data	CPU 1512C-1 PN, 250 KB Prog, 1 MB data
Protocols		
• IP protocol	Yes; IPv4	Yes; IPv4
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• SIMATIC communication	Yes	Yes
• Open IE communication	Yes	Yes
• Web server	Yes	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
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
- PROFIenergy	Yes	Yes
- 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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Compact CPUs

Technical specifications (continued)

Article number	6ES7511-1CK01-0AB0 CPU 1511C-1 PN, 175 KB Prog, 1 MB data	6ES7512-1CK01-0AB0 CPU 1512C-1 PN, 250 KB Prog, 1 MB data
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; 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
- PROFinergy	Yes	Yes
- Shared device	Yes	Yes
- Number of IO Controllers with shared device, max.	4	4
- Asset management record	Yes; Per user program	Yes; Per user program
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
OPC UA		
• OPC UA client	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; With minimum OB 6x cycle of 825 µs (distributed)	Yes; With minimum OB 6x cycle of 625 µs (distributed)
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
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
Altitude during operation relating to sea level		
• Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual

SIMATIC S7-1500 Advanced Controllers

Central processing units

Compact CPUs

Technical specifications (continued)

Article number	6ES7511-1CK01-0AB0	6ES7512-1CK01-0AB0
	CPU 1511C-1 PN, 175 KB Prog, 1 MB data	CPU 1512C-1 PN, 250 KB Prog, 1 MB data
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
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

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Ordering data

Article No.	Article No.
CPU 1511C-1 PN 175 KB work memory for program, 1 MB for data, 16 digital inputs, 16 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IRT interface with 2-port switch, SIMATIC memory card required	6ES7511-1CK01-0AB0
CPU 1512C-1 PN 250 KB work memory for program, 1 MB for data, 32 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IRT interface with 2-port switch, SIMATIC memory card required	6ES7512-1CK01-0AB0
Accessories	
SIMATIC memory card	
4 MB	6ES7954-8LC03-0AA0
12 MB	6ES7954-8LE03-0AA0
24 MB	6ES7954-8LF03-0AA0
256 MB	6ES7954-8LL03-0AA0
2 GB	6ES7954-8LP02-0AA0
32 GB	6ES7954-8LT03-0AA0
Front connectors	
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 element	
10 units; spare part	6ES7590-5BA00-0AA0
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	
• 2 000 mm	6ES7590-1BC00-0AA0
PE connection element for DIN rail 2 000 mm	
20 units	6ES7590-5AA00-0AA0
Power supply	
For supplying the backplane bus of the S7-1500 controller	
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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Compact CPUs

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Ordering data	Article No.	Article No.
Power connector With coding element for power supply module; spare part, 10 units	6ES7590-8AA00-0AA0	SIMATIC S7-1500 Starter Kit 6ES7511-1CK02-4YB5 Comprising: CPU 1511C-1 PN, SIMATIC memory card 4 MB, 160 mm DIN rail, front connector, STEP 7 Professional 365-day license, SIMATIC ProDiag 1500, SIMATIC OPC UA S7-1500 Small, PM 1507 24 V/3 A power supply, Ethernet cable, documentation STEP 7 Professional V15.1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1 (64-bit) Windows 7 Enterprise SP1 (64-bit) Windows 7 Ultimate SP1 (64-bit) Windows 10 Home Version 1709, 1803 Windows 10 Professional Version 1709, 1803 Windows 10 Enterprise Version 1709, 1803 Windows 10 Enterprise 2016 LTSC Windows 10 IoT Enterprise 2015 LTSC Windows 10 IoT Enterprise 2016 LTSC Windows Server 2012 R2 StdE (full installation) Windows Server 2016 Standard (full installation) Type of delivery: en, de, fr, it, es, zh 6ES7822-1AA05-0YA5 6ES7822-1AE05-0YA5 STEP 7 Professional V15.1, floating license STEP 7 Professional V15.1, floating license, software 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
Load power supply 24 V DC/3 A 24 V DC/8 A	6EP1332-4BA00 6EP1333-4BA00	
Power supply connector Spare part; for connecting the 24 V DC supply voltage • With push-in terminals	6ES7193-4JB00-0AA0	
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 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0	
IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 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 RJ45 outlet/IE FC RJ45 plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 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 RJ45 outlet/IE FC RJ45 plug 180/90 with marine approval; sold by the meter; max. delivery unit 1 000 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	

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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Overview CPU 1511F-1 PN



- Entry-level CPU in the S7-1500F Controller product range
- Can be used for safety functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- 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 non-Siemens PROFINET I/O 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
- Can be used for safety 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
- 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 non-Siemens PROFINET I/O controller
- Isochronous mode

Note:

SIMATIC Memory Card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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 failsafe 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 non-Siemens PROFINET I/O 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 failsafe applications with high requirements regarding program scope and networking.
- Can be used for failsafe 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 non-Siemens 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Overview CPU 1517F-3 PN/DP



- The CPU with a very large program and data memory in the S7-1500 controller product range for failsafe applications with high requirements regarding program scope and networking.
- Can be used for failsafe 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 non-Siemens 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 failsafe applications with highest requirements regarding program scope and networking.
- Can be used for failsafe 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 non-Siemens 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Overview CPU 1518F-4 PN/DP MFP



Multi-functional platform

With the multi-functional platform (MFP), more functionality can be accommodated in a module. The computing power of the CPU 1518F-4 PN/DP MFP allows the merging of previously separate applications on a common platform while continuing to meet the high S7-1500 demands with regard to maintenance and ruggedness.

This means that, in addition to the control function, it is also possible to process typical PC applications on the multi-functional platform, e.g. tasks that:

- require high-level language programming,
- are developed based on models, or
- have to be solved via databases.

Besides the option of running C/C++ code in the standard STEP 7 program, the multi-functional platform CPU 1518F-4 PN/DP MFP thus provides an additional second independent runtime environment which facilitates execution of C/C++ applications in parallel to the STEP 7 program if required.

Control-independent applications, e.g. protocol converters, database applications and others, can be created in C/C++. This simplifies the creation or reuse of customer-specific, high-level language applications.

The CPU 1518F-4 PN/DP MFP has the quantity structure and functionality of a CPU 1518F-4 PN/DP with regard to the control part. In addition to the user program created with STEP 7 in the TIA Portal, C/C++ functions formulated via the SIMATIC ODK 1500S can be integrated into the standard user program. By using SIMATIC ODK 1500S (ODK - Open Development Kit), higher-level programming language mechanisms, such as object orientation, can also be utilized. Furthermore, with the SIMATIC Target 1500S™ engineering package for Simulink®, it is also possible to integrate complex Simulink models to take advantage of the model-based development using MATLAB and Simulink®.

Note:

SIMATIC memory card required for operation of the CPU.

