



SIMATIC ET 200SP Open Controllers, CPU 1515SP PC F. 4 GB RAM, 30 GB CFAST with WES 7 E 32 bit pre-installed, mit S7-1500 Fail-safe SWC CPU 1505SP F pre-installed Interfaces: 1x slot CFAST, 1x slot SD/MMC, 1x connection for ET 200SP bus adapter PROFINET 1x 10/100/1000 Mbit/s Ethernet, 3x USB, 1x DVI-I graphics card connection, Documentation on DVD, Restore DVD

General information	
Product type designation	CPU 1515SP PC F
HW functional status	FS05
Firmware version	V2.1
Engineering with	
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version 	V14 SP1
Installed software	
<ul style="list-style-type: none"> Visualization Control 	No S7-1500 Software Controller CPU 1505SP F
Configuration control	
via dataset	Yes
Control elements	
Mode selector switch	1
Supply voltage	
Type of supply voltage	24 V DC
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
<ul style="list-style-type: none"> Mains/voltage failure stored energy time 	5 ms
Input current	
Current consumption (rated value)	1.5 A; Full processor load, incl. ET 200SP modules and using USB
Current consumption (in no-load operation), typ.	0.6 A
Inrush current, max.	4.7 A; Rated value
Power	
Active power input, max.	36 W; incl. ET 200SP modules and using USB
Infeed power to the backplane bus	8.75 W
Power loss	
Power loss, typ.	15 W; without ET 200SP modules and without using USB
Processor	
Processor type	Dual-Core 1 GHz, AMD G Series APU T40E
Memory	
Type of memory	DDR3-SDRAM
Main memory	4 GB RAM
CFAST memory card	Yes; 30 GB flash memory
SIMATIC memory card required	No

Work memory	
<ul style="list-style-type: none"> integrated (for program) 	1.5 Mbyte
<ul style="list-style-type: none"> integrated (for data) 	5 Mbyte
<ul style="list-style-type: none"> integrated (for CPU function library of CPU Runtime) 	10 Mbyte
Load memory	
<ul style="list-style-type: none"> integrated (on PC mass storage) 	320 Mbyte
Backup	
<ul style="list-style-type: none"> with UPS 	Yes; all memory areas declared retentive
<ul style="list-style-type: none"> with non-volatile memory 	Yes
CPU processing times	
for bit operations, typ.	10 ns
for word operations, typ.	12 ns
for fixed point arithmetic, typ.	16 ns
for floating point arithmetic, typ.	64 ns
CPU-blocks	
Number of elements (total)	6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements
DB	
<ul style="list-style-type: none"> Number, max. 	5 999; Number range: 1 to 65535
<ul style="list-style-type: none"> Size, max. 	5 Mbyte
FB	
<ul style="list-style-type: none"> Number, max. 	5 998; Number range: 1 to 65535
<ul style="list-style-type: none"> Size, max. 	512 kbyte
FC	
<ul style="list-style-type: none"> Number, max. 	5 999; Number range: 1 to 65535
<ul style="list-style-type: none"> Size, max. 	512 kbyte
OB	
<ul style="list-style-type: none"> Size, max. 	1 048 kbyte
<ul style="list-style-type: none"> Number of free cycle OBs 	100
<ul style="list-style-type: none"> Number of time alarm OBs 	20
<ul style="list-style-type: none"> Number of delay alarm OBs 	20
<ul style="list-style-type: none"> Number of cyclic interrupt OBs 	20
<ul style="list-style-type: none"> Number of process alarm OBs 	50
<ul style="list-style-type: none"> Number of DPV1 alarm OBs 	3
<ul style="list-style-type: none"> Number of isochronous mode OBs 	1
<ul style="list-style-type: none"> Number of technology synchronous alarm OBs 	2
<ul style="list-style-type: none"> Number of startup OBs 	100
<ul style="list-style-type: none"> Number of asynchronous error OBs 	4
<ul style="list-style-type: none"> Number of synchronous error OBs 	2
<ul style="list-style-type: none"> Number of diagnostic alarm OBs 	1
Nesting depth	
<ul style="list-style-type: none"> per priority class 	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
<ul style="list-style-type: none"> Number 	2 048
Retentivity	
— adjustable	Yes
IEC counter	
<ul style="list-style-type: none"> Number 	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
<ul style="list-style-type: none"> Number 	2 048
Retentivity	
— adjustable	Yes
IEC timer	
<ul style="list-style-type: none"> Number 	Any (only limited by the main memory)

Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes
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
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
of which per assigned PC interface	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Hardware configuration	
Integrated power supply	Yes
Number of distributed IO systems	20
Number of DP masters	
• Via CM	1
Rack	
• Modules per rack, max.	64; CPU 1515SP PC + 64 modules + server module
• Number of lines, max.	1
PtP CM	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
• Type	Hardware clock
• Hardware clock (real-time)	Yes; Resolution: 1 s
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Clock synchronization	
• supported	Yes
• to DP, master	No
• on Ethernet via NTP	Yes
• on Windows clock, slave	Yes
Interfaces	
Number of industrial Ethernet interfaces	2
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1
Number of RS 485 interfaces	1; Via CM DP module
Number of USB interfaces	3; 3x USB 2.0 on the front, 500 mA each - of which 2x 500 mA and 1x 100 mA simultaneously
Number of SD card slots	1
Video interfaces	
• Graphics interface	1x DVI-I
1. Interface	
Interface type	PROFINET
automatic detection of transmission rate	Yes

Autonegotiation	Yes
Autocrossing	Yes
Number of connections	88
Interface types	
<ul style="list-style-type: none"> ● RJ 45 (Ethernet) <ul style="list-style-type: none"> — Transmission rate, max. 100 Mbit/s — Industrial Ethernet status LED Yes ● Number of ports 2 ● integrated switch Yes ● BusAdapter (PROFINET) Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC 	
Protocols	
<ul style="list-style-type: none"> ● PROFINET IO Controller Yes ● PROFINET IO Device Yes ● SIMATIC communication Yes ● Open IE communication Yes ● Web server Yes 	
PROFINET IO Controller	
Services	
<ul style="list-style-type: none"> — Isochronous mode Yes — shortest clock pulse 500 µs — IRT Yes — Prioritized startup Yes; Max. 32 PROFINET devices — Number of connectable IO Devices, max. 128 — Of which IO devices with IRT, max. 64 — of which in line, max. 64 — Number of connectable IO Devices for RT, max. 128 — of which in line, max. 128 — Number of IO Devices that can be simultaneously activated/deactivated, max. 8 — IO Devices changing during operation (partner ports), supported Yes — Number of IO Devices per tool, max. 8 — Updating times The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data 	
Update time for IRT	
<ul style="list-style-type: none"> — for send cycle of 500 µs 500 µs to 8 ms — for send cycle of 1 ms 1 ms to 16 ms — for send cycle of 2 ms 2 ms to 32 ms — for send cycle of 4 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 for RT	
<ul style="list-style-type: none"> — for send cycle of 500 µs 500 µs to 256 ms — for send cycle of 1 ms 1 ms to 512 ms — for send cycle of 2 ms 2 ms to 512 ms — for send cycle of 4 ms 4 ms to 512 ms 	
PROFINET IO Device	
Services	
<ul style="list-style-type: none"> — Isochronous mode No — IRT Yes — Prioritized startup Yes — Shared device Yes — Number of IO Controllers with shared device, max. 4 	
2. Interface	
Interface type	Integrated Ethernet interface
automatic detection of transmission rate	Yes
Autonegotiation	Yes

