Introduction

S7-1500

Overview



- Modular, scalable, and universally usable system in IP20 level of protection
- The system solution for a variety of automation applications in discrete automation
- · Highest performance with excellent usability
- 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.

Introduction

S7-1500

Overview (continued) Redundant systems

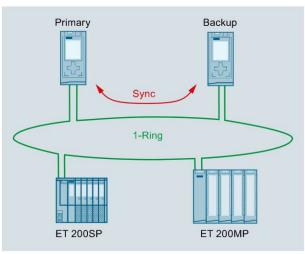


CPU 1513R-1 PN, CPU 1515R-2 PN

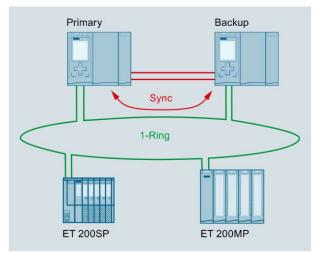


CPU 1517H-3 PN/FO

- 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 S7-1500H mode of operation



SIMATIC S7-1500H mode of operation

Introduction

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 updatesStorage 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

Introduction

S7-1500

Technical specifications

General technical specifications SIM	MATIC S7-1500
Degree of protection	IP20 acc. to IEC 60 529
Ambient temperature • Horizontal installation	060 °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
	Requirements of the EMC directive; interference emission according to EN 61000-6-4
 Emission of radio frequency interference 	Interference emission according to 61000-6-4
	Interference emission of electromagnetic fields according to EN 61000-6-4
Mechanical stress	
Vibrations Shock	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 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

-40/-25/-20 +55/60/70 °C
Coating of the printed circuit boards and the electronic components
The technical data of the standard product applies except for the ambient conditions.
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)
0° C
100 %; RH incl. bedewing/frost (no commissioning in bedewed stat
Yes; Class 3B2 mold and fungal spores (except fauna); the supplied plug covers must remain in place on the unused interfaces during operation.
Yes; Class 3C4 (RH < 75%) incl. salt spray in accordance with EN 60068-2-52 (severity 3); the supplied plug covers must rema in place on the unused interfaces during operation.
Yes; Class 3S4 incl. sand, dust; the supplied plug covers must remain in place on unused interfaces during operation.
supplied plug covers must remai place on unused interfaces durin

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

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
- · 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

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 speedcontrolled 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

Central processing units

Standard CPUs

Overview CPU 1517-3 PN/DP



- · The CPU with a very large program and data memory in the S7-1500 controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- · For cross-industry automation tasks in series 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

SIMATIC memory card required for operation of the CPU.

Overview CPU 1518-4 PN/DP



- The CPU with a very large program and data memory in the S7-1500 controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- · Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series 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

Central processing units

Standard CPUs

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 multifunctional 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.

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 1500STM 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:

Central processing units

Technical	specifica	tions

Article number	6ES7511-1AK02-0AB0	6ES7513-1AL02-0AB0	6ES7515-2AM01-0AB0	6ES7516-3AN01-0AB0
	CPU 1511-1 PN, 150KB prog., 1MB data	CPU 1513-1 PN, 300KB prog., 1.5MB data	CPU 1515-2 PN, 500KB prog., 3MB data	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				
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				
 integrated (for program) 	150 kbyte	300 kbyte	500 kbyte	1 Mbyte
 integrated (for data) 	1 Mbyte	1.5 Mbyte	3 Mbyte	5 Mbyte
Load memory				
 Plug-in (SIMATIC memory card), max. 	32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times				
for bit operations, typ.	60 ns	40 ns	30 ns	10 ns
for word operations, typ.	72 ns	48 ns	36 ns	12 ns
for fixed point arithmetic, typ.	96 ns	64 ns	48 ns	16 ns
for floating point arithmetic, typ.	384 ns	256 ns	192 ns	64 ns
Counters, timers and their retentivity				
S7 counter				
Number	2 048	2 048	2 048	2 048
IEC counter				
Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times				
• Number	2 048	2 048	2 048	2 048
IEC timer				
Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
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	
Outputs	process image 32 kbyte; All outputs are in	process image 32 kbyte; All outputs are in	process image 32 kbyte; All outputs are in	process image 32 kbyte; All outputs are in
	the process image	the process image	the process image	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

Central processing units

Standard CPUs

Article number	6ES7511-1AK02-0AB0	6ES7513-1AL02-0AB0	6ES7515-2AM01-0AB0	6ES7516-3AN01-0AB0
	CPU 1511-1 PN, 150KB prog., 1MB data	CPU 1513-1 PN, 300KB prog., 1.5MB data	CPU 1515-2 PN, 500KB prog., 3MB data	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
- PROFlenergy	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 inter- faces	8; in total across all inter- faces	8; in total across all inter- faces	8; in total across all inter- faces
 Number of IO Devices per tool, max. 	8	8	8	8
- Updating times	for PROFINET IO, on the number of IO devices, and	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	for PROFINET IO, on the number of IO devices, and	The minimum value of the update time also depends on communication share se for PROFINET IO, on the number of IO devices, and on the quantity of configurer user data

Central processing units

Technical specifications (conf	inuea)			
Article number	6ES7511-1AK02-0AB0	6ES7513-1AL02-0AB0	6ES7515-2AM01-0AB0	6ES7516-3AN01-0AB0
	CPU 1511-1 PN, 150KB prog., 1MB data	CPU 1513-1 PN, 300KB prog., 1.5MB data	CPU 1515-2 PN, 500KB prog., 3MB data	CPU 1516-3 PN/DP, 1MB prog., 5MB data
Jpdate time for IRT				
- for send cycle of 250 μs	$250~\mu s$ to $4~ms$; Note: In the case of IRT with isochronous mode, the minimum update time of $625~\mu s$ of the isochronous OB is decisive	$250~\mu s$ 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 isochronomode, the minimum updatime of 375 µs of the isochronous OB is decisived.
- for send cycle of 500 μs	$500~\mu s$ 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)
Jpdate 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		A 40-00-800 (A 40-00-80)	37770 3-12,000 3-100 (1,000 3-2)	WAS ASSESSED TO SEASON PROPERTY.
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 clier 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	**************************************			
nterface 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

Central processing units

Standard CPUs

Article number	6ES7511-1AK02-0AB0	6ES7513-1AL02-0AB0	6ES7515-2AM01-0AB0	6ES7516-3AN01-0AB0
	CPU 1511-1 PN, 150KB prog., 1MB data	CPU 1513-1 PN, 300KB prog., 1.5MB data	CPU 1515-2 PN, 500KB prog., 3MB data	CPU 1516-3 PN/DP, 1MB prog., 5MB data
PROFINET IO Controller	rooms progr, mis data	ooone progr, nome data	occino progr, ome data	mb progr, omb data
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 inter- faces	8; in total across all inter- faces
 Number of IO Devices per tool, max. 			8	8
- Updating times			The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	for PROFINET IO, on the number of IO devices, and
Update time for RT				
- for send cycle of 1 ms			1 ms to 512 ms	1 ms to 512 ms
PROFINET IO Device			THIS GO I E THO	This to o'l' the
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			4	4
shared device, max.				_
- Asset management record 3. Interface			Yes; Per user program	Yes; Per user program
Interface types				
Number of ports				1
• RS 485				Yes; X3
Protocols				
PROFIBUS DP master				Yes
PROFIBUS DP slave				198
				No

Central processing units

Technical specifications (cont	inued)			
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	West after the second of		· ·	
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	07	A construction of the cons	The second section of the second seco	Dr. 00.00 VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
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 ℃	0 ℃	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

Central processing units

Standard CPUs

Article number	6ES7511-1AK02-0AB0	6ES7513-1AL02-0AB0	6ES7515-2AM01-0AB0	6ES7516-3AN01-0AB0
	CPU 1511-1 PN, 150KB prog., 1MB data	CPU 1513-1 PN, 300KB prog., 1.5MB data	CPU 1515-2 PN, 500KB prog., 3MB data	CPU 1516-3 PN/DP, 1MB prog., 5MB data
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	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
(now-how protection				
 User program protection/ password protection 	Yes	Yes	Yes	Yes
Copy protection	Yes	Yes	Yes	Yes
Block protection	Yes	Yes	Yes	Yes
access protection				
Password for display	Yes	Yes	Yes	Yes
Protection level: Write protection	Yes	Yes	Yes	Yes
 Protection level: Read/write protection 	Yes	Yes	Yes	Yes
 Protection level: Complete protection 	Yes	Yes	Yes	Yes
Dimensions				
Width	35 mm	35 mm	70 mm	70 mm
Height	147 mm	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm	129 mm
Veights				
Weight, approx.	405 g	405 g	830 g	845 g

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
General information			
Product type designation	CPU 1517-3 PN/DP	CPU 1518-4 PN/DP	CPU 1518-4 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) 	2 Mbyte	4 Mbyte	4 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.