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- CPU with an extremely large program and data memory in the S7-1500 controller product range for demanding standard and fail-safe applications with demanding requirements regarding program scope, performance and networking
- Can be used for safety 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++ functions can be called and executed in the CPU runtime.
- In parallel to the CPU runtime, there is an additional C/C++ Runtime, in which call-independent, i.e. stand-alone, C/C++ applications can be executed.
- 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 non-Siemens 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 facilitates data transfer at a speed of 1 Gbps.
- PROFIBUS DP master interface
- OPC UA server (data access) as runtime option for easy connection of the 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, gearing between axes, output cams/cam tracks and probes
- Integrated web server for diagnostics with the option of creating user-defined web pages

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN, 225KB prog, 1MB data	6ES7513-1FL02-0AB0 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				
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/ integrated as of version 	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7511-1FK01-0AB0	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7513-1FL01-0AB0	V15 (FW V2.5) / V13 SP1 Update 4 (FW V1.8) or higher	V15.1 (FW V2.6)/V13 SP1 Update 4 (FW V1.8) or higher
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
Memory				
Work memory				
<ul style="list-style-type: none"> integrated (for program) integrated (for data) 	225 kbyte 1 Mbyte	450 kbyte 1.5 Mbyte	750 kbyte 3 Mbyte	1.5 Mbyte 5 Mbyte
Load memory				
<ul style="list-style-type: none"> 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				
<ul style="list-style-type: none"> Number 	2 048	2 048	2 048	2 048
IEC counter				
<ul style="list-style-type: none"> 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				
<ul style="list-style-type: none"> Number 	2 048	2 048	2 048	2 048
IEC timer				
<ul style="list-style-type: none"> 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				
<ul style="list-style-type: none"> Number, max. 	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area				
I/O address area				
<ul style="list-style-type: none"> Inputs Outputs 	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
Time of day				
Clock				
<ul style="list-style-type: none"> Type 	Hardware clock	Hardware clock	Hardware clock	Hardware clock

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications (continued)

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN, 225KB prog., 1MB data	6ES7513-1FL02-0AB0 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
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
Protocols				
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4	Yes; IPv4
• 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; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
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	128; In total, up to 512 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	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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications (continued)

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN, 225KB prog, 1MB data	6ES7513-1FL02-0AB0 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 375 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; 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	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
- PROFinergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO controllers with shared device, max.	4	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program	Yes; Per user program
2. Interface				
Interface types				
• Number of ports			1	1
• integrated switch			No	No
• RJ 45 (Ethernet)			Yes; X2	Yes; X2
Protocols				
• IP protocol			Yes; IPv4	Yes; IPv4
• PROFINET IO controller			Yes	Yes
• PROFINET IO Device			Yes	Yes
• SIMATIC communication			Yes	Yes
• Open IE communication			Yes	Yes
• Web server			Yes	Yes
• Media redundancy			No	No

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications (continued)

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN, 225KB prog, 1MB data	6ES7513-1FL02-0AB0 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
- MRPD			No	No
- PROFlenergy			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 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 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
- PROFlenergy			Yes	Yes
- Prioritized startup			No	No
- Shared device			Yes	Yes
- Number of IO controllers with shared device, max.			4	4
- Asset management record			Yes; Per user program	Yes; Per user program
3. Interface				
Interface types				
• Number of ports				1
• RS 485				Yes; X3
Protocols				
• PROFIBUS DP master				Yes
• PROFIBUS DP slave				No
• SIMATIC communication				Yes

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications (continued)

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN, 225KB prog, 1MB data	6ES7513-1FL02-0AB0 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
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	192; via integrated interfaces of the CPU and connected CPs / CMs	256; 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 512 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
OPC UA				
• OPC UA client	Yes	Yes	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; Distributed and central; with minimum OB 6x cycle of 625 µs (distributed) and 1 ms (central)	Yes; With minimum OB 6x cycle of 500 µs	Yes; With minimum OB 6x cycle of 500 µs	Yes; Distributed and central; with minimum OB 6x cycle of 375 µs (distributed) and 1 ms (central)
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	800	2 400	2 400
• 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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications (continued)

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN, 225KB prog, 1MB data	6ES7513-1FL02-0AB0 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
Standards, approvals, certificates				
Highest safety class achievable in safety mode				
• Performance level according to ISO 13849-1	PLe	PLe	PLe	PLe
• SIL acc. to IEC 61508	SIL 3	SIL 3	SIL 3	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	< 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
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
Altitude during operation relating to sea level				
• Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Configuration				
Programming				
Programming language				
- LAD	Yes; incl. failsafe	Yes; ncl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; ncl. 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; Specific write protection both for Standard and for Failsafe	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	405 g	830 g	845 g

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

Technical specifications (continued)

Article number	6ES7517-3FP00-0AB0	6ES7518-4FP00-0AB0	6ES7518-4FX00-1AC0
	CPU 1517F-3 PN/DP, 3MB Prog., 8MB data	CPU 1518F-4 PN/DP, 6 MB Prog, 20MB data	CPU 1518F-4 PN/DP MFP + C/C++ RT +OPC UA
General information			
Product type designation	CPU 1517F-3PN/DP	CPU 1518F-4PN/DP	CPU 1518F-4 PN/DP MFP
Engineering with			
• STEP 7 TIA Portal configurable/ integrated as of version	V15.1 (FW V2.6) / V13 Update 3 (FW V1.6) or higher	V15.1 (FW V2.6) / V13 (FW V1.5) or higher	V15.1 (FW V2.6) / V15 (FW V2.5) or higher
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
Memory			
Work memory			
• integrated (for program)	3 Mbyte	6 Mbyte	6 Mbyte
• integrated (for data)	8 Mbyte	20 Mbyte	20 Mbyte
• integrated (for CPU function library of CPU runtime)			50 Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.
Working memory for additional functions			
• Integrated (for C/C++ Runtime application)			512 Mbyte
Load memory			
• Plug-in (SIMATIC memory card), max.	32 Gbyte	32 Gbyte	32 Gbyte; The memory card must have at least 2 GB of space on it
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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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	6ES7518-4FX00-1AC0 CPU 1518F-4 PN/DP MFP + C/C++ RT +OPC UA
1. Interface			
Interface types			
• Number of ports	2	2	2
• integrated switch	Yes	Yes	Yes
• RJ 45 (Ethernet)	Yes; X1	Yes; X1	Yes; X1
Protocols			
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes
• Web server	Yes	Yes	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
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
- PROFInergy	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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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	6ES7518-4FX00-1AC0 CPU 1518F-4 PN/DP MFP + C/C++ RT +OPC UA
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	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; 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
- PROFINergy	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO controllers with shared device, max.	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program
2. Interface			
Interface types			
• Number of ports	1	1	1
• integrated switch	No	No	No
• RJ 45 (Ethernet)	Yes; X2	Yes; X2	Yes; X2
Protocols			
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• SIMATIC communication	Yes	Yes	Yes
• Open IE communication	Yes	Yes	Yes
• Web server	Yes	Yes	Yes
• Media redundancy	No	No	No

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SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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	6ES7518-4FX00-1AC0 CPU 1518F-4 PN/DP MFP + C/C++ RT +OPC UA
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
- MRPD	No	No	No
- PROFlenergy	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	128
- 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	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
- PROFlenergy	Yes	Yes	Yes
- Prioritized startup	No	No	No
- Shared device	Yes	Yes	Yes
- Number of IO controllers with shared device, max.	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program
3. Interface			
Interface types			
• Number of ports	1	1	1; C/C++ Runtime can also be reached via this port
• integrated switch		No	No
• RJ 45 (Ethernet)		Yes; X3	Yes; X3
• RS 485	Yes; X3		

