

SIMATIC S7-1500H, CPU 1518HF-4 PN, central processing unit with 18 MB work memory for program and 150 MB for data, 1st interface: PROFINET RT with 2-port switch, 2nd interface: PROFINET with 2-port switch, 3rd interface: PROFINET, 4th/5th interface: H-SYNC, SIMATIC Memory Card required



General information	
Product type designation	CPU 1518HF-4 PN
HW functional status	FS01
Firmware version	V4.0
• FW update possible	Yes
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
• SysLog	Yes
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V20 (FW V4.0)
Redundancy	
• stand-alone operation	No
Display	
Screen diagonal [cm]	6.1 cm
Control elements	
Number of keys	8
Mode buttons	2
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
• Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	1.4 A
Current consumption, max.	1.9 A
Inrush current, max.	1.9 A; Rated value
I ² t	0.5 A ² ·s
Power	
Infeed power to the backplane bus	12 W
Power consumption from the backplane bus (balanced)	30 W
Power loss	
Power loss, typ.	22 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	

• integrated (for program)	18 Mbyte
• integrated (for data)	150 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	1 ns
for word operations, typ.	2 ns
for fixed point arithmetic, typ.	2 ns
for floating point arithmetic, typ.	8 ns
CPU-blocks	
Number of elements (total)	40 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
• Number range	1 ... 60 999; subdivided into: number range that can be used by the user: 1 ... 59 999, and number range of DBs created via SFC 86: 60 000 ... 60 999
• Size, max.	16 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	1 Mbyte
FC	
• Number range	0 ... 65 535
• Size, max.	1 Mbyte
OB	
• Size, max.	1 Mbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of cyclic interrupt OBs	20; with minimum OB 3x cycle of 1 ms
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number of startup OBs	100
• Number of asynchronous error OBs	4
• Number of synchronous error OBs	2
• Number of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	4.5 Mbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
Extended retentive data area (incl. timers, counters, flags), max.	100 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
• Size, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte

Data blocks	
• Retentivity adjustable	Yes
• Retentivity preset	No
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	16 kbyte
— Outputs (volume)	16 kbyte
Subprocess images	
• Number of subprocess images, max.	31
Hardware configuration	
Number of distributed IO systems	64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET, but also by the connection of I/O via IE/PB-Links.
Number of IO Controllers	
• integrated	1
Rack	
• Modules per rack, max.	9; CPU + 2 PS + 6 CP
Time of day	
Clock	
• Type	Hardware clock
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	3
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
• Number of ports	2
• integrated switch	Yes
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• SIMATIC communication	Yes; Only Server
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	Yes
PROFINET IO Controller	
Services	
— Isochronous mode	No
— IRT	No
— PROFINergy	Yes; per user program
— Number of connectable IO Devices, max.	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
— PROFINET Security Class	1
Update time for RT	
— for send cycle of 1 ms	1 ms to 512 ms
2. Interface	
Interface types	

• RJ 45 (Ethernet) • Number of ports • integrated switch	Yes; X2 2 Yes
Protocols	
• IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	Yes; IPv4 No No Yes; Only Server Yes; Optionally also encrypted Yes No
3. Interface	
Interface types	
• RJ 45 (Ethernet) • Number of ports • integrated switch	Yes; X3 1 No
Protocols	
• IP protocol • SIMATIC communication • Open IE communication • Web server	Yes; IPv4 Yes; Only Server Yes; Optionally also encrypted Yes
4. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1CB00-0AA5, 6ES7960-1FB00-0AA5 or 6ES7960-1FE00-0AA5
5. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1CB00-0AA5, 6ES7960-1FB00-0AA5 or 6ES7960-1FE00-0AA5
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps • 1000 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED	Yes Yes; Only possible at the X3 interface of the CPU 1518 Yes Yes Yes
Protocols	
PROFIsafe	Yes; V2.4 / V2.6
Number of connections	
• Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths	384; via integrated interfaces of the CPU and connected CPs 10 320 64
Redundancy mode	
• PROFINET system redundancy (S2) • PROFINET system redundancy (R1)	Yes Yes
Media redundancy	
— Media redundancy — MRP — MRP interconnection, supported — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max.	Yes; only via 1st interface (X1) Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 No 200 ms; PROFINET MRP 50
SIMATIC communication	
• PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client	Yes; encryption with TLS V1.3 pre-selected Yes Yes No
Open IE communication	
• TCP/IP — Data length, max.	Yes 64 kbyte