Central processing units

recillical specifications (continued	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
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
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

Central processing units

Standard CPUs

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	3200		
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
- PROFlenergy	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	also depends on communication share	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	also depends on communication share
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 μ s: 375 μ s, 625 μ s 3 875 μ s)	Update time = set "odd" send clock (any multiple of 125 $\mu s;375~\mu s,625~\mu s$ 3 875 $\mu s)$	Update time = set "odd" send clock (any multiple of 125 μ s: 375 μ s, 625 μ s 3 875 μ s)
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

Central processing units

Technical specifications (c	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 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
- PROFlenergy	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
- 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

Central processing units

Standard CPUs

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
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	Tool to also brogram	roof roo door program	, and , and and program
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	,00,70	,,,,,
Protocols	100,70		
• IP protocol		Yes: IPv4	Yes; IPv4
PROFINET IO Controller		No	No
PROFINET IO Device		No	No
PROFIBUS DP master	Yes	140	140
PROFIBUS DP slave	No		
SIMATIC communication	Yes	Yes	Yes
Open IE communication	165	Yes	Yes
Web server		Yes	Yes
4. Interface		165	les
Annual Control of the			
Interface types Number of ports		1	1
RS 485		Yes; X4	Yes; X4
Protocols		165, 74	1e5, A4
PROFIBUS DP master		Yes	Yes
PROFIBUS DP slave SIMATIC communication		No Yes	No Yes
		res	res
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	Or O and connected or s / Civis	or o and connected of 5 / Olvis	or o and connected or s / Givis
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

Central processing units

Standard CPUs

Technical specifications (cont	inued)		
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
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 ℃	0 °C	0 ℃
• 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

5 000 m; Restrictions for installation altitudes > 2 000 m, see manual

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

Central processing units

Standard CPUs

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
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			1999
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

Central processing units

Ordering data	Article No.		Article No.
CPU 1511-1 PN	6ES7511-1AK02-0AB0	SIMATIC S7-1500 DIN rail	
150 KB work memory for program, 1 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required		Fixed lengths, with grounding elements • 160 mm • 245 mm	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0
CPU 1513-1 PN	6ES7513-1AL02-0AB0	• 482 mm • 530 mm	6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0
300 KB work memory for program, 1.5 MB for data, PROFINET IRT interface with 2-port switch; SIMATIC memory card required		830 mm For cutting to length by customer, without drill holes; grounding	6ES7590-1AJ30-0AA0
CPU 1515-2 PN	6ES7515-2AM01-0AB0	elements must be ordered separately	
500 KB work memory for program.	SECTOTO ET MICH STEED	• 2 000 mm	6ES7590-1BC00-0AA0
3 MB for data, PROFINET IRT interface with 2-port switch, PROFINET RT interface; SIMATIC memory card required		PE connection element for DIN rail 2 000 mm 20 units	6ES7590-5AA00-0AA0
CPU 1516-3 PN/DP	6ES7516-3AN01-0AB0	Power supply	
1 MB work memory for program, 5 MB for data,	SECTOTO SAILOT SAES	For supplying the backplane bus of the S7-1500 controller	
PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface;		24 V DC input voltage, power 25 W	6ES7505-0KA00-0AB0
SIMATIC memory card required	000000000000000000000000000000000000000	24/48/60 V DC input voltage, power 60 W	6ES7505-0RA00-0AB0
CPU 1517-3 PN/DP 2 MB work memory for program, 8 MB for data,	6ES7517-3AP00-0AB0	24/48/60 V DC input voltage, power 60 W, buffering functionality	6ES7505-0RB00-0AB0
PROFINET IRT interface with 2-port switch, PROFINET RT interface, PROFIBUS interface;		120/230 V AC input voltage, power 60 W	6ES7507-0RA00-0AB0
SIMATIC memory card required		Power connector	6ES7590-8AA00-0AA0
CPU 1518-4 PN/DP	6ES7518-4AP00-0AB0	With coding element for power supply module; spare part, 10 units	
4 MB work memory for program, 20 MB for data,		Load power supply	
PROFINET IRT interface with 2-port switch, PROFINET RT interface,		24 V DC/3 A	6EP1332-4BA00
Ethernet interface,		24 V DC/8 A	6EP1333-4BA00
PROFIBUS interface; SIMATIC memory card required		Power supply connector	
CPU 1518-4 PN/DP MFP	6ES7518-4AX00-1AC0	Spare part; for connecting the 24 V DC supply voltage	
CPU 1518-4 PN/DP MFP,		With push-in terminals	6ES7193-4JB00-0AA0
including C/C++ Runtime and OPC UA runtime license		PROFIBUS FastConnect RS 485 bus connector	and the state of t
Accessories		with 90° cable outlet	
SIMATIC memory card	0507054 01 000 000	With insulation displacement, max. transmission rate 12 Mbps	
4 MB	6ES7954-8LC03-0AA0	Without PG interface,	6ES7972-0BA70-0XA0
12 MB	6ES7954-8LE03-0AA0 6ES7954-8LF03-0AA0	grounding via control cabinet contact surface; 1 unit	
24 MB 256 MB	6ES7954-8LF03-0AA0	With PG interface,	6ES7972-0BB70-0XA0
2 GB	6ES7954-8LP02-0AA0	grounding via control cabinet	OLOTOTE ODDITO OMAG
32 GB	6ES7954-8LT03-0AA0	contact surface; 1 unit	CVI/4000 OFLIAO
32 GB	0E37334-0L103-0AA0	PROFIBUS FC Standard Cable GP	6XV1830-0EH10
		Standard type with special design for fast mounting, 2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	
		PROFIBUS FC Robust Cable	6XV1830-0JH10
		2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	
		PROFIBUS FC Flexible Cable	6XV1831-2K
		2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	

Central processing units

Ordering data	Article No.		Article No.
PROFIBUS FC Trailing Cable		IE FC TP Marine Cable 2 x 2	6XV1840-4AH10
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		(Type B) 4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/IE FC RJ45	
Sheath color: Petrol	6XV1830-3EH10	plug 180/90 with marine approval; sold by the meter;	
Sheath color: Violet	6XV1831-2L	max. delivery unit 1 000 m, minimum order quantity 20 m	
PROFIBUS FC Food Cable	6XV1830-0GH10	IE FC stripping tool	6GK1901-1GA00
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
PROFIBUS FC Ground Cable	6XV1830-3FH10	Display	
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		For CPU 1511-1 PN and CPU 1513-1 PN; spare part For CPU 1515-2 PN,	6ES7591-1AA01-0AA0 6ES7591-1BA01-0AA0
PROFIBUS FC FRNC Cable GP	6XV1830-0LH10	CPU 1516-3 PN/DP, CPU 1517-3 PN/DP and CPU 1518-4 PN/DP, space part	
2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter;		CPU 1518-4 PN/DP; spare part Front cover for PROFIBUS DP interface	6ES7591-8AA00-0AA0
max. delivery unit 1 000 m, minimum order quantity 20 m		For CPU 1517-3 PN/DP, CPU 1518-4 PN/DP,	
PROFIBUS FastConnect stripping tool	6GK1905-6AA00	CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part	
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables		SIMATIC S7-1500 Starter Kit	6ES7511-1CK02-4YB5
IE FC RJ45 plugs		Comprising: CPU 1511C-1 PN, SIMATIC memory card 4 MB,	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		160 mm DIN rail, front connector, STEP 7 Professional 365-day license, PM 70 W 120/230 V AC power supply, Ethernet cable, documentation	
IE FC RJ45 plug 180			
180° cable outlet			
1 unit	6GK1901-1BB10-2AA0		
10 units	6GK1901-1BB10-2AB0		
50 units	6GK1901-1BB10-2AE0		
IE FC TP Standard Cable GP 2x2	6XV1840-2AH10		
4-wire, shielded TP installation cable for connection to IE FC 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			
IE FC TP Trailing Cable 2 x 2 (Type C)	6XV1840-3AH10		
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,			

Central processing units

Ordering data	Article No.		Article No.
STEP 7 Professional V15.1		SIMATIC Target 1500S for Simulink V3.0	6ES7823-1BE02-0YA5
Target system: SIMATIC S7-1200, S7-1500,		Download incl. license key 1)	
S7-300, S7-400, WinAC		Email address required for delivery	
Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1		Upgrade of SIMATIC Target 1500S for Simulink V2.0 to V3.0, download incl. license key 1)	6ES7823-1BE02-0YE5
(64-bit)		Email address required for delivery	
Windows 7 Enterprise SP1 (64-bit) Windows 7 Ultimate SP1 (64-bit) Windows 10 Home		SIMATIC Target + ODK 1500S bundle	6ES7823-1BE12-0YA0
Version 1709, 1803		Download incl. license key 1)	
Windows 10 Professional Version 1709, 1803		Email address required for delivery	
Windows 10 Enterprise Version 1709, 1803		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Windows 10 Enterprise 2016 LTSB Windows 10 IoT Enterprise 2015 LTSB Windows 10 IoT Enterprise 2016 LTSB Windows 10 IoT Enterprise 2016 LTSB Windows Server 2012 R2 StdE (full installation) Windows Server 2016 Standard (full installation)		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,	
Type of delivery:		SIMATIC Software, SIMATIC TDC	
en, de, fr, it, es, zh		SIMATIC Manual Collection	6ES7998-8XC01-8YE2
STEP 7 Professional V15.1, floating license	6ES7822-1AA05-0YA5	update service for 1 year Current "Manual Collection" DVD	
STEP 7 Professional V15.1, floating license, software download incl. license key 1)	6ES7822-1AE05-0YA5	and the three subsequent updates	
Email address required for delivery			
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	6ES7806-2CD03-0YA0		
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	6ES7806-2CD03-0YG0		
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	6ES7806-2CD03-0YK0		

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

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.

Central processing units

SIPLUS standard CPUs

Overview SIPLUS CPU 1518-4 PN/DP



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

Overview SIPLUS CPU 1518-4 PN/DP MFP



- 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

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 multifunctional 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 1500STM 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.

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.