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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	6ES7518-4FX00-1AC0 CPU 1518F-4 PN/DP MFP + C/C++ RT +OPC UA
Protocols			
• IP protocol		Yes; IPv4	Yes; IPv4
• 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
Protocols			
• PROFIBUS DP master		Yes	Yes
• PROFIBUS DP slave		No	No
• SIMATIC communication		Yes	Yes
Protocols			
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
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
OPC UA			
• OPC UA client	Yes	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; Distributed and central; with minimum OB 6x cycle of 250 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 125 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 125 µs (distributed) and 1 ms (central)
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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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	6ES7518-4FX00-1AC0 CPU 1518F-4 PN/DP MFP + C/C++ RT +OPC UA
Standards, approvals, certificates			
Highest safety class achievable in safety mode			
• Performance level according to ISO 13849-1	PLe	PLe	PLe
• SIL acc. to IEC 61508	SIL 3	SIL 3	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	< 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
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
Altitude during operation relating to sea level			
• Installation altitude above sea level, max.	3 000 m; Restrictions for installation altitudes > 2 000 m, see manual	3 000 m; Restrictions for installation altitudes > 2 000 m, see manual	
Configuration			
Programming			
Programming language			
- LAD	Yes; incl. failsafe	Yes; incl. failsafe	Yes
- FBD	Yes; incl. failsafe	Yes; incl. failsafe	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; Specific write protection both for Standard and for Failsafe	Yes; Specific write protection both for Standard and for Failsafe	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.			9.8 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	2 117 g

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Central processing units

Fail-safe CPUs

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Ordering data	Article No.	Article No.	
CPU 1511F-1 PN Fail-safe CPU, 230 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6ES7511-1FK02-0AB0		
CPU 1513F-1 PN Fail-safe CPU, 450 KB work memory for program, 1.5 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6ES7513-1FL02-0AB0		
CPU 1515F-2 PN Fail-safe CPU, 750 KB work memory for program, 3 MB for data, PROFINET IRT interface with 2-port switch; PROFINET RT interface; SIMATIC memory card required	6ES7515-2FM01-0AB0		
CPU 1516F-3 PN/DP Fail-safe CPU, 1.5 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC memory card required	6ES7516-3FN01-0AB0		
CPU 1517F-3 PN/DP Fail-safe CPU, 3 MB work memory for program, 8 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC memory card required	6ES7517-3FP00-0AB0		
CPU 1518F-4 PN/DP Fail-safe CPU, 6 MB work memory for program, 20 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6ES7518-4FP00-0AB0		
CPU 1518F-4 PN/DP MFP CPU 1518F-4 PN/DP MFP, including C/C++ Runtime and OPC UA runtime license	6ES7518-4FX00-1AC0		
		Accessories	
		SIMATIC memory card 4 MB 12 MB 24 MB 256 MB 2 GB 32 GB	6ES7954-8LC03-0AA0 6ES7954-8LE03-0AA0 6ES7954-8LF03-0AA0 6ES7954-8LL03-0AA0 6ES7954-8LP02-0AA0 6ES7954-8LT03-0AA0
		SIMATIC S7-1500 DIN rail Fixed lengths, with grounding elements <ul style="list-style-type: none"> • 160 mm • 245 mm • 482 mm • 530 mm • 830 mm For cutting to length by customer, without drill holes; grounding elements must be ordered separately <ul style="list-style-type: none"> • 2 000 mm 	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 6ES7590-1AJ30-0AA0 6ES7590-1BC00-0AA0
		PE connection element for DIN rail 2 000 mm 20 units	6ES7590-5AA00-0AA0
		Power supply For supplying the backplane bus of the S7-1500 controller 24 V DC input voltage, power 25 W 24/48/60 V DC input voltage, power 60 W 24/48/60 V DC input voltage, power 60 W, buffering functionality 120/230 V AC input voltage, power 60 W	6ES7505-0KA00-0AB0 6ES7505-0RA00-0AB0 6ES7505-0RB00-0AB0 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/3 A 24 V DC/8 A	6EP1332-4BA00 6EP1333-4BA00
		Power supply connector Spare part; for connecting the 24 V DC supply voltage <ul style="list-style-type: none"> • 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 With PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0 6ES7972-0BB70-0XA0

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Central processing units

Fail-safe CPUs

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Ordering data	Article No.	Article No.
PROFIBUS FC Standard Cable GP Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0EH10	IE FC TP Trailing Cable 2 x 2 (Type C) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m
PROFIBUS FC Robust Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0JH10	
PROFIBUS FC Flexible Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1831-2K	IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug 180/90 with marine approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m
PROFIBUS FC Trailing Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m Sheath color: Petrol Sheath color: Violet	6XV1830-3EH10 6XV1831-2L	
PROFIBUS FC Food Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1830-0GH10	IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables Display For CPU 1511-1 PN, CPU 1511F-1 PN, CPU 1513-1 PN and CPU 1513F-1 PN; spare part For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part
PROFIBUS FC Ground Cable 2-wire, shielded; sold by the meter; max. delivery unit 1 000 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 1 000 m, minimum order quantity 20 m	6XV1830-0LH10	IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables
PROFIBUS FastConnect stripping tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	6GK1905-6AA00	Display For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part
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		Front cover for PROFIBUS DP interface For CPU 1517-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part
IE FC RJ45 plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0	SIMATIC S7-1500 Starter Kit 6ES7591-1AA01-0AA0 6ES7591-1BA01-0AA0
IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1840-2AH10	For CPU 1511-1 PN, CPU 1511F-1 PN, CPU 1513-1 PN and CPU 1513F-1 PN; spare part For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part