— several passive connections per port, supported • ISO-on-TCP (RFC1006) — Data length, max. • UDP — Data length, max. — UDP multicast • DHCP • DNS • SNMP • DCP • LLDP • Encryption	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 128 multicast circuits No Yes Yes Yes Yes Yes; Optional
Web server	
• HTTP • HTTPS • web API — Number of sessions, max. — number of simultaneous HTTP calls, max. — HTTP request body, max.	No Yes; only via Web API Yes 200 4 131 072 byte
OPC UA	
• Runtime license required • OPC UA Client • OPC UA Server — Application authentication — Security policies — User authentication — GDS support (certificate management) — Number of sessions, max. — Number of subscriptions per session, max. — Sampling interval, min. — Publishing interval, min. — Number of server methods, max. — Number of inputs/outputs per server method, max. — Number of monitored items, recommended max. — Number of server interfaces, max. — Number of nodes for user-defined server interfaces, max. • Alarms and Conditions	Yes; "Large" license required per CPU No Yes; data access (read, write, subscribe), method call, custom address space, role-based access control Yes available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss "anonymous" or by user name & password No 32 25 25 ms 25 ms 100; max. 20 concurrently running jobs each for asynchronous instructions OPC-UA_ServerMethodPre (V1.1) and OPC-UA_ServerMethodPost (V1.1) 20 25 000; for 1 s sampling interval and 1 s send interval 10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace" 50 000 No
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	64
number of subscriptions, max.	750
number of tags/attributes for subscriptions, max.	120 000
Program alarms	Yes
Number of configurable program messages, max.	20 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	20 000
Number of simultaneously active program alarms	
• Number of program alarms • Number of alarms for system diagnostics	4 000 1 000
Test commissioning functions	
Joint commission (Team Engineering)	Yes
Status block	Yes; Up to 16 simultaneously
Single step	No
Number of breakpoints	20; Breakpoints are only supported in RUN-Solo status
Profiling	Yes
Status/control	

• Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max.	Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job
Forcing	
• Forcing • Forcing, variables • Number of variables, max.	Yes; without fail-safe peripheral inputs/outputs (without fail-safe) 200
Diagnostic buffer	
• present • Number of entries, max. — of which powerfail-proof	Yes 3 200 1 000
Traces	
• Number of configurable Traces • Memory size per trace, max.	8 512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED • ERROR LED • MAINT LED • STOP ACTIVE LED • Connection display LINK TX/RX	Yes Yes Yes Yes Yes
Supported technology objects	
Motion Control	No
Controller • PID_Compact • PID_3Step • PID-Temp	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature
Counting and measuring	Yes
Standards, approvals, certificates	
Ecological footprint	
Global warming potential	
— global warming potential, (total) [CO2 eq]	488 kg
— global warming potential, (during production) [CO2 eq]	78.3 kg
— global warming potential, (during operation) [CO2 eq]	417 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-8.21 kg
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1 • SIL acc. to IEC 61508	PLe 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
— High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09
product functions / security / header	
PROFINET Security Class	1
signed firmware update	Yes
Secure Boot	Yes
safely removing data	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max.	0 °C 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off 0 °C 40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	

• min.	-40 °C
• max.	70 °C
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
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— CFC	Yes; either CFC or failsafe functionality
— GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	No
• Block protection	Yes
Access protection	
• protection of confidential configuration data	Yes
• Password for display	Yes
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Write protection for Failsafe	Yes
• Protection level: Complete protection	Yes
• User administration	Yes; device-wide and centralized
• Number of users	100
• Number of groups	100
• Number of roles	50
programming / cycle time monitoring / header	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	210 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 806 g
Classifications	

	Version	Classification
eClass	14	27-24-22-07
eClass	12	27-24-22-07
eClass	9.1	27-24-22-07
eClass	9	27-24-22-07
eClass	8	27-24-22-07
eClass	7.1	27-24-22-07
eClass	6	27-24-22-07
ETIM	9	EC000236
ETIM	8	EC000236
ETIM	7	EC000236

Approvals / Certificates		
General Product Approval	EMV	Functional Safety

[Manufacturer Declaration](#)

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