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

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	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
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	7.5			
 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

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 Military testing according to	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

Central processing units

SIPLUS standard CPUs

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

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

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:

Central processing units

Compact CPUs

Technical specifications		
Article number	6ES7511-1CK01-0AB0	6ES7512-1CK01-0AB0
THE TAX CONTRACT	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/	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older	V15.1 (FW V2.6) / V15 (FW V2.5) or higher; with older
integrated as of version	TIA Portal versions configurable as 6ES7511-1CK00-0AB0	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	processing *	
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		00000000000000000000000000000000000000
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
- 110 40 (Ethernet)	100,771	100, 77

Central processing units

Compact CPUs

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
- PROFlenergy	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	$250~\mu s$ 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	$250~\mu s$ 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	$500~\mu s$ 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	$500~\mu s$ 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		Update time = set "odd" send clock (any multiple of 125 µs:
"odd" send cycles	375 µs, 625 µs 3 875 µs)	375 µs, 625 µs 3 875 µs)
Update time for RT	050 1- 100	050 1- 100
- 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

Central processing units

Compact CPUs

Technica	I 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
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;	Yes; As MRP redundancy manager and/or MRP client;
	max. number of devices in the ring: 50	max. number of devices in the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFlenergy	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 625 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		
	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual $$	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual

Central processing units

Compact CPUs

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

Article No.	Article No.
	Article No.

CPU 1511C-1 PN	6ES7511-1CK01-0AB0
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	
CPU 1512C-1 PN	6ES7512-1CK01-0AB0
250 KB work memory for program, 1 MB for data, 32 digital inputs, 32 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, PROFINET IRT interface with 2-port switch, SIMATIC memory card required	
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	6ES7590-5BA00-0AA0
10 units; spare part	
SIMATIC S7-1500 DIN rail	
Fixed lengths, with grounding elements • 160 mm • 245 mm • 482 mm • 530 mm • 830 mm	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0 6ES7590-1AF30-0AA0 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	6ES7590-5AA00-0AA0
20 units	
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,	6ES7505-0RB00-0AB0
power 60 W, buffering functionality	

Central processing units

Compact CPUs

Ordering data	Article No.		Article No.
Power connector	6ES7590-8AA00-0AA0	SIMATIC S7-1500 Starter Kit	6ES7511-1CK02-4YB5
With coding element for power		Comprising: CPU 1511C-1 PN,	
supply module; spare part, 10 units Load power supply		SIMATIC memory card 4 MB, 160 mm DIN rail, front connector,	
24 V DC/3 A	6EP1332-4BA00	STEP 7 Professional 365-day license, SIMATIC ProDiag 1500.	
24 V DC/8 A	6EP1333-4BA00	SIMATIC OPC UA S7-1500 Small, PM 1507 24 V/3 A power supply,	
Power supply connector		Ethernet cable, documentation	
Spare part; for connecting the		STEP 7 Professional V15.1	
24 V DC supply voltageWith push-in terminals	6ES7193-4JB00-0AA0	Target system: SIMATIC S7-1200, S7-1500,	
IE FC RJ45 plugs	0E3/193-4JB00-UAA0	S7-300, S7-400, WinAC	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		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	
IE FC RJ45 plug 180		Version 1709, 1803	
180° cable outlet		Windows 10 Professional Version 1709, 1803	
1 unit	6GK1901-1BB10-2AA0	Windows 10 Enterprise Version 1709, 1803	
10 units	6GK1901-1BB10-2AB0	Windows 10 Enterprise 2016 LTSB	
50 units IE FC TP Standard Cable GP 2x2	6GK1901-1BB10-2AE0 6XV1840-2AH10	Windows 10 IoT Enterprise 2015 LTSB	
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		Windows 10 loT 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	
IE FC TP Trailing Cable 2 x 2 (Type C)	6XV1840-3AH10	STEP 7 Professional V15.1, floating license	6ES7822-1AA05-0YA5
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;		STEP 7 Professional V15.1, floating license, software download incl. license key ¹⁾ Email address required for delivery	6ES7822-1AE05-0YA5
with UL approval;		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus	
IE FC TP Marine Cable 2 x 2 (Type B)	6XV1840-4AH10	components, SIMATIC C7, SIMATIC Distributed I/O,	
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.		SIMATIC HMI, SIMATIC sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
max. delivery unit 1 000 m, minimum order quantity 20 m		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
IE FC stripping tool	6GK1901-1GA00		
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables			
Display	6ES7591-1AA01-0AA0		
For CPU 1511(F), CPU 1511C, CPU 1512C, CPU 1513(F); spare part			

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

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:

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:

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:

Central processing units

Fail-safe CPUs

Overview CPU 1518F-4 PN/DP MFP



- 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

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 1500STM 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

Central processing units

Fail-safe CPUs

Technical specifications

Article number	6ES7511-1FK02-0AB0	6ES7513-1FL02-0AB0	6ES7515-2FM01-0AB0	6ES7516-3FN01-0AB0
	CPU 1511F-1PN, 225KB prog, 1MB data	CPU 1513F-1 PN, 450KB prog., 1.5MB data	CPU 1515F-2 PN, 750KB prog., 3MB data	CPU 1516F-3 PN/DP, 1,5MB prog, 5MB data
General information				
Product type designation	CPU 1511F-1 PN	CPU 1513F-1 PN	CPU 1515F-2 PN	CPU 1516F-3 PN/DP
Engineering with				
STEP 7 TIA Portal configurable/ integrated as of version	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				
 integrated (for program) 	225 kbyte	450 kbyte	750 kbyte	1.5 Mbyte
 integrated (for data) 	1 Mbyte	1.5 Mbyte	3 Mbyte	5 Mbyte
Load memory				
 Plug-in (SIMATIC memory card), max. 	32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times				
for bit operations, typ.	60 ns	40 ns	30 ns	10 ns
for word operations, typ.	72 ns	48 ns	36 ns	12 ns
for fixed point arithmetic, typ.	96 ns	64 ns	48 ns	16 ns
for floating point arithmetic, typ.	384 ns	256 ns	192 ns	64 ns
Counters, timers and their retentivity				
S7 counter				
Number	2 048	2 048	2 048	2 048
IEC counter				
Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times				
Number	2 048	2 048	2 048	2 048
IEC timer				
Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity				7.00
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

Central processing units

Article number	6ES7511-1FK02-0AB0	6ES7513-1FL02-0AB0	6ES7515-2FM01-0AB0	6ES7516-3FN01-0AB0
	CPU 1511F-1PN, 225KB prog, 1MB data	CPU 1513F-1 PN, 450KB prog., 1.5MB data	CPU 1515F-2 PN, 750KB prog., 3MB data	CPU 1516F-3 PN/DP, 1,5MB prog, 5MB data
1. Interface				
nterface 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			1/1	All
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 Edition 2.0
PROFINET IO controller		BUS WAYNES		DOCUMENTO DE LA STONYA NO
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 redundant manager and/or MRP cl max. number of devices the ring: 50
- MRPD	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT	Yes; Requirement: IRT
- PROFlenergy	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 be connected via AS-i, PROFIBUS or PROFINE
- 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	for PROFINET IO, on the number of IO devices, and	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 depen on communication share for PROFINET IO, on the number of IO devices, a on the quantity of configure user data

6ES7513-1FL02-0AB0

SIMATIC S7-1500 Advanced Controllers

6ES7515-2FM01-0AB0

No

Yes

Yes

Yes

Yes

Yes

4

No

Yes

Yes

Yes

Yes

Yes

No

Yes; X2

Yes; IPv4

Yes; Requirement: IRT

Yes; Per user program

Central processing units

6ES7516-3FN01-0AB0

Fail-safe CPUs

/ II tiolo Harribor	OLOTOTT TITLOL ONDO	OEDIGIO II EGE GADO	OLOTOTO LI MIOT ONDO	OLOTOTO OF HOT ONDO
	CPU 1511F-1PN, 225KB prog, 1MB data	CPU 1513F-1 PN, 450KB prog., 1.5MB data	CPU 1515F-2 PN, 750KB prog., 3MB data	CPU 1516F-3 PN/DP, 1,5MB prog, 5MB data
Update time for IRT				
- for send cycle of 250 μs	$250~\mu s$ 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	$250~\mu s$ 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	$250~\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of $500~\mu s$ 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	$500~\mu s$ to $8~ms$; Note: In the case of IRT with isochronous mode, the minimum update time of $625~\mu s$ 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

No

Yes

Yes

Yes

Yes

4

the ring: 50

Yes; As MRP redundancy manager and/or MRP client; max. number of devices in

Yes; Requirement: IRT

Yes; Per user program

- Asset management record 2. Interface Interface types

Number of ports

Isochronous modeOpen IE communication

- IRT

- MRP

- MRPD

- PROFlenergy

- Shared device

- Number of IO controllers with

shared device, max.