SIMATIC S7-1500 Advanced Controllers

Central processing units

Fail-safe CPUs

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Ordering data	Article No.	Article No.
<p>STEP 7 Professional V15.1</p> <p>Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC</p> <p>Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1 (64-bit) Windows 7 Enterprise SP1 (64-bit) Windows 7 Ultimate SP1 (64-bit) Windows 10 Home Version 1709, 1803 Windows 10 Professional Version 1709, 1803 Windows 10 Enterprise Version 1709, 1803 Windows 10 Enterprise 2016 LTSC Windows 10 IoT Enterprise 2015 LTSC Windows 10 IoT Enterprise 2016 LTSC Windows Server 2012 R2 StdE (full installation) Windows Server 2016 Standard (full installation)</p> <p>Type of delivery: en, de, fr, it, es, zh</p> <p>STEP 7 Professional V15.1, floating license</p> <p>STEP 7 Professional V15.1, floating license, software download incl. license key ¹⁾</p> <p>Email address required for delivery</p>		<p>SIMATIC ODK 1500S</p> <p>Open Development Kit for support in developing high-level language applications for SIMATIC S7-1500 Advanced Controllers; supplied on DVD, license key (floating license) on USB flash drive</p> <p>Open Development Kit for support in developing high-level language applications for SIMATIC S7-1500 Advanced Controllers Software download including license key (floating license) ¹⁾</p> <p>Email address required for delivery</p> <p>Open Development Kit for support in developing high-level language applications for SIMATIC S7-1500 Advanced Controllers; upgrade for existing installations as from V1.0; software download including license key (floating license) ¹⁾</p> <p>Email address required for delivery</p> <p>SIMATIC Target 1500S for Simulink V3.0</p> <p>Download incl. license key ¹⁾</p> <p>Email address required for delivery</p> <p>SIMATIC Target + ODK 1500S bundle</p> <p>Download incl. license key ¹⁾</p> <p>Email address required for delivery</p> <p>Upgrade of SIMATIC Target 1500S for Simulink V2.0 to V3.0, download incl. license key ¹⁾</p> <p>Email address required for delivery</p> <p>SIMATIC Manual Collection</p> <p>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</p> <p>SIMATIC Manual Collection update service for 1 year</p> <p>Current "Manual Collection" DVD and the three subsequent updates</p>
		6ES7806-2CD03-0YA0
		6ES7806-2CD03-0YGO
		6ES7806-2CD03-0YK0
	6ES7822-1AA05-0YA5	6ES7823-1BE02-0YA5
	6ES7822-1AE05-0YA5	6ES7823-1BE12-0YA0
		6ES7823-1BE02-0YE5
<p>STEP 7 Safety Advanced V15.1</p> <p>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 200MP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O</p> <p>Requirement: STEP 7 Professional V15.1</p> <p>Floating license for 1 user; software and documentation on DVD; license key on USB flash drive</p> <p>Floating license for 1 user; software, documentation and license key for download¹⁾; email address required for delivery</p>	6ES7833-1FA15-0YA5	6ES7998-8XC01-8YE0
	6ES7833-1FA15-0YH5	6ES7998-8XC01-8YE2

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

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS fail-safe CPUs

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 non-Siemens PROFINET I/O 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 non-Siemens PROFINET I/O 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS fail-safe CPUs

Overview SIPLUS 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 failsafe 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 non-Siemens 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.

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 1516F-3 PN/DP



- The CPU with a large program and data memory in the SIPLUS S7-1500 controller product range for failsafe applications with high requirements regarding program scope and networking.
- Can be used for failsafe 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 non-Siemens 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.

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS fail-safe CPUs

Overview SIPLUS CPU 1518F-4 PN/DP

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- The CPU with a very large program and data memory in the SIPLUS S7-1500 controller product range for failsafe applications with highest requirements regarding program scope, performance and networking.
- Can be used for failsafe 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 non-Siemens 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:

SIPLIC 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	6AG1515-2FM01-2AB0	6AG1516-3FN01-2AB0	6AG1518-4FP00-4AB0
Based on	6ES7511-1FK01-0AB0 SIPLUS S7-1500 CPU 1511F-1 PN	6ES7513-1FL01-0AB0 SIPLUS S7-1500 CPU 1513F-1 PN	6ES7515-2FM01-0AB0 SIPLUS S7-1500 CPU 1515F-2 PN	6ES7516-3FN01-0AB0 SIPLUS S7-1500 CPU-1516F-3 PN/DP	6ES7518-4FP00-0AB0 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	-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; = Tmax; display: 50 °C, the display is switched off at an operating temperature of typically 50 °C	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	-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	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS fail-safe CPUs

Technical specifications (continued)

Article number	6AG1511-1FK01-2AB0	6AG1513-1FL01-2AB0	6AG1515-2FM01-2AB0	6AG1516-3FN01-2AB0	6AG1518-4FP00-4AB0
Based on	6ES7511-1FK01-0AB0 SIPLUS S7-1500 CPU 1511F-1 PN	6ES7513-1FL01-0AB0 SIPLUS S7-1500 CPU 1513F-1 PN	6ES7515-2FM01-0AB0 SIPLUS S7-1500 CPU 1515F-2 PN	6ES7516-3FN01-0AB0 SIPLUS S7-1500 CPU-1516F-3 PN/DP	6ES7518-4FP00-0AB0 SIPLUS S7-1500 CPU 1518F-4 PN/DP
Altitude during operation relating to sea level					
• Installation altitude above sea level, max.	2 000 m	2 000 m	2 000 m	2 000 m	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 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 %; incl. condensation / frost permitted (no commissioning under condensation conditions)	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance					
Coolants and lubricants					
- Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems					
- to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
- to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea					
- to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
- to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
- to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *	Yes; Class 6S3 incl. sand, dust; *
Remark					
- Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating					
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability	Yes; Class 2 for high availability
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A	Yes; Conformal coating, Class A

SIMATIC S7-1500 Advanced Controllers

Central processing units

SIPLUS fail-safe CPUs

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Ordering data	Article No.	Ordering data	Article No.
CPU 1511F-1 PN (Extended temperature range and exposure to environmental substances) Fail-safe CPU, 225 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6AG1511-1FK01-2AB0	Accessories System power supply (Extended temperature range and exposure to environmental substances) For supplying the backplane bus of the S7-1500 controller 24 V DC input voltage, power 25 W	6AG1505-0KA00-7AB0
SIPLUS CPU 1513F-1 PN (Extended temperature range and exposure to environmental substances) Fail-safe CPU, 450 KB work memory for program, 1.5 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6AG1513-1FL01-2AB0	24/48/60 V DC input voltage, power 60 W 120/230 V AC input voltage, power 60 W	6AG1505-0RA00-7AB0 6AG1507-0RA00-7AB0
SIPLUS CPU 1515F-2 PN (Extended temperature range and exposure to environmental substances) Fail-safe CPU, 750 KB work memory for program, 3 MB for data, PROFINET IRT interface with 2-port switch; PROFINET RT interface; SIMATIC memory card required	6AG1515-2FM01-2AB0	Load power supply (Extended temperature range and exposure to environmental substances) 24 V DC/3 A 24 V DC/8 A	6AG1332-4BA00-7AA0 6AG1333-4BA00-7AA0
SIPLUS CPU 1516F-3 PN/DP (Extended temperature range and exposure to environmental substances) Fail-safe CPU, 1.5 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface; SIMATIC memory card required	6AG1516-3FN01-2AB0	Display (Extended temperature range and exposure to environmental substances) For SIPLUS CPU 1511F-1 PN and CPU 1513F-1 PN; spare part For SIPLUS CPU 1515F-2 PN, CPU 1516F-3 PN/DP and CPU 1518-4F PN/DP; spare part	6AG1591-1AA01-2AA0 6AG1591-1BA01-2AA0
CPU 1518F-4 PN/DP (exposure to environmental substances) Fail-safe CPU, 6 MB work memory for program, 20 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6AG1518-4FP00-4AB0	Other accessories	See SIMATIC S7-1500, fail-safe CPUs, page 4/53

SIMATIC S7-1500 Advanced Controllers

Central processing units

Redundant CPUs

Overview CPU 1513R-1 PN



- The CPU for applications with medium requirements for program scope and processing speed, and increased requirements for availability.
- High processing speed for binary and floating-point arithmetic
- Used as the central controller in production lines with distributed I/O
- PROFINET IO RT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET

Note:

SIMATIC Memory Card required for operation of the CPU.