Autocrossing	Yes
Interface types	
<ul style="list-style-type: none"> ● RJ 45 (Ethernet) <ul style="list-style-type: none"> — Transmission rate, max. 1 000 Mbit/s — Industrial Ethernet status LED No ● Number of ports 1 	
3. Interface	
Interface type	PROFIBUS with CM DP
Number of connections via this interface	44
Interface types	
<ul style="list-style-type: none"> ● RS 485 Yes 	
Protocols	
<ul style="list-style-type: none"> ● PROFIBUS DP master Yes ● PROFIBUS DP slave Yes ● SIMATIC communication Yes 	
PROFIBUS DP master	
<ul style="list-style-type: none"> ● Number of DP slaves, max. 125 	
Services	
<ul style="list-style-type: none"> — Equidistance No — Isochronous mode No 	
Interface types	
RS 485	
<ul style="list-style-type: none"> ● Transmission rate, max. 12 Mbit/s 	
Protocols	
Number of connections	
<ul style="list-style-type: none"> ● Number of connections, max. 88 ● Number of connections reserved for ES/HMI/web 10 ● Number of S7 routing paths 16 	
Redundancy mode	
Media redundancy	
<ul style="list-style-type: none"> — MRP Yes — MRPD Yes — Switchover time on line break, typ. 200 ms — Number of stations in the ring, max. 50 	
SIMATIC communication	
<ul style="list-style-type: none"> ● PG/OP communication Yes ● S7 routing Yes ● S7 communication, as server Yes ● S7 communication, as client Yes ● User data per job, max. 64 kbyte 	
Open IE communication	
<ul style="list-style-type: none"> ● TCP/IP Yes <ul style="list-style-type: none"> — Data length, max. 64 kbyte ● ISO-on-TCP (RFC1006) Yes <ul style="list-style-type: none"> — Data length, max. 64 kbyte ● UDP Yes <ul style="list-style-type: none"> — Data length, max. 1 472 kbyte ● SNMP Yes ● DCP Yes ● LLDP Yes 	
Web server	
<ul style="list-style-type: none"> ● HTTP Yes; Via Windows and PROFINET interface ● HTTPS Yes; Only via PROFINET interface 	
OPC UA	
<ul style="list-style-type: none"> ● OPC UA Server <ul style="list-style-type: none"> — Application authentication Data access (read, write, subscribe), runtime license required — Security policies Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 	

— User authentication	Basic256Sha256 "anonymous" or by user name & password
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	10 000
Number of simultaneously active program alarms	
• Number of program alarms	1 000
• Number of alarms for system diagnostics	200
• Number of alarms for motion technology objects	160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering systems
Status block	Yes; up to 8 simultaneously
Single step	No
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• Number of variables, max.	
— of which status variables, max.	200
— of which control variables, max.	200
Forcing	
• Forcing	Yes
• Forcing, variables	Inputs, outputs
• Number of variables, max.	200
Diagnostic buffer	
• present	Yes
• Number of entries, max.	1 000
— of which powerfail-proof	300
Traces	
• Number of configurable Traces	4
• Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
Supported technology objects	
Motion Control	Yes
• Number of available Motion Control resources for technology objects	2 400
• Required Motion Control resources	
— per speed-controlled axis	40; per axis
— per positioning axis	80; per axis
— per synchronous axis	160; per axis
— per external encoder	80; per external encoder
— per output cam	20; per cam
— per cam track	160; per cam track
— per probe	40; per probe
• Positioning axis	
— Number of positioning axes at motion control cycle of 4 ms (typical value)	5
— Number of positioning axes at motion control cycle of 8 ms (typical value)	12
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves

<ul style="list-style-type: none"> • PID-Temp 	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
<ul style="list-style-type: none"> • High-speed counter 	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
Highest safety class achievable in safety mode	
<ul style="list-style-type: none"> • 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 1/h
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • min. • max. 	0 °C Up to 60 °C with max. 32 ET 200SP modules and 3x 100 mA USB load; up to 55 °C with max. 64 ET 200SP modules and 2x max. 500 mA and 1x max. 100 mA USB load
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. 	0 °C 60 °C 0 °C 50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load
Ambient temperature during storage/transportation	
<ul style="list-style-type: none"> • min. • max. 	-40 °C 70 °C
Vibrations	
<ul style="list-style-type: none"> • Operation, tested according to IEC 60068-2-6 • Transport, tested acc. to IEC 60068-2-6 	Yes Yes
Shock testing	
<ul style="list-style-type: none"> • tested according to IEC 60068-2-6 • tested according to IEC 60068-2-27 • tested according to IEC 60068-2-29 • Storage/transport, tested acc. to IEC 60068-2-27 	Yes Yes Yes Yes
Operating systems	
pre-installed operating system	Windows Embedded Standard 7 E 32-bit
Configuration	
Programming	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— CFC	No
— GRAPH	Yes
Know-how protection	
<ul style="list-style-type: none"> • User program protection/password protection • Copy protection • Block protection 	Yes Yes Yes
Access protection	
<ul style="list-style-type: none"> • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection 	Yes Yes Yes
Cycle time monitoring	
<ul style="list-style-type: none"> • lower limit 	adjustable minimum cycle time

• upper limit	adjustable maximum cycle time
Open Development interfaces	
• Size of ODK SO file, max.	3.8 Mbyte
Peripherals/Options	
SD card	Optionally for additional mass storage
Dimensions	
Width	160 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	0.83 kg
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