SIEMENS

Data sheet

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SIMATIC ET 200SP Open Controllers, CPU 1515SP PC F. 4 GB RAM, 30 GB CFAST with WES 7 P 64 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	FS02
Firmware version	V2.1
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	V14 SP1
Installed software	
 Visualization 	No
Control	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	
 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	
integrated (for program)	1.5 Mbyte
integrated (for data)	5 Mbyte
 integrated (for CPU function library of CPU 	10 Mbyte
Runtime)	
Load memory	
integrated (on PC mass storage)	320 Mbyte
Backup	
• with UPS	Yes; all memory areas declared retentive
 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	
	0.000 18% 1.11 1.15 1.50 1.50 1.50 1.50
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	Constants, etc. are also regarded as elements
	5 000: Number range: 1 to 65525
Number, max. Size may.	5 999; Number range: 1 to 65535
• Size, max.	5 Mbyte
FB	
Number, max.	5 998; Number range: 1 to 65535
• Size, max.	512 kbyte
FC	
Number, max.	5 999; Number range: 1 to 65535
• Size, max.	512 kbyte
OB	
Size, max.	512 kbyte
 Number of free cycle OBs 	100
 Number of time alarm OBs 	20
 Number of delay alarm OBs 	20
Number of cyclic interrupt OBs	20
Number of process alarm OBs	50
Number of DPV1 alarm OBs	3
Number of isochronous mode OBs	1
Number of isocinionous mode CBs Number of technology synchronous alarm OBs	2
	100
Number of startup OBs	
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	, (o) miniou of all monorfy
— adjustable	Yes
·	163
S7 times	2.040
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.	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

Autonegotiation	Yes
Autocrossing	Yes
Number of connections	88
Interface types	
RJ 45 (Ethernet)	Yes; Via BusAdapter BA 2x RJ45
 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	
 PROFINET IO Controller 	Yes
 PROFINET IO Device 	Yes
 SIMATIC communication 	Yes
Open IE communication	Yes
Web server	Yes
PROFINET IO Controller	
Services	
— 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	
— 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 μ s: 375 μ s, 625 μ s 3 875 μ s)
Update time for RT	
— 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	
— Isochronous mode	No
— IRT	Yes
 Prioritized startup 	Yes
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
2. Interface	
	Integrated Ethernet interface
Interface type automatic detection of transmission rate	Integrated Ethernet interface Yes

Autocrossing	Yes
Interface types	100
• RJ 45 (Ethernet)	Yes; Integrated
— Transmission rate, max.	1 000 Mbit/s
— Industrial Ethernet status LED	No
	1
Number of ports	
3. Interface	PROFINIO W OM PR
Interface type	PROFIBUS with CM DP
Number of connections via this interface	44
Interface types	
• RS 485	Yes
Protocols	
PROFIBUS DP master	Yes
 PROFIBUS DP slave 	Yes
SIMATIC communication	Yes
PROFIBUS DP master	
Number of DP slaves, max.	125
Services	
— Equidistance	No
 Isochronous mode 	No
Interface types	
RS 485	
Transmission rate, max.	12 Mbit/s
Protocols	
Number of connections	
Number of connections, max.	88
Number of connections reserved for ES/HMI/web	10
Number of S7 routing paths	16
Redundancy mode	10
Media redundancy	
— MRP	Yes
— MRPD	Yes
Switchover time on line break, typ.	200 ms
	50
— Number of stations in the ring, max.	50
SIMATIC communication	Von
PG/OP communication S7 souting	Yes
• S7 routing	Yes
S7 communication, as server	Yes
S7 communication, as client	Yes
User data per job, max.	64 kbyte
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
Data length, max.	1 472 kbyte
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Via Windows and PROFINET interface
• HTTPS	Yes; Only via PROFINET interface
OPC UA	
OPC UA Client	No
OPC UA Server	Yes; Data access (read, write, subscribe), runtime license required
Application authentication	Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15,
P.P	Basic256Sha256