Overview CPU 1515R-2 PN



- The CPU for applications with medium/high requirements for program scope, networking and processing speed, and with increased requirements for availability.
- High processing speed for binary and floating-point arithmetic
- Used as central controller with distributed I/O
- PROFINET IO RT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET

Note:

SIMATIC Memory Card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Redundant CPUs

Overview CPU 1517H-3 PN



- The CPU for applications with high requirements for availability, very high requirements for program scope and networking, and very high requirements for processing speed.
- High processing speed for binary and floating-point arithmetic
- Used as central controller with distributed I/O
- PROFINET IO RT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET

Note:

SIMATIC Memory Card required for operation of the CPU.

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Technical specifications

Article number	6ES7513-1RL00-0AB0 CPU 1513R-1 PN, 300KB program, 1.5MB data	6ES7515-2RM00-0AB0 CPU 1515R-2 PN, 500KB program, 3MB data	6ES7517-3HP00-0AB0 CPU 1517H-3 PN, 2MB program, 8MB data
General information			
Product type designation	CPU 1513R-1 PN	CPU 1515R-2 PN	CPU 1517H-3 PN
Engineering with			
• STEP 7 TIA Portal configurable/ integrated as of version	STEP 7 V15.1 or higher	STEP 7 V15.1 or higher	STEP 7 V15.1 or higher
Display			
Screen diagonal [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
Memory			
Work memory			
• integrated (for program)	300 kbyte	500 kbyte	2 Mbyte
• integrated (for data)	1.5 Mbyte	3 Mbyte	8 Mbyte
Load memory			
• Plug-in (SIMATIC memory card), max.	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times			
for bit operations, typ.	80 ns	60 ns	4 ns
for word operations, typ.	96 ns	72 ns	6 ns
for fixed point arithmetic, typ.	128 ns	96 ns	6 ns
for floating point arithmetic, typ.	512 ns	384 ns	24 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

SIMATIC S7-1500 Advanced Controllers

Central processing units

Redundant CPUs

Technical specifications (continued)

Article number	6ES7513-1RL00-0AB0 CPU 1513R-1 PN, 300KB program, 1.5MB data	6ES7515-2RM00-0AB0 CPU 1515R-2 PN, 500KB program, 3MB data	6ES7517-3HP00-0AB0 CPU 1517H-3 PN, 2MB program, 8MB data
Address area			
I/O address area			
• Inputs	32 kbyte	32 kbyte; All inputs are in the process image	32 kbyte
• Outputs	32 kbyte	32 kbyte; All outputs are in the process image	32 kbyte
Time of day			
Clock			
• Type			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
Protocols			
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO controller	Yes	Yes	Yes
• PROFINET IO Device	No	No	No
• SIMATIC communication	Yes; Only Server	Yes; Only Server	Yes; Only Server
• Open IE communication	Yes	Yes	Yes
• Web server	No	No	No
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes	Yes
PROFINET IO controller			
Services			
- PG/OP communication	Yes	Yes	Yes
- S7 routing	No	No	No
- Isochronous mode	No	No	No
- Open IE communication	Yes	Yes	Yes
- IRT	No	No	No
- MRP	Yes; Only Manager Auto, max. 50 nodes; only 16 are recommended, however	Yes; Only Manager Auto, max. 50 nodes; only 16 are recommended, however	Yes; Only Manager Auto, max. 50 nodes
- MRPD	No	No	No
- PROFinergy	Yes	Yes	Yes
- Number of connectable IO Devices, max.	64	64	256
- 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	1 ms to 512 ms	1 ms to 512 ms
2. Interface			
Interface types			
• Number of ports		1	1
• integrated switch		No	No
• RJ 45 (Ethernet)		Yes; X2	Yes; X2
Protocols			
• IP protocol		Yes; IPv4	Yes; IPv4
• PROFINET IO controller		No	No
• PROFINET IO Device		No	No
• SIMATIC communication		Yes; Only Server	Yes; Only Server
• Open IE communication		Yes	Yes
• Web server		No	No
• Media redundancy		No	No

SIMATIC S7-1500 Advanced Controllers

Central processing units

Redundant CPUs

Technical specifications (continued)

Article number	6ES7513-1RL00-0AB0 CPU 1513R-1 PN, 300KB program, 1.5MB data	6ES7515-2RM00-0AB0 CPU 1515R-2 PN, 500KB program, 3MB data	6ES7517-3HP00-0AB0 CPU 1517H-3 PN, 2MB program, 8MB data
3. Interface			
Interface type			Pluggable interface module (IF)
Plug-in interface modules			Synchronization module 6ES7960-1CB00-0AA5 or 6ES7960-1FB00-0AA5
4. Interface			
Interface type			Pluggable synchronization submodule (FO)
Plug-in interface modules			Synchronization module 6ES7960-1CB00-0AA5 or 6ES7960-1FB00-0AA5
Protocols			
Number of connections			
• Number of connections, max.	88	108	160
OPC UA			
• OPC UA client	No	No	No
• OPC UA server	No	No	No
Supported technology objects			
Motion control	No	No	No
Controller			
• PID_Compact	No	No	No
• PID_3Step	No	No	No
• PID-Temp	No	No	No
Counting and measuring			
• High-speed counter	No	No	No
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
- CFC	No	No	No
- GRAPH	No	No	No
Know-how protection			
• User program protection/ password protection	Yes	Yes	Yes
• Copy protection	No	No	No
• 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	70 mm	210 mm
Height	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm
Weights			
Weight, approx.	430 g	830 g	2 119 g; Interface modules: 2x 18 g