Technical specifications (continued)

6ES7511-1FK02-0AB0

No

Yes

Yes

Yes

the ring: 50

Yes; As MRP redundancy manager and/or MRP client; max. number of devices in

Yes; Requirement: IRT

Yes; Per user program

Article number

integrated switchRJ 45 (Ethernet)

Protocols

- IP protocol
- PROFINET IO controller
- PROFINET IO Device
- SIMATIC communication
 Open IE communication
- Web server
- Media redundancy

No

Yes

Yes

Yes

Yes

4

1

No

Yes

Yes

Yes

Yes

Yes

No

Yes; X2

Yes; IPv4

the ring: 50

Yes; As MRP redundancy manager and/or MRP client; max. number of devices in

Yes; Requirement: IRT

Yes; Per user program

Central processing units

Technical	specifications	(continued
-----------	----------------	------------

Article number	6ES7511-1FK02-0AB0	6ES7513-1FL02-0AB0	6ES7515-2FM01-0AB0	6ES7516-3FN01-0AB0
	CPU 1511F-1PN,	CPU 1513F-1 PN,	CPU 1515F-2 PN,	CPU 1516F-3 PN/DP,
	225KB prog, 1MB data	450KB prog., 1.5MB data	750KB prog., 3MB data	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/deacti- vated, max. 			8; in total across all inter- faces	8; in total across all inter- faces
 Number of IO Devices per tool, max. 			8	8
- Updating times			The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data	for PROFINET IO, on the number of IO devices, and
Update time for RT			door data	door data
- for send cycle of 1 ms			1 ms to 512 ms	1 ms to 512 ms
PROFINET IO Device			11110 10 012 1110	1113 to 512 113
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

Central processing units

Article number	6ES7511-1FK02-0AB0	6ES7513-1FL02-0AB0	6ES7515-2FM01-0AB0	6ES7516-3FN01-0AB0
	CPU 1511F-1PN, 225KB prog, 1MB data	CPU 1513F-1 PN, 450KB prog., 1.5MB data	CPU 1515F-2 PN, 750KB prog., 3MB data	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 interfact 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 of 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	Yes; Data access (read, write, subscribe), method call, custom address spa
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 cen with minimum OB 6x cycl 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. The PLC program; selecting uide 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	with integrated optimization	Yes; Universal PID controller with integrated optimization	with integrated optimization	Yes; Universal PID contro with integrated optimizat
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			W)	
High-speed counter	Yes	Yes	Yes	Yes

Central processing units

Technical	specifications	(continued)

Article number	6ES7511-1FK02-0AB0 CPU 1511F-1PN,	6ES7513-1FL02-0AB0 CPU 1513F-1 PN,	6ES7515-2FM01-0AB0 CPU 1515F-2 PN,	6ES7516-3FN01-0AB0 CPU 1516F-3 PN/DP,
Standards, approvals, certificates	225KB prog, 1MB data	450KB prog., 1.5MB data	750KB prog., 3MB data	1,5MB prog, 5MB data
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 ℃	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 ℃	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. 	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

Central processing units

Fail-safe CPUs

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		2000	NO. 001 199 At 141
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)		Ŷ	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

Central processing units

Fail-safe CPUs

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
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	33 (40 (20 to 40 t		*
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
- PROFlenergy	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/deacti- vated, 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	also depends on communication share	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	also depends on communication share

Central processing units

Fail-safe CPUs

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
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
- PROFlenergy	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

Central processing units

Technical	specifications	(continued)

Article number	6ES7517-3FP00-0AB0	6ES7518-4FP00-0AB0	6ES7518-4FX00-1AC0
	CPU 1517F-3 PN/DP, CPU		CPU 1518F-4 PN/DP MFP
	3MB Prog., 8MB data	6 MB Prog, 20MB data	+ C/C++ RT +OPC UA
PROFINET IO controller			
Services		2000	The same of
 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	set for PROFINET IO, on the number of set for PROFINET IO, on the number of set for PROFINET IO devices, and on the quantity of IO devices, and IO devices, IO devices, and IO devices, IO device		also depends on communication share
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
TO DESCRIPTION OF THE PARTY OF			
- 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		

Central processing units

Fail-safe CPUs

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	
Protocols			The second secon	
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		165, 74	165, 74	
PROFIBUS DP master		Vaa	Van	
		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	Variable and the second	() ()		
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	•		52,	
High-speed counter	Yes	Yes	Yes	

Central processing units

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	
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			- 0.4-m//	
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		ALC CHILL		
Weight, approx.	1 978 g	1 988 g	2 117 g	
rroigin, approx.	. 5,5 g	, 555 g	L 1 11 9	

Central processing units

Ordering data	Article No.		Article No.
CPU 1511F-1 PN	6ES7511-1FK02-0AB0	Accessories	
Fail-safe CPU, 230 KB work		SIMATIC memory card	
memory for program, 1 MB for data, PROFINET IRT interface with 2-port		4 MB	6ES7954-8LC03-0AA0
switch;		12 MB	6ES7954-8LE03-0AA0
SIMATIC memory card required	CEC7510 151 00 04 D0	24 MB	6ES7954-8LF03-0AA0
CPU 1513F-1 PN	6ES7513-1FL02-0AB0	256 MB	6ES7954-8LL03-0AA0
Fail-safe CPU, 450 KB work memory for program, 1.5 MB for		2 GB	6ES7954-8LP02-0AA0
data, PROFINET IRT interface with 2-port switch; SIMATIC memory		32 GB	6ES7954-8LT03-0AA0
card required		SIMATIC S7-1500 DIN rail	
CPU 1515F-2 PN	6ES7515-2FM01-0AB0	Fixed lengths,	
Fail-safe CPU, 750 KB work		with grounding elements • 160 mm	CEC7500 1 APC0 04 A0
memory for program, 3 MB for data, PROFINET IRT interface with 2-port		• 245 mm	6ES7590-1AB60-0AA0 6ES7590-1AC40-0AA0
switch; PROFINET RT interface;		• 482 mm	6ES7590-1AE80-0AA0
SIMATIC memory card required		• 530 mm	6ES7590-1AF30-0AA0
CPU 1516F-3 PN/DP	6ES7516-3FN01-0AB0	• 830 mm	6ES7590-1AJ30-0AA0
Fail-safe CPU, 1.5 MB work memory for program, 5 MB for data,		For cutting to length by customer, without drill holes; grounding	
PROFINET IRT interface with 2-port		elements must be ordered separately	
switch, PROFINET RT interface, PROFIBUS interface; SIMATIC		• 2 000 mm	6ES7590-1BC00-0AA0
memory card required		PE connection element for DIN rail 2 000 mm	6ES7590-5AA00-0AA0
CPU 1517F-3 PN/DP	6ES7517-3FP00-0AB0	20 units	
Fail-safe CPU, 3 MB work memory for program, 8 MB for data,		Power supply	
PROFINET IRT interface with 2-port		For supplying the backplane bus of	
switch, PROFINET RT interface, PROFIBUS interface;		the S7-1500 controller	
SIMATIC memory card required CPU 1518F-4 PN/DP	CEC7540 AEDOO OADO	24 V DC input voltage, power 25 W	6ES7505-0KA00-0AB0
Fail-safe CPU, 6 MB work memory	6ES7518-4FP00-0AB0	24/48/60 V DC input voltage,	6ES7505-0RA00-0AB0
for program, 20 MB for data,		power 60 W	
PROFINET IRT interface with 2-port switch, PROFINET RT interface,		24/48/60 V DC input voltage, power 60 W, buffering functionality	6ES7505-0RB00-0AB0
Ethernet interface, PROFIBUS interface;		120/230 V AC input voltage,	6ES7507-0RA00-0AB0
SIMATIC memory card required		power 60 W	
CPU 1518F-4 PN/DP MFP	6ES7518-4FX00-1AC0	Power connector	6ES7590-8AA00-0AA0
CPU 1518F-4 PN/DP MFP, including C/C++ Runtime and		With coding element for power supply module; spare part, 10 units	
OPC UA runtime license		Load power supply	
		24 V DC/3 A	6EP1332-4BA00
		24 V DC/8 A	6EP1333-4BA00
		Power supply connector	
		Spare part; for connecting the	
		24 V DC supply voltage • With push-in terminals	6ES7193-4JB00-0AA0
		PROFIBUS FastConnect	0201100 40000 0AA0
		RS 485 bus connector with 90° cable outlet	
		With insulation displacement, max. transmission rate 12 Mbps	
		Without PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0
		With PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BB70-0XA0

Central processing units

Ordering data	Article No.		Article No.
PROFIBUS FC Standard Cable GP	6XV1830-0EH10	IE FC TP Trailing Cable 2 x 2	6XV1840-3AH10
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		(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	
PROFIBUS FC Robust Cable	6XV1830-0JH10	cable; PROFINET-compatible; with UL approval;	
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m IE FC TP Marine Cable 2 x 2	6XV1840-4AH10
PROFIBUS FC Flexible Cable	6XV1831-2K	(Type B)	0XV1040-4A1110
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		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;	
PROFIBUS FC Trailing Cable		max. delivery unit 1 000 m,	
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		minimum order quantity 20 m IE FC stripping tool Preadjusted stripping tool for fast stripping of	6GK1901-1GA00
Sheath color: Petrol	6XV1830-3EH10	Industrial Ethernet FC cables	
Sheath color: Violet	6XV1831-2L	Display	
PROFIBUS FC Food Cable 2-wire, shielded; sold by the meter;	6XV1830-0GH10	For CPU 1511-1 PN, CPU 1511F-1 PN, CPU 1513-1 PN and CPU 1513F-1 PN; spare part	6ES7591-1AA01-0AA0
max. delivery unit 1 000 m, minimum order quantity 20 m		For CPU 1515-2 PN, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP,	6ES7591-1BA01-0AA0
PROFIBUS FC Ground Cable	6XV1830-3FH10	CPU 1518-4 PN/DP,	
2-wire, shielded; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m		CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP; spare part Front cover for	6ES7591-8AA00-0AA0
PROFIBUS FC FRNC Cable GP	6XV1830-0LH10	PROFIBUS DP interface	SECTOS I SAASS SAAS
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		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	
PROFIBUS FastConnect stripping tool	6GK1905-6AA00	SIMATIC S7-1500 Starter Kit	6ES7511-1CK02-4YB5
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables		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,	
IE FC RJ45 plugs		SIMATIC OPC UA S7-1500 Small,	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		PM 1507 24 V/3 A power supply, Ethernet cable, documentation	
IE FC RJ45 plug 180			
180° cable outlet			
1 unit	6GK1901-1BB10-2AA0		
10 units	6GK1901-1BB10-2AB0		
50 units	6GK1901-1BB10-2AE0		
IE FC TP Standard Cable GP 2x2	6XV1840-2AH10		
4-wire, shielded TP installation cable for connection to IE FC 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			