Further protocols • MODBUS • MODBUS **Treassage functions **Number of login stations for message functions, max.** **Number of login stations for messages, max.** **Number of simultaneously active program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects **Test commissioning functions* Joint commission (Team Engineering) Status blook **Status Stook **Status Stook **Status Stook • Variables • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. — of which powerfail-groof • Forcing, • Forcing, • Forcing, variables, max. — of which powerfail-groof **Number of entries, max. — of which powerfail-groof **Number of configurable Traces • Number of configurable Traces • Number of configurable Notion Control resources for technology objects **Number of variables Motion Control resources for technology objects **Number of variables Motion Control resources for technology objects **Memory size per trace, max. — of which powerfail-groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which powerfail groof **Pes • Number of variables, max. — of which grow have the wave power po	— Security policies	Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
MODBUS **MODBUS** **Tracessage functions** **Number of login stations for message functions, max.** **Program alarms** **Number of login stations for messages, max.** **Number of login stations for messages, max.** **Number of oringurable program messages, max.** **Number of alarms for system diagnostics and incomplete of alarms for system diagnostics and incomplete of alarms for system diagnostics and incomplete original materials.** **Joint commission (Team Engineering)** **Joint commission (Team Engineering	— User authentication	Yes; "anonymous" or by user name & password
Number of login stations for message functions, max. Number of login stations for message, max. Number of configurable program messages, max. Number of configurable program messages, max. Number of program alarms Number of program alarms Number of program alarms Number of alarms for motion technology objects Test commission (Team Engineering) Joint commission (Team Engineering) Yes; Parallel online access possible for up to 8 engineering systems Status shock Yes; up to 8 simultaneously No Status/control variable Variables Number of variables, max. — of which status variables, max. — of which control variables, max. — of which control variables, max. — of which control variables, max. — Forcing Percing, variables Number of variables, max. — of which powerfall-proof Number of configurable Traces Number of configurable Traces Number of configurable Traces Number of variables nex. — of which powerfall-proof Traces Number of variables of configurable Traces Number of variables of variable	Further protocols	
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Joint commission (Team Engineering) Status blook Yes; up to 8 simultaneously Single step No Status/control Status/control variable Ves Number of variables, max. Of which status variables, max. Of which control variables, max. Of which control variables, max. Of which status variables, max. Of which control variables, max. Percing Forcing Forcing, variables Number of variables, max. 200 Forcing Forcing, variables Number of variables, max. 200 Diagnostic buffer Of which powerfail-proof Traces Number of configurable Traces Nemory size per trace, max. 512 kbyte Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED	 Number of alarms for motion technology objects 	160
Status block Single step No Status/control Status/control variable Variables Number of variables, max. Of which control variables, max. Of which powerfalles, max. Of which powerfalles Number of variables, max. Of which powerfalles, max. Of wes Number of configurable Traces Number of configurable Traces Of which powerfalles, max. Of wes Of which powerfalles, max. Of wes Of which powerfalles, max. Of wes Of w	Test commissioning functions	
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ERROR LED MAINT LED Yes Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources Per speed-controlled axis Per positioning axis Per synchronous axis Per external encoder Per output cam Per cam track Per probe Positioning axis Positioning axis Positioning axis Main Yes Yes 2 400 40; per axis 40; per axis 80; per axis 160; per axis 160; per cam 160; per cam 160; per cam track 40; per probe 40; per probe		Yes
■ MAINT LED Supported technology objects Motion Control ■ Number of available Motion Control resources for technology objects ■ Required Motion Control resources □ per speed-controlled axis □ per positioning axis □ per synchronous axis □ per synchronous axis □ per external encoder □ per output cam □ per cam track □ per probe ■ Positioning axis		
Supported technology objects Motion Control ● Number of available Motion Control resources for technology objects ● Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe ● Positioning axis Yes 2 400 40; per axis 80; per axis 80; per axis 160; per axis 160; per cam 160; per cam 160; per cam track 40; per probe		
Motion Control ■ Number of available Motion Control resources for technology objects ■ Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe ■ Positioning axis Yes 2 400 40; per axis 40; per axis 40; per axis 