SIMATIC S7-1500 Advanced Controllers

Central processing units

Redundant CPUs

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Ordering data	Article No.	Article No.	
CPU 1513R-1 PN SIMATIC S7-1500R CPU, 300 KB work memory for program, 1.5 MB for data, PROFINET RT interface with 2-port switch; SIMATIC memory card required	6ES7513-1RL00-0AB0	PE connection element for DIN rail 2000 mm 20 units	6ES7590-5AA00-0AA0
CPU 1515R-2 PN SIMATIC S7-1500R CPU, 450 KB work memory for program, 3 MB for data, PROFINET RT interface with 2-port switch, PROFINET interface; SIMATIC memory card required	6ES7515-2RM00-0AB0	Power supply For supplying the backplane bus of the S7-1500 controller	
		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
CPU 1517H-3 PN SIMATIC S7-1500H CPU, 2 MB work memory for program, 8 MB for data, 1st interface PROFINET RT with 2-port switch, 2nd interface PROFINET, 3rd interface synchronization, command times for bit operations 4 ns; SIMATIC memory card required	6ES7517-3HP00-0AB0	Power connector With coding element for power supply module; spare part, 10 units	6ES7590-8AA00-0AA0
SIMATIC S7-1500H system bundle Comprising 2 CPUs 517H-3 PN, 4 synchronization modules up to 10 m, 2 FOC synchronization cables (1 m)	6ES7500-0HP00-0AB0	Load power supply 24 V DC/3A 24 V DC/8A	6EP1332-4BA00 6EP1333-4BA00
Accessories		Power supply connector Spare part; for connecting the 24 V DC supply voltage <ul style="list-style-type: none"> With push-in terminals 	6ES7193-4JB00-0AA0
Synchronization module For patch cable FOC up to 10 m For routing cable FOC up to 10 m	6ES7960-1CB00-0AA5 6ES7960-1FB00-0AA5	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	
Synchronization connecting cables FOC for S7-1500H Length 1 m Length 2 m Length 10 m	6ES7960-1BB00-5AA5 6ES7960-1BC00-5AA5 6ES7960-1CB00-5AA5	IE FC RJ45 plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
SIMATIC memory card 4 MB 12 MB 24 MB 256 MB 2 GB 32 GB	6ES7954-8LC03-0AA0 6ES7954-8LE03-0AA0 6ES7954-8LF03-0AA0 6ES7954-8LL03-0AA0 6ES7954-8LP02-0AA0 6ES7954-8LT03-0AA0	IE FC TP Standard Cable GP 2x2 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/ 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
SIMATIC S7-1500 DIN rail Fixed lengths, with grounding elements <ul style="list-style-type: none"> 160 mm 245 mm 482 mm 530 mm 830 mm For cutting to length by customer, without drill holes; grounding elements must be ordered separately <ul style="list-style-type: none"> 2000 mm 	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 6ES7590-1AJ30-0AA0 6ES7590-1BC00-0AA0	IE FC TP Trailing Cable 2 x 2 (Type C) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45 plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	6XV1840-3AH10

SIMATIC S7-1500 Advanced Controllers

Central processing units

Redundant CPUs

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Ordering data	Article No.	Article No.
IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/ 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, CPU 1511F-1 PN, CPU 1513-1 PN, CPU 1513F-1 PN, CPU 1513R-1 PN; spare part For CPU 1515-2 PN, CPU 1515F-2 PN, CPU 1515R-2 PN, CPU 1516-3 PN/DP, CPU 1516F-3 PN/DP, CPU 1517-3 PN/DP, CPU 1517H-3 PN, CPU 1517F-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518F-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518F-4 PN/DP ODK; spare part	6ES7591-1AA01-0AA0 6ES7591-1BA01-0AA0	
		STEP 7 Professional V15.1 (required for S7-1500R/H) Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1 (64-bit) Windows 7 Enterprise SP1 (64-bit) Windows 7 Ultimate SP1 (64-bit) Windows 10 Home Version 1703 Windows 10 Professional Version 1703 Windows 10 Enterprise Version 1703 Windows 10 Enterprise 2016 LTSB Windows 10 IoT Enterprise 2015 LTSB Windows 10 IoT Enterprise 2016 LTSB Windows Server 2012 R2 StdE (full installation) Windows Server 2016 Standard (full installation) Type of delivery: en, de, fr, it, es, zh STEP 7 Professional V15.1, floating license STEP 7 Professional V15.1, floating license, software download incl. license key ¹⁾ Email address required for delivery
		6ES7822-1AA05-0YA5
		6ES7822-1AE05-0YA5
		SIMATIC Manual Collection Electronic manuals on DVD, multilingual: 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>

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

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 non-Siemens PROFINET IO controller
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed isochronous mode
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes.

Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA.

User-defined kinematics are also supported.
- 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 1511TF-1 PN



- Entry-level CPU in the S7-1500T 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
- Can be used for safety functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- 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 non-Siemens PROFINET IO controller
- OPC UA server and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access,
 - OPC UA Security,
 - OPC UA Methods Call,
 - Support of OPC UA Companion specifications.
- Isochronous mode centrally and distributed
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes.

Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA.

User-defined kinematics are also supported.
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC memory card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Overview CPU 1515T-2 PN



- The CPU for applications with medium to high requirements regarding 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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access,
 - OPC UA Security,
 - OPC UA Methods Call,
 - Support of OPC UA Companion specifications.
- Isochronous mode centrally and distributed
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes. Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA. User-defined kinematics are also supported.
- 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 1515TF-2 PN



- The CPU for standard and fail-safe applications with medium to high requirements regarding 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
- Can be used for safety functions up to SIL 3 according to IEC 61508 and up to PLe according to ISO 13849
- 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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access,
 - OPC UA Security,
 - OPC UA Methods Call,
 - Support of OPC UA Companion specifications.
- Isochronous mode centrally and distributed
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes. Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA. User-defined kinematics are also supported.
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC memory card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Overview CPU 1516T-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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access,
 - OPC UA Security,
 - OPC UA Methods Call,
 - Support of OPC UA Companion specifications.
- Isochronous mode centrally and distributed on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes. Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA. User-defined kinematics are also supported.
- 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 1516TF-3 PN/DP



- The CPU with a large program and data memory in the S7-1500 controller product range for standard and fail-safe applications with high requirements regarding program scope and networking.
- Can be used for safety 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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access
 - OPC UA Security
 - OPC UA Methods Call
 - Support of OPC UA Companion specifications.
- Central and distributed 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, output cams/cam tracks and probes. Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA. User-defined kinematics are also supported.
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC memory card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Overview CPU 1517T-3 PN/DP



Overview CPU 1517TF-3 PN/DP



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- 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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access,
 - OPC UA Security,
 - OPC UA Methods Call,
 - Support of OPC UA Companion specifications.
- Isochronous mode centrally and distributed on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes. Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA. User-defined kinematics are also supported.
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC memory card required for operation of the CPU.

- The CPU with a very large program and data memory in the S7-1500 controller product range for failsafe applications with high requirements regarding program scope and networking.
- Can be used for safety functions up to SIL 3 according to IEC 61508 and up to PL_e 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 non-Siemens 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 and client as runtime option for the easy connection of SIMATIC S7-1500 to third-party devices/ systems with the functions:
 - OPC UA Data Access,
 - OPC UA Security,
 - OPC UA Methods Call,
 - Support of OPC UA Companion specifications.
- Isochronous mode centrally and distributed on PROFIBUS and PROFINET
- Integrated motion control functionalities for controlling speed-controlled, positioning and synchronized axes (gearing and camming), support for external encoders, output cams/cam tracks and probes. Technology object for controlling kinematics with up to 4 interpolating axes, e.g. Cartesian portal, delta picker, roll picker, articulated arm, cylindrical robot, tripod picker and SCARA. User-defined kinematics are also supported.
- Integrated web server for diagnostics with the option of creating user-defined web pages

Note:

SIMATIC memory card required for operation of the CPU.

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Technical specifications

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB progr., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB progr, 3MB data	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog./8MB data
General information				
Product type designation	CPU 1511T-1 PN	CPU 1515T-2 PN	CPU 1516T-3 PN/DP	CPU 1517T-3 PN/DP
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V15.1 (FW V2.6)/V14 (FW V2.0) or higher	V15.1 (FW V2.6)/V14 (FW V2.0) or higher	V15.1 (FW V2.6) / V15 (FW V2.5) or higher	V15.1 (FW V2.6)/V14 (FW V2.0) or higher
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
Memory				
Work memory				
• integrated (for program)	225 kbyte	750 kbyte	1.5 Mbyte	3 Mbyte
• integrated (for data)	1 Mbyte	3 Mbyte	5 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	10 ns	2 ns
for word operations, typ.	72 ns	36 ns	12 ns	3 ns
for fixed point arithmetic, typ.	96 ns	48 ns	16 ns	3 ns
for floating point arithmetic, typ.	384 ns	192 ns	64 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
Protocols				
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4	Yes; IPv4
• 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; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB progr., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB progr, 3MB data	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3TP00-0AB0 CPU 1517T-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	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
- Of which IO devices with IRT, max.	64	64	64	64
- Number of connectable IO Devices for RT, max.	128	256	256	512
- of which in line, max.	128	256	256	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
- 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

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Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB progr., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB progr, 3MB data	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog./8MB 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; 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
- PROFlenergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO controllers with shared device, max.	4	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program	Yes; Per user program
2. Interface				
Interface types				
• Number of ports		1	1	1
• integrated switch		No	No	No
• RJ 45 (Ethernet)		Yes; X2	Yes; X2	Yes; X2
Protocols				
• IP protocol		Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO controller		Yes	Yes	Yes
• PROFINET IO Device		Yes	Yes	Yes
• SIMATIC communication		Yes	Yes	Yes
• Open IE communication		Yes	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
- MRPD		No	No	No
- PROFlenergy		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	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
- Number of connectable IO Devices for RT, max.		32	32	128
- of which in line, max.		32	32	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

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Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB progr., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB progr, 3MB data	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog./8MB 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
- Asset management record		Yes; Per user program	Yes; Per user program	Yes; Per user program
3. Interface				
Interface types				
• Number of ports			1	1
• RS 485			Yes; X3	Yes; X3
Protocols				
• PROFIBUS DP master			Yes	Yes
• PROFIBUS DP slave			No	No
• SIMATIC communication			Yes	Yes
Protocols				
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	256; 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 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
OPC UA				
• OPC UA client	Yes	Yes	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; Distributed and central; with minimum OB 6x cycle of 625 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 375 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 250 µs (distributed) and 1 ms (central)

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Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB progr., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB progr, 3MB data	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog./8MB data
Supported technology objects				
Motion control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of technology objects 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	6 400	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
• Number of available Extended motion control resources for technology objects	40	120	192	256
• Required Extended motion control resources				
- for each cam	2	2	2	2
- for each set of kinematics	30	30	30	30
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 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

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Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN, 225KB progr., 1MB data	6ES7515-2TM01-0AB0 CPU 1515T-2 PN, 750KB progr, 3MB data	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP, 3MB prog./8MB data
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
Article number	6ES7511-1UK01-0AB0 CPU 1511TF-1PN, 225KB progr., 1MB data	6ES7515-2UM01-0AB0 CPU 1515TF-2 PN, 750KB progr, 3MB data	6ES7516-3UN00-0AB0 CPU 1516TF-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
General information				
Product type designation	CPU 1511TF-1 PN	CPU 1515TF-2 PN	CPU 1516TF-3 PN/DP	CPU 1517TF-3 PN/DP
Engineering with				
• STEP 7 TIA Portal configurable/ integrated as of version	V15.1 (FW V2.6) / V14 SP1 (FW V2.1) or higher	V15.1 (FW V2.6) / V14 SP1 (FW V2.1) or higher	V15.1 (FW V2.6) / V15 (FW V2.5) or higher	V15.1 (FW V2.6)/V14 (FW V2.0) or higher
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
Memory				
Work memory				
• integrated (for program)	225 kbyte	750 kbyte	1.5 Mbyte	3 Mbyte
• integrated (for data)	1 Mbyte	3 Mbyte	5 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	10 ns	2 ns
for word operations, typ.	72 ns	36 ns	12 ns	3 ns
for fixed point arithmetic, typ.	96 ns	48 ns	16 ns	3 ns
for floating point arithmetic, typ.	384 ns	192 ns	64 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

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Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1UK01-0AB0	6ES7515-2UM01-0AB0	6ES7516-3UN00-0AB0	6ES7517-3UP00-0AB0
	CPU 1511TF-1PN, 225KB progr., 1MB data	CPU 1515TF-2 PN, 750KB progr, 3MB data	CPU 1516TF-3 PN/DP, 1.5MB prog./5MB data	CPU 1517TF-3 PN/DP, 3MB progr., 8MB data
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
Protocols				
• IP protocol	Yes; IPv4	Yes; IPv4	Yes; IPv4	Yes; IPv4
• 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; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
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	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
- Of which IO devices with IRT, max.	64	64	64	64
- Number of connectable IO Devices for RT, max.	128	256	256	512
- of which in line, max.	128	256	256	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

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SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1UK01-0AB0 CPU 1511TF-1PN, 225KB progr., 1MB data	6ES7515-2UM01-0AB0 CPU 1515TF-2 PN, 750KB progr, 3MB data	6ES7516-3UN00-0AB0 CPU 1516TF-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB prog., 8MB 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
- 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; 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
- PROFinergy	Yes	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes	Yes
- Number of IO controllers with shared device, max.	4	4	4	4
- Asset management record	Yes; Per user program	Yes; Per user program	Yes; Per user program	Yes; Per user program
2. Interface				
Interface types				
• Number of ports		1	1	1
• integrated switch		No	No	No
• RJ 45 (Ethernet)		Yes; X2	Yes; X2	Yes; X2
Protocols				
• IP protocol		Yes; IPv4	Yes; IPv4	Yes; IPv4
• PROFINET IO controller		Yes	Yes	Yes
• PROFINET IO Device		Yes	Yes	Yes
• SIMATIC communication		Yes	Yes	Yes
• Open IE communication		Yes	Yes	Yes
• Web server		Yes	Yes	Yes
• Media redundancy		No	No	No

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Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1UK01-0AB0 CPU 1511TF-1PN, 225KB progr., 1MB data	6ES7515-2UM01-0AB0 CPU 1515TF-2 PN, 750KB progr, 3MB data	6ES7516-3UN00-0AB0 CPU 1516TF-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
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
- MRPD		No	No	No
- PROFlenergy		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	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
- Number of connectable IO Devices for RT, max.		32	32	128
- of which in line, max.		32	32	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
- PROFlenergy		Yes	Yes	Yes
- Prioritized startup		No	No	No
- Shared device		Yes	Yes	Yes
- Number of IO controllers with shared device, max.		4	4	4
- Asset management record		Yes; Per user program	Yes; Per user program	Yes; Per user program
3. Interface				
Interface types				
• Number of ports			1	1
• RS 485			Yes; X3	Yes; X3
Protocols				
• PROFIBUS DP master			Yes	Yes
• PROFIBUS DP slave			No	No
• SIMATIC communication			Yes	Yes
Protocols				
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	256; via integrated interfaces of the CPU and connected CPs / CMs	320; via integrated interfaces of the CPU and connected CPs / CMs

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1UK01-0AB0 CPU 1511TF-1PN, 225KB progr., 1MB data	6ES7515-2UM01-0AB0 CPU 1515TF-2 PN, 750KB progr, 3MB data	6ES7516-3UN00-0AB0 CPU 1516TF-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB progr., 8MB 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			
- 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 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
OPC UA				
• OPC UA client	Yes	Yes	Yes	Yes
• OPC UA server	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space	Yes; Data access (read, write, subscribe), method call, custom address space
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	Yes; Distributed and central; with minimum OB 6x cycle of 625 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 375 µs (distributed) and 1 ms (central)	Yes; Distributed and central; with minimum OB 6x cycle of 250 µs (distributed) and 1 ms (central)
Supported technology objects				
Motion control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER	Yes; Note: The number of technology objects 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	6 400	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
• Number of available Extended motion control resources for technology objects	40	120	192	256
• Required Extended motion control resources				
- for each cam	2	2	2	2
- for each set of kinematics	30	30	30	30
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

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Central processing units

Technology CPUs

Technical specifications (continued)

Article number	6ES7511-1UK01-0AB0 CPU 1511TF-1PN, 225KB progr., 1MB data	6ES7515-2UM01-0AB0 CPU 1515TF-2 PN, 750KB progr, 3MB data	6ES7516-3UN00-0AB0 CPU 1516TF-3 PN/DP, 1.5MB prog./5MB data	6ES7517-3UP00-0AB0 CPU 1517TF-3 PN/DP, 3MB prog., 8MB data
Standards, approvals, certificates				
Highest safety class achievable in safety mode				
• Performance level according to ISO 13849-1	PLe	PLe	PLe	PLe
• SIL acc. to IEC 61508	SIL 3	SIL 3	SIL 3	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	< 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/h	< 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; incl. failsafe	Yes; ncl. failsafe	Yes; incl. failsafe	Yes; incl. failsafe
- FBD	Yes; incl. failsafe	Yes; ncl. 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	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes	Yes
• Protection level: Write protection for Failsafe	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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Central processing units

Technology CPUs

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Ordering data	Article No.	Accessories	Article No.
CPU 1511T-1 PN 225 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6ES7511-1TK01-0AB0	SIMATIC memory card 4 MB 12 MB 24 MB 256 MB 2 GB 32 GB	6ES7954-8LC03-0AA0 6ES7954-8LE03-0AA0 6ES7954-8LF03-0AA0 6ES7954-8LL03-0AA0 6ES7954-8LP02-0AA0 6ES7954-8LT03-0AA0
CPU 1511TF-1 PN 225 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required	6ES7511-1UK01-0AB0	SIMATIC S7-1500 DIN rail Fixed lengths, with grounding elements • 160 mm • 245 mm • 482 mm • 530 mm • 830 mm For cutting to length by customer, without drill holes; grounding elements must be ordered separately • 2000 mm	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 6ES7590-1AJ30-0AA0 6ES7590-1BC00-0AA0
CPU 1515T-2 PN 750 KB work memory for program, 3 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface; SIMATIC memory card required	6ES7515-2TM01-0AB0	PE connection element for DIN rail 2000 mm 20 units	6ES7590-5AA00-0AA0
CPU 1515TF-2 PN 750 KB work memory for program, 3 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface; SIMATIC memory card required	6ES7515-2UM01-0AB0	Power supply For supplying the backplane bus of the S7-1500 controller 24 V DC input voltage, power 25 W 24/48/60 V DC input voltage, power 60 W 24/48/60 V DC input voltage, power 60 W, buffering functionality 120/230 V AC input voltage, power 60 W	6ES7505-0KA00-0AB0 6ES7505-0RA00-0AB0 6ES7505-0RB00-0AB0 6ES7507-0RA00-0AB0
CPU 1516T-3 PN/DP 1.5 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6ES7516-3TN00-0AB0	Power connector With coding element for power supply module; spare part, 10 units	6ES7590-8AA00-0AA0
CPU 1516TF-3 PN/DP 1.5 MB work memory for program, 5 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6ES7516-3UN00-0AB0	Load power supply 24 V DC/3 A 24 V DC/8 A	6EP1332-4BA00 6EP1333-4BA00
CPU 1517T-3 PN/DP 3 MB work memory for program, 8 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6ES7517-3TP00-0AB0	Power supply connector Spare part; for connecting the 24 V DC supply voltage • With push-in terminals	6ES7193-4JB00-0AA0
CPU 1517TF-3 PN/DP 3 MB work memory for program, 8 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface, PROFIBUS interface; SIMATIC memory card required	6ES7517-3UP00-0AB0	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 With PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0 6ES7972-0BB70-0XA0

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Central processing units

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Ordering data	Article No.	Article No.
PROFIBUS FC Standard Cable GP 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	6XV1830-0EH10	IE FC TP Trailing Cable 2 x 2 (Type C) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/ IE FC RJ45 plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m
PROFIBUS FC Robust Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-0JH10	IE FC TP Marine Cable 2 x 2 (Type B) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/ IE FC RJ45 plug 180/90 with marine approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m
PROFIBUS FC Flexible Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1831-2K	IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables
PROFIBUS FC Trailing Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m		Display For CPU 1511T-1 PN and CPU 1511TF-1 PN; spare part
Sheath color: Petrol Sheath color: Violet	6XV1830-3EH10 6XV1831-2L	6ES7591-1AA01-0AA0 6ES7591-1BA01-0AA0
PROFIBUS FC Food Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-0GH10	Front cover for PROFIBUS DP interface For CPU 1517-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518F-4 PN/DP ODK; spare part
PROFIBUS FC Ground Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-3FH10	SIMATIC S7-1500T Starter Kit Comprising: CPU 1511T-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
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 RJ45 outlet/ 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	

SIMATIC S7-1500 Advanced Controllers

Central processing units

Technology CPUs

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Ordering data	Article No.	Ordering data	Article No.
STEP 7 Professional V15.1 Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1 (64-bit) Windows 7 Enterprise SP1 (64-bit) Windows 7 Ultimate SP1 (64-bit) Windows 10 Home Version 1709, 1803 Windows 10 Professional Version 1709, 1803 Windows 10 Enterprise Version 1709, 1803 Windows 10 Enterprise 2016 LTSC Windows 10 IoT Enterprise 2015 LTSC Windows 10 IoT Enterprise 2016 LTSC Windows Server 2012 R2 StdE (full installation) Windows Server 2016 Standard (full installation) Type of delivery: en, de, fr, it, es, zh STEP 7 Professional V15.1, floating license STEP 7 Professional V15.1, floating license, software download incl. license key ¹⁾ Email address required for delivery	6ES7822-1AA05-0YA5 6ES7822-1AE05-0YA5	STEP 7 Safety Advanced V15.1 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 200MP, ET 200S, ET 200M, ET 200iSP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V15.1 Floating license for 1 user; software and documentation on DVD, license key on USB flash drive Floating license for 1 user; software, documentation and license key for download ¹⁾ ; email address required for delivery 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 SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7833-1FA15-0YA5 6ES7833-1FA15-0YH5 6ES7998-8XC01-8YE0 6ES7998-8XC01-8YE2

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