Central processing units

Ordering data	Article No.		Article No.
STEP 7 Professional V15.1		SIMATIC ODK 1500S	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC Requirement: Windows 7 Home Premium SP1 (64-bit)		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	6ES7806-2CD03-0YA0
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		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)	6ES7806-2CD03-0YG0
Version 1709, 1803		Email address required for delivery	
Windows 10 Enterprise Version 1709, 1803 Windows 10 Enterprise 2016 LTSB Windows 10 IoT Enterprise 2015 LTSB Windows 10 IoT Enterprise 2016 LTSB Windows Server 2012 R2 StdE		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)	6ES7806-2CD03-0YK0
(full installation) Windows Server 2016 Standard		Email address required for delivery	
(full installation)		SIMATIC Target 1500S for Simulink V3.0	6ES7823-1BE02-0YA5
Type of delivery: en, de, fr, it, es, zh		Download incl. license key 1)	
STEP 7 Professional V15.1, floating license	6ES7822-1AA05-0YA5	Email address required for delivery	
STEP 7 Professional V15.1, floating license,	6ES7822-1AE05-0YA5	SIMATIC Target + ODK 1500S bundle	6ES7823-1BE12-0YA0
software download incl. license key 1)		Download incl. license key 1)	
Email address required for delivery		Email address required for delivery	
STEP 7 Safety Advanced V15.1		Upgrade of SIMATIC Target 1500S for Simulink V2.0 to V3.0, download incl. license key 1)	6ES7823-1BE02-0YE5
Task: Engineering tool for configuring		Email address required for delivery	
and programming fail-safe user		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
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 2001SP, ET 200pro and ET 200eco I/O Requirement: STEP 7 Professional V15.1		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	
Floating license for 1 user; software and documentation on DVD; license key on USB flash drive	6ES7833-1FA15-0YA5	SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Floating license for 1 user; software, documentation and license key for download ¹⁾ ; email address required for delivery	6ES7833-1FA15-0YH5	Current "Manual Collection" DVD and the three subsequent updates	

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

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.

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.

Central processing units

SIPLUS fail-safe CPUs

Overview SIPLUS CPU 1518F-4 PN/DP



- 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:

SIMATIC memory card required for operation of the CPU.

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

Technical specifications

Article number	6AG1511-1FK01- 2AB0	6AG1513-1FL01- 2AB0	6AG1515-2FM01- 2AB0	6AG1516-3FN01- 2AB0	6AG1518-4FP00- 4AB0
Based on	6ES7511-1FK01- 0AB0	6ES7513-1FL01- 0AB0	6ES7515-2FM01- 0AB0	6ES7516-3FN01- 0AB0	6ES7518-4FP00- 0AB0
	SIPLUS S7-1500 CPU 1511F-1 PN	SIPLUS S7-1500 CPU 1513F-1 PN	SIPLUS S7-1500 CPU 1515F-2 PN	SIPLUS S7-1500 CPU-1516F-3 PN/DP	SIPLUS S7-1500 CPU 1518F-4 PN/DP
Ambient conditions					
Ambient temperature during operation					
horizontal installation, min.	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C	-25 °C; = Tmin	-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 of
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 of

Central processing units

SIPLUS fail-safe CPUs

Technical s

Article number	6AG1511-1FK01- 2AB0	6AG1513-1FL01- 2AB0	6AG1515-2FM01- 2AB0	6AG1516-3FN01- 2AB0	6AG1518-4FP00- 4AB0
Based on	6ES7511-1FK01- 0AB0	6ES7513-1FL01- 0AB0	6ES7515-2FM01- 0AB0	6ES7516-3FN01- 0AB0	6ES7518-4FP00- 0AB0
	SIPLUS S7-1500 CPU 1511F-1 PN	SIPLUS S7-1500 CPU 1513F-1 PN	SIPLUS S7-1500 CPU 1515F-2 PN	SIPLUS S7-1500 CPU-1516F-3 PN/DP	SIPLUS S7-1500 CPU 1518F-4 PN/DP
Altitude during operation relating to sea level					
 Installation altitude above sea level, max. 	2 000 m				
Ambient air temperature-barometric pressure-altitude	1 140 hPa 795 hPa			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		PW P V W 2	22 2 2 22	22 2 2 2 2 2	
 Resistant to commercially available coolants and lubricants 	Yes; Incl. diesel and oil droplets in the air	Yes; Incl. d'esel 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, *				
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		Yes; Class 6S3 incl.			
according to EN 60721-3-6 Remark	sand, dust; *				
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				

Central processing units

SIPLUS fail-safe CPUs

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

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:

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.

Technical specifications

Article number	6ES7513-1RL00-0AB0	6ES7515-2RM00-0AB0	6ES7517-3HP00-0AB0 CPU 1517H-3 PN, 2MB program, 8MB data	
	CPU 1513R-1 PN, 300KB program, 1.5MB data	CPU 1515R-2 PN, 500KB program, 3MB 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		111		
 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	

Central processing units

Redundant CPUs

Technical	specifications	(continued
-----------	----------------	------------

Article number	6ES7513-1RL00-0AB0	6ES7515-2RM00-0AB0	6ES7517-3HP00-0AB0
	CPU 1513R-1 PN, 300KB program, 1.5MB data	CPU 1515R-2 PN, 500KB program, 3MB data	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	120 121 121 121		
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
- PROFlenergy	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 Controller PROFINET IO Device		No	No
SIMATIC communication Open IF communication		Yes; Only Server	Yes; Only Server
Open IE communication Web server		Yes	Yes
		No No	No
 Media redundancy 		No	No

Central processing units

Redundant CPUs

Technical specifications (con	itinuea)		
Article number	6ES7513-1RL00-0AB0	6ES7515-2RM00-0AB0	6ES7517-3HP00-0AB0
	CPU 1513R-1 PN, 300KB program, 1.5MB data	CPU 1515R-2 PN, 500KB program, 3MB data	CPU 1517H-3 PN, 2MB program, 8MB data
3. Interface		100 23	
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
Plug-in interface modules			(FO) 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	0.02		
 horizontal installation, min. 	0 °C	0 °C	0 ℃
 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
- 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	420 a	920 a	2 110 at Interface modules: 2v 10 a

830 g

2 119 g; Interface modules: 2x 18 g

Weight, approx.

430 g

Central processing units

Redundant CPUs

Ordering data	Article No.		Article No.
CPU 1513R-1 PN	6ES7513-1RL00-0AB0	PE connection element for DIN rail 2000 mm	6ES7590-5AA00-0AA0
SIMATIC S7-1500R CPU, 300 KB work memory for program,		20 units	
1.5 MB for data, PRÓFINET RT		graneum.	
interface with 2-port switch; SIMATIC memory card required		Power supply	
CPU 1515R-2 PN	6ES7515-2RM00-0AB0	For supplying the backplane bus of the S7-1500 controller	
	0E3/313-2HM00-0AB0	24 V DC input voltage,	6ES7505-0KA00-0AB0
SIMATIC S7-1500R CPU, 450 KB work memory for program,		power 25 W	
3 MB for data,		24/48/60 V DC input voltage,	6ES7505-0RA00-0AB0
PROFINET RT interface with 2-port switch, PROFINET interface;		power 60 W	
SIMATIC memory card required		24/48/60 V DC input voltage, power 60 W, buffering functionality	6ES7505-0RB00-0AB0
CPU 1517H-3 PN	6ES7517-3HP00-0AB0		252527 25 402 24 52
SIMATIC S7-1500H CPU,		120/230 V AC input voltage, power 60 W	6ES7507-0RA00-0AB0
2 MB work memory for program, 8 MB for data.		Power connector	6ES7590-8AA00-0AA0
1st interface PROFINET RT		With coding element for power	
with 2-port switch, 2nd interface PROFINET,		supply module; spare part, 10 units	
3rd interface synchronization,		Load power supply	
command times for bit operations 4 ns; SIMATIC memory card		24 V DC/3A	6EP1332-4BA00
required		24 V DC/8A	6EP1333-4BA00
SIMATIC S7-1500H system bundle	6ES7500-0HP00-0AB0	Power supply connector	
Comprising 2 CPUs 517H-3 PN,		Spare part; for connecting	
4 synchronization modules up to 10 m, 2 FOC synchronization		the 24 V DC supply voltage	
cables (1 m)		With push-in terminals	6ES7193-4JB00-0AA0
Accessories		IE FC RJ45 plugs	
Synchronization module		RJ45 plug connector for Industrial Ethernet with a rugged	
For patch cable FOC up to 10 m	6ES7960-1CB00-0AA5	metal enclosure and integrated	
For routing cable FOC up to 10 km	6ES7960-1FB00-0AA5	insulation displacement contacts for connecting Industrial Ethernet	
Synchronization connecting		FC installation cables	
cables FOC for S7-1500H		IE FC RJ45 plug 180	
Length 1 m	6ES7960-1BB00-5AA5	180° cable outlet	
Length 2 m	6ES7960-1BC00-5AA5	1 unit	6GK1901-1BB10-2AA0
Length 10 m	6ES7960-1CB00-5AA5	10 units	6GK1901-1BB10-2AB0
SIMATIC memory card		50 units	6GK1901-1BB10-2AE0
4 MB	6ES7954-8LC03-0AA0	IE FC TP Standard Cable GP 2x2	6XV1840-2AH10
12 MB	6ES7954-8LE03-0AA0		0X 1040-2A1110
24 MB	6ES7954-8LF03-0AA0	4-wire, shielded TP installation cable for connection to	
256 MB	6ES7954-8LL03-0AA0	IE FC RJ45 outlet/ IE FC RJ45 plug; PROFINET-compatible:	
2 GB	6ES7954-8LP02-0AA0	with UL approval;	
		sold by the meter; max. delivery unit 1000 m,	
32 GB SIMATIC S7-1500 DIN rail	6ES7954-8LT03-0AA0	minimum order quantity 20 m	
		IE FC TP Trailing Cable 2 x 2	6XV1840-3AH10
Fixed lengths, with grounding elements		(Type C)	
• 160 mm	6ES7590-1AB60-0AA0	4-wire, shielded TP installation cable for connection to	
• 245 mm	6ES7590-1AC40-0AA0	IE FC RJ45 outlet/IE FC RJ45 plug	
• 482 mm	6ES7590-1AE80-0AA0	180/90 for use as trailing cable;	
• 530 mm	6ES7590-1AF30-0AA0	PROFINET-compatible; with UL approval;	
• 830 mm	6ES7590-1AJ30-0AA0	sold by the meter;	
For cutting to length by customer,		max. delivery unit 1 000 m,	
without drill holes; grounding elements must be ordered separately		minimum order quantity 20 m	
• 2000 mm	6ES7590-1BC00-0AA0		

Central processing units

Redundant CPUs

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,	6XV1840-4AH10	STEP 7 Professional V15.1 (required for S7-1500R/H) Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC	
sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m		Requirement: Windows 7 Home Premium SP1 (64-bit) Windows 7 Professional SP1	
IE FC stripping tool	6GK1901-1GA00	(64-bit) Windows 7 Enterprise SP1 (64-bit)	
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables		Windows 7 Ultimate SP1 (64-bit) Windows 10 Home Version 1703 Windows 10 Professional	
Display		Version 1703 Windows 10 Enterprise	
For CPU 1511-1 PN, CPU 1511F-1 PN, CPU 1513-1 PN, CPU 1513F-1 PN, CPU 1513R-1 PN; spare part	6ES7591-1AA01-0AA0	Version 1703 Windows 10 Enterprise 2016 LTSB Windows 10 IoT Enterprise 2015 LTSB	
For CPU 1515-2 PN, CPU 1515F-2 PN, CPU 1515R-2 PN, CPU 1516-3 PN/DP, CPU 1516-3 PN/DP, CPU 1517-3 PN/DP, CPU 1517-3 PN,	6ES7591-1BA01-0AA0	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	
CPU 1517F-3 PN/DP, CPU 1518-4 PN/DP, CPU 1518F-4 PN/DP,		STEP 7 Professional V15.1, floating license	6ES7822-1AA05-0YA5
CPU 1518-4 PN/DP ODK and CPU 1518F-4 PN/DP ODK; spare part		STEP 7 Professional V15.1, floating license, software download incl. license key 1)	6ES7822-1AE05-0YA5
		Email address required for delivery	
		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
		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	
		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
		Current "Manual Collection" DVD and the three subsequent updates	

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

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

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

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

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

Central processing units

Technology CPUs

Overview CPU 1517T-3 PN/DP



- · The CPU with a very large program and data memory in the S7-1500 controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- · For cross-industry automation tasks in series machines, special machines and plant construction
- · Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or 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 1517TF-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 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.
- 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:

Central processing units

-		
	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		progr ₁ onto data	programma data	p. 03., 0.110 00.00
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 mair memory)
S7 times	FA50-		Section 2 Action Value (1998)	
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 mair memory)
Data areas and their retentivity				
Flag				
Number, max.	16 kbyte	16 kbyte	16 kbyte	16 kbyte
Address area	Supplementary Washington		· ·	
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	The state of the s			
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 Controller PROFINET IO Device	Yes	Yes	Yes	Yes
SIMATIC communication	Yes	Yes	Yes	Yes
Open IE communication Web server	Yes	Yes	Yes	Yes
Web server Media redundancy	Yes; MRP Automanager	Yes; MRP Automanager	Yes; MRP Automanager	Yes; MRP Automanager
950 min - 37 (3 min) An (3 min 3 min) (3 min)	according to IEC 62439-2 Edition 2.0	according to IEC 62439-2 Edition 2.0	according to IEC 62439-2 Edition 2.0	according to IEC 62439-2 Edition 2.0

Central processing units

Technical specifications (continued)					
Article number	6ES7511-1TK01-0AB0	6ES7515-2TM01-0AB0	6ES7516-3TN00-0AB0	6ES7517-3TP00-0AB0	
	CPU 1511T-1PN, 225KB progr., 1MB data	CPU 1515T-2 PN, 750KB progr, 3MB data	CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	CPU 1517T-3 PN/DP, 3MB prog./8MB data	
PROFINET IO controller				Į- J	
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 clier 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	
- 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's for PROFINET IO, on the number of IO devices, and on the quantity of configuration user data	
Update time for IRT					
- for send cycle of 250 μs	$250~\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of $625~\mu s$ of the isochronous OB is decisive	$250~\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of $500~\mu s$ 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 μ s to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μ s 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)	
Jpdate time for RT	The area of the second of the	* *		A	
- 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	

Central processing units

Technology CPUs

Article number	6ES7511-1TK01-0AB0 CPU 1511T-1PN,	6ES7515-2TM01-0AB0 CPU 1515T-2 PN,	6ES7516-3TN00-0AB0 CPU 1516T-3 PN/DP,	6ES7517-3TP00-0AB0 CPU 1517T-3 PN/DP,
PROFINET IO Device	225KB progr., 1MB data	750KB progr, 3MB data	1.5MB prog./5MB data	3MB prog./8MB data
Services				
- PG/OP communication	Yes	Yes	Yes	Yes
	Yes	Yes		
- S7 routing	No	No	Yes	Yes
 Isochronous mode Open IE communication 	Yes	Yes	No Yes	No Yes
- IRT	Yes	Yes		Yes
- MRP			Yes	
- Mur	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			- 11	
Interface types				
 Number of ports 		1	1	1
 integrated switch 		No	No	No
RJ 45 (Ethernet)		Yes; X2	Yes; X2	Yes; X2
Protocols				110
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	for PROFINET IO, on the number of IO devices, and

Central processing units

Technology CPUs

Article number	6ES7511-1TK01-0AB0	6ES7515-2TM01-0AB0	6ES7516-3TN00-0AB0	6ES7517-3TP00-0AB0
	CPU 1511T-1PN, 225KB progr., 1MB data	CPU 1515T-2 PN, 750KB progr, 3MB data	CPU 1516T-3 PN/DP, 1.5MB prog./5MB data	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
- 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				100
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 interfa of the CPU and connecte 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,	125; In total, up to 1 000 distributed I/O devices c be connected via AS-i, PROFIBUS or PROFINET
			distributed I/O devices can	distributed I/O be connected

Yes

Yes; Data access (read,

1 ms (central)

write, subscribe), method call, custom address space

Yes; Data access (read, write subscribe), method

1 ms (central)

call, custom address space

Yes; Distributed and central; Yes; D

1 ms (central)

Yes; Data access (read, write, subscribe), method call, custom address space Yes; Data access (read, write, subscribe), method call, custom address space

1 ms (central)

OPC UA

OPC UA client

• OPC UA server

Isochronous mode

Isochronous operation (application synchronized up to terminal)

Central processing units

Technology CPUs

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			
PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
PID-Temp	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature	Yes; PID controller with integrated optimization for temperature
Counting and measuring				
High-speed counter	Yes	Yes	Yes	Yes
Ambient conditions				
Ambient temperature during operation				
 horizontal installation, min. 	0 °C	0 °C	0 °C	0 °C
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration				
Programming				
Programming language				
- LAD	Yes	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
Know-how protection			NAMES OF STREET	
User program protection/password protection	Yes	Yes	Yes	Yes
Copy protection	Yes	Yes	Yes	Yes
Block protection	Yes	Yes	Yes	Yes
AND THE PROPERTY OF THE PROPER				

Central processing units

	Technical specifications (cor	ntinued)			
	Article number	6ES7511-1TK01-0AB0	6ES7515-2TM01-0AB0	6ES7516-3TN00-0AB0	6ES7517-3TP00-0AB0
- Proguencin for display Yes Yes Yes Yes Yes Yes Yes Yes Yes Proguencin level Peachwine Yes Yes Yes Yes Yes Yes Yes Proguencin level Peachwine Yes Yes Yes Yes Yes Proguencin level Peachwine Yes Yes Yes Yes Yes Proguencin level Peachwine Yes Yes Yes Proguencin level Peachwine Yes Yes Yes Peachwine Yes Yes Peachwine Yes Peachwine Yes Peachwine Yes Peachwine Yes Yes Peachwine Yes					
Protection levels: Readwrite Yes	Access protection				
Protection level: Readwrite protection Yes	 Password for display 	Yes	Yes	Yes	Yes
Production Pro	Protection level: Write protection	Yes	Yes	Yes	Yes
Decision Dimension Dimen		Yes	Yes	Yes	Yes
Midth		Yes	Yes	Yes	Yes
Height	Dimensions				
Depth 129 mm 12	Width	35 mm	70 mm	175 mm	175 mm
Weights Weights Weights Agrov. 430 g 830 g 1978 g	Height	147 mm	147 mm	147 mm	147 mm
Mail	Depth	129 mm	129 mm	129 mm	129 mm
Article number SE37511-1UK01-0AB0 CPU 151TF-1PN 2250k progr., 1MB data CPU 1515TF-2 PN 750k progr. 3MB data CPU 1515TF-3 PNDP CPU 1	Weights				
CPU 151TT-1 PN, 225KB progr., 1MB data CPU 151TT-2 PN, 750KB progr. 3MB data CPU 151TT-2 PN, 2MB progr., 3MB	Weight, approx.	430 g	830 g	1 978 g	1 978 g
CPU 151TT-1 PN, 225KB progr., 1MB data CPU 151TT-2 PN, 750KB progr. 3MB data CPU 151TT-2 PN, 2MB progr., 3MB	Addata	0507514 11W01 04 B0	CECTES CUMOS CARO	CECTES CUINOS CADO	CECTEST OLIDOO OADO
Product type designation CPU 151TF-1 PN CPU 1515TF-2 PN CPU 1516TF-3 PNIDP CPU 1517TF-3 PNIDP Engineering with sites product oringurable in programs as of version V15.1 (FWV2.6) / V14 SPI (FWV2.6) / V14 SPI (FWV2.6) / V14 SPI (FWV2.6) / V16 SPI (FWV2.5) or higher (FWV2.0) or higher V15.1 (FWV2.6) / V14 SPI (FWV2.6) / V14 SPI (FWV2.6) / V15 (FWV2.5) or higher V15.1 (FWV2.6) / V15 (Article number	CPU 1511TF-1PN,	CPU 1515TF-2 PN,	CPU 1516TF-3 PN/DP,	CPU 1517TF-3 PN/DP,
Figure F	General information				
STEP 7 TIA Portal configurable/ integrated as of version V15.1 (FW V2.6) V14 SPI (FW V2.1) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) v14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) v14 SPI (FW V2.5) v14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) v14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher V15.1 (FW V2.6) V14 SPI (FW V2.5) or higher C15.1 CW CHASTILE V15.1 (FW V2.6) V14 SPI (FW V2.6) V14 SPI (FW V2.5) or higher C15.1 CW CW V15.1 (FW V2.6) V14 SPI (FW V2.6) V15 SPI (FW V2.6) V	Product type designation	CPU 1511TF-1 PN	CPU 1515TF-2 PN	CPU 1516TF-3 PN/DP	CPU 1517TF-3 PN/DP
Integrated as of version CFW V2.1) or higher CFW V2.5) or higher CFW V2.5) or higher CFW V2.0) or higher	Engineering with				
Screen diagonal [cm] 3.45 cm 6.1 cm 6.1 cm 6.1 cm					
Supply voltage	Display				
Type of supply voltage	Screen diagonal [cm]	3.45 cm	6.1 cm	6.1 cm	6.1 cm
Work memory Work memory work memory integrated (for program) 225 kbyte 750 kbyte 1.5 Mbyte 3 Mbyte 6 Mbyte 8 Mbyte • integrated (for data) 1 Mbyte 3 Mbyte 5 Mbyte 8 Mbyte 8 Mbyte • integrated (for data) 1 Mbyte 3 Mbyte 5 Mbyte 8 Mbyte 8 Mbyte Load memory • Plug-in (SIMATIC memory card), max. 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. 98 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 2 048 EC counter • Number Any (only limited by the main memory) S7 times • Number 2 048 2 048 2 048 2 048 2 048 EC 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 16 kbyte 16 kbyte 32 kbyte; All inputs are in the process image • Outputs 3 2 kbyte; All inputs are in the process image • Outputs 3 2 kbyte; All outputs are in 3 2 kbyte; All outputs are in 18 process image • Outputs 5 2 kbyte; All outputs are in 18 process image • Outputs 5 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image • Outputs 6 2 kbyte; All outputs are in 18 process image	Supply voltage				
Vork memory integrated (for program) integrated (for program) 225 kbyte 750 kbyte 750 kbyte 5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 1.5 Mbyte 8 Mbyte 8 Mbyte 1.5 Mbyte 1.6 Kbyte	Type of supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
 integrated (for program) integrated (for data) integration integration integration integration integration integration integration integration integration integrated (for data) integration integration<	Memory				
Integrated (for data) 1 Mbyte 3 Mbyte 5 Mbyte 8 Mbyte Load memory Pilug-in (SIMATIC memory card), max. 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 (miners and their retentivity 57 counter 5 048 2 048 2 048 2 048 Number 2 048 2 048 2 048 2 048 2 048 IEC counter Any (only limited by the main memory)	Work memory				
Load memory Pilug-in (SIMATIC memory card), max. CPU processing times for bit operations, typ. 60 ns 30 ns 10 ns 2 ns for fixed point arithmetic, typ. 96 ns 48 ns 16 ns 31 ns for fixed point arithmetic, typ. 384 ns 192 ns 64 ns 12 ns Counters, timers and their retentivity S7 counter Number Any (only limited by the main memory) Any (only limited by the main memory	 integrated (for program) 	225 kbyte	750 kbyte	1.5 Mbyte	3 Mbyte
Plug-in (SIMATIC memory card), max, CPU processing times for bit operations, typ. 60 ns 30 ns 10 ns 2 ns 60 ns 30 ns 10 ns 2 ns 30 ns 60 ns 30 ns 10 ns 2 ns 30 ns 10 ns 30 ns 10 ns 2 ns 30 ns 10 ns 2 ns 30 ns 10 ns 2 ns 30 ns 10 ns 30 ns 10 ns 2 ns 30 ns 10 ns 30	 integrated (for data) 	1 Mbyte	3 Mbyte	5 Mbyte	8 Mbyte
CPU processing times for bit operations, typ. for word operations, typ. 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. 2048 8 Counters, timers and their retentivity S7 counter • Number Any (only limited by the main memory) Data areas and their retentivity Flag • Number, max. Als kbyte: All inputs are in the process image • Outputs 32 kbyte: All inputs are in the process image • Outputs 32 kbyte: All outputs are in 33 kbyte: All outputs are in 34 kbyte: All outputs are in 35 kbyte: All outputs are in 36 kbyte: All outputs are in 37 kbyte: All outputs are in 38 kbyte: All outputs are in	Load memory				
for bit operations, typ. for word operations, typ. for word operations, typ. for word operations, typ. for fixed point arithmetic, typ. gens 48 ns 16 ns 3 ns for fixed point arithmetic, typ. gens 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 2 048 Number 2 048 2 048 Number 3 048 Number 4 048 Number 5 048 Number 5 048 Number 6 048 Number 6 058 Number 7 058 Number 7 058 Number 8 058 Number 8 058 Number 8 058 Number 9		32 Gbyte	32 Gbyte	32 Gbyte	32 Gbyte
for word operations, typ. for word operations, typ. 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 2 048 2 048 2 048 2 048 EC counter Number Any (only limited by the main memory) Any (only limited by the main me	CPU processing times				
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 2 048 ECC counter Number Any (only limited by the main memory) Any (only limited by th	for bit operations, typ.	60 ns	30 ns	10 ns	2 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 2 048 2 048 IEC counter Number Any (only limited by the main memory) Any (only limited by the main memo	for word operations, typ.	72 ns	36 ns	12 ns	3 ns
Counters, timers and their retentivity S7 counter Number 2 048 2 048 2 048 2 048 ECC counter Number 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 Number 2 048 2 048 2 048 ECC timer Number Any (only limited by the main memory) Any (only limited by the	for fixed point arithmetic, typ.	96 ns	48 ns	16 ns	3 ns
retentivity S7 counter Number 2 048 2 048 2 048 2 048 2 048 IEC counter Number 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)	for floating point arithmetic, typ.	384 ns	192 ns	64 ns	12 ns
 Number 2 048 2 048 2 048 EC counter Number 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 2 048 2 048 EC timer Number Any (only limited by the main memory) Any (only limited by the main memory Any (only limited by the main memory <l< td=""><td></td><td></td><td></td><td></td><td></td></l<>					
Fig. 2	S7 counter				
Any (only limited by the main memory) Any (only limited	Number	2 048	2 048	2 048	2 048
S7 times Number 2 048 2 048 2 048 2 048 2 048 ECC timer Number Any (only limited by the main memory) Any (only limited by the main	IEC counter				
Number 2 048 2 048 2 048 2 048 2 048 2 048 IEC timer Number Any (only limited by the main memory) In puts 16 kbyte 17 kbyte 18 kbyte; All inputs are in the process image 18 process image 19 cocess image 20 2 48 20 48 20 48 20 48 20 48 20 48 20 48 Any (only limited by the main memory) Any (only limited by the main memory) 16 kbyte main memory) 16 kbyte 16 kbyte 16 kbyte 16 kbyte 16 kbyte 17 kbyte; All inputs are in the process image 20 48 4	Number				
Any (only limited by the main memory)	S7 times				
Any (only limited by the main memory) Any (only limited	Number	2 048	2 048	2 048	2 048
Data areas and their retentivity Flag Number, max. 16 kbyte 16 kb	IEC timer				
Flag Number, max. 16 kbyte 18 kbyte 19 kbyte 19 kbyte 19 kbyte 19 kbyte 10 kby	Number				
 Number, max. Address area I/O address area Inputs Outputs 32 kbyte; All inputs 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 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 	Data areas and their retentivity				
Address area I/O address area	Flag				
 I/O address area Inputs Inputs 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 32 kbyte; All outputs are in the process image 32 kbyte; All outputs are in the process image 	 Number, max. 	16 kbyte	16 kbyte	16 kbyte	16 kbyte
 Inputs 32 kbyte; All inputs are in the process image Outputs 32 kbyte; All inputs are in the process image 32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in 	Address area				
process image process image process image process image process image process image Outputs 32 kbyte; All outputs are in	I/O address area				
	• Inputs				
	Outputs				

Central processing units

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 prog., 8MB data
Time of day				
Clock				
• Type	Hardware clock	Hardware clock	Hardware clock	Hardware clock
I. Interface				
nterface 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 clier 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
- 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 ca 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 s for PROFINET IO, on the number of IO devices, and on the quantity of configuruser data

Central processing units

Article number	6ES7511-1UK01-0AB0	6ES7515-2UM01-0AB0	6ES7516-3UN00-0AB0	6ES7517-3UP00-0AB0
A tible humber	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 prog., 8MB data
Update time for IRT				3
- for send cycle of 250 μs	$250~\mu s$ 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	$500~\mu s$ to $8~ms$; Note: In the case of IRT with isochronous mode, the minimum update time of $625~\mu s$ 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)
Jpdate 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 redundance manager and/or MRP cli max. number of devices 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
. Interface				
nterface 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

Central processing units

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/deacti- vated, max. 		8; in total across all inter- faces	8; in total across all inter- faces	8; in total across all inter- faces
 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			N ///	1177 3277
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

Central processing units

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 prog., 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.				
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 car 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 centra with minimum OB 6x cycle 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 v 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 controlle 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

Central processing units

Technical specifications (co	ntinuec	1)
------------------------------	---------	----

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 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 ℃	0 ℃	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	1000 Carlot (1000	2000000		
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

Central processing units

Ordering data	Article No.		Article No.
CPU 1511T-1 PN	6ES7511-1TK01-0AB0	Accessories	
225 KB work memory for program,		SIMATIC memory card	
1 MB for data, PROFINET IRT interface with 2-port		4 MB	6ES7954-8LC03-0AA0
switch; SIMATIC memory card		12 MB	6ES7954-8LE03-0AA0
required		24 MB	6ES7954-8LF03-0AA0
CPU 1511TF-1 PN	6ES7511-1UK01-0AB0	256 MB	6ES7954-8LL03-0AA0
225 KB work memory for program, 1 MB for data.		2 GB	6ES7954-8LP02-0AA0
PROFINET IRT interface with 2-port		32 GB	6ES7954-8LT03-0AA0
switch; SIMATIC memory card required		SIMATIC S7-1500 DIN rail	
CPU 1515T-2 PN	6ES7515-2TM01-0AB0	Fixed lengths.	
750 KB work memory for program,		with grounding elements	
3 MB for data,		• 160 mm	6ES7590-1AB60-0AA0
PROFINET IRT interface with 2-port switch, Ethernet interface;		• 245 mm • 482 mm	6ES7590-1AC40-0AA0 6ES7590-1AE80-0AA0
SIMATIC memory card required		• 530 mm	6ES7590-1AF30-0AA0
CPU 1515TF-2 PN	6ES7515-2UM01-0AB0	• 830 mm	6ES7590-1AJ30-0AA0
750 KB work memory for program,		For cutting to length by customer,	
3 MB for data, PROFINET IRT interface with 2-port		without drill holes; grounding elements must be ordered separately	
switch, Ethernet interface;		• 2000 mm	6ES7590-1BC00-0AA0
SIMATIC memory card required		PE connection element	6ES7590-5AA00-0AA0
CPU 1516T-3 PN/DP	6ES7516-3TN00-0AB0	for DIN rail 2000 mm	
I.5 MB work memory for program, 5 MB for data, PROFINET IRT inter-		20 units	
ace with 2-port switch, Ethernet		Power supply	
nterface, PROFIBUS interface; SIMATIC memory card required		For supplying the backplane bus of the S7-1500 controller	
CPU 1516TF-3 PN/DP I.5 MB work memory for program,	6ES7516-3UN00-0AB0	24 V DC input voltage, power 25 W	6ES7505-0KA00-0AB0
5 MB for data, PROFINET IRT interface with 2-port switch, Ethernet interface,		24/48/60 V DC input voltage, power 60 W	6ES7505-0RA00-0AB0
PROFIBUS interface; SIMATIC memory card required		24/48/60 V DC input voltage, power 60 W, buffering functionality	6ES7505-0RB00-0AB0
CPU 1517T-3 PN/DP	6ES7517-3TP00-0AB0	120/230 V AC input voltage, power 60 W	6ES7507-0RA00-0AB0
BMB work memory for program, BMB for data,		Power connector	6ES7590-8AA00-0AA0
PROFINET IRT interface with 2-port switch, Ethernet interface, PROFIBUS interface;		With coding element for power supply module; spare part, 10 units	
SIMATIC memory card required		Load power supply	
CPU 1517TF-3 PN/DP	6ES7517-3UP00-0AB0	24 V DC/3 A	6EP1332-4BA00
MB work memory for program,		24 V DC/8 A	6EP1333-4BA00
BMB for data, PROFINET IRT interface with		Power supply connector	
2-port switch, Ethernet interface,		Spare part; for connecting the	
PROFIBUS interface; SIMATIC memory card required		24 V DC supply voltage	
and the second section of the second of the second		With push-in terminals	6ES7193-4JB00-0AA0
		PROFIBUS FastConnect RS 485 bus connector with 90° cable outlet	
		With insulation displacement, max. transmission rate 12 Mbps	
		Without PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BA70-0XA0
		With PG interface, grounding via control cabinet contact surface; 1 unit	6ES7972-0BB70-0XA0

Central processing units

Ordering data	Article No.		Article No.
PROFIBUS FC Standard Cable GP	6XV1830-0EH10	IE FC TP Trailing Cable 2 x 2	6XV1840-3AH10
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		(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;	
PROFIBUS FC Robust Cable 2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m	6XV1830-0JH10	PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	6XV1831-2K	IE FC TP Marine Cable 2 x 2 (Type B)	6XV1840-4AH10
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m		4-wire, shielded TP installation cable for connection to IE FC RJ45 outlet/ IE FC RJ45 plug 180/90 with marine approval;	
PROFIBUS FC Trailing Cable		sold by the meter; max. delivery unit 1 000 m,	
2-wire, shielded; sold by the meter;		minimum order quantity 20 m IE FC stripping tool	6GK1901-1GA00
max. delivery unit 1000 m, minimum order quantity 20 m		Preadjusted stripping tool for fast stripping of	GGK 1901-1GA00
Sheath color: Petrol	6XV1830-3EH10	Industrial Ethernet FC cables	
Sheath color: Violet	6XV1831-2L	Display	
PROFIBUS FC Food Cable	6XV1830-0GH10	For CPU 1511T-1 PN and CPU 1511TF-1 PN; spare part	6ES7591-1AA01-0AA0
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m		For CPU 1515-2 PN, CPU 1515F-2 PN, CPU 1515F-2 PN,	6ES7591-1BA01-0AA0
PROFIBUS FC Ground Cable	6XV1830-3FH10	CPU 1516-3 PN/DP, CPU 1516F-3 PN/DP,	
2-wire, shielded; sold by the meter; max. delivery unit 1000 m, minimum order quantity 20 m		CPU 1517-3 PN/DP, CPU 1517H-3 PN, CPU 1517F-3 PN/DP, CPU 1518-4 PN/DP,	
PROFIBUS FC FRNC Cable GP	6XV1830-0LH10	CPU 1518F-4 PN/DP, CPU 1518-4 PN/DP ODK and	
2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; sold by the meter; max. delivery unit 1000 m,		CPU 1518F-4 PN/DP ODK; spare part Front cover for PROFIBUS DP interface	6ES7591-8AA00-0AA0
minimum order quantity 20 m		For CPU 1517-3 PN/DP,	
PROFIBUS FastConnect stripping tool Preadjusted stripping tool	6GK1905-6AA00	CPU 1518-4 PN/DP, CPU 1518-4 PN/DP ODK and CPU 1518-4 PN/DP MFP;	
for fast stripping of PROFIBUS FastConnect bus cables		spare part SIMATIC S7-1500T Starter Kit	6ES7511-1TK01-4YB5
IE FC RJ45 plugs		Comprising: CPU 1511T-1 PN,	0201011-11R01-41B0
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		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	
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		

Central processing units

Ordering data	Article No.		Article No.
STEP 7 Professional V15.1		STEP 7 Safety Advanced V15.1	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC		Task: Engineering tool for configuring and programming fail-safe user	
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		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 200SP, ET 200pro and ET 200co I/O Requirement: STEP 7 Professional V15.1	
Version 1709, 1803 Windows 10 Enterprise Version 1709, 1803 Windows 10 Enterprise 2016 LTSB		Floating license for 1 user; software and documentation on DVD, license key on USB flash drive	6ES7833-1FA15-0YA5
Windows 10 IoT Enterprise 2015 LTSB Windows 10 IoT Enterprise 2016 LTSB		Floating license for 1 user; software, documentation and license key for download ¹⁾ ; email address required for delivery	6ES7833-1FA15-0YH5
Windows Server 2012 R2 StdE (full installation)		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Windows Server 2016 Standard (full installation)		Electronic manuals on DVD, multi-language:	
Type of delivery: en, de, fr, it, es, zh		LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7,	
STEP 7 Professional V15.1, floating license	6ES7822-1AA05-0YA5	SIMATIC Distributed I/O, SIMATIC HMI, SIMATIC sensors, SIMATIC NET, SIMATIC PC-based	
STEP 7 Professional V15.1, floating license, software download	6ES7822-1AE05-0YA5	Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
incl. license key 1) Email address required for delivery		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Email address required for delivery		Current "Manual Collection" DVD and the three subsequent updates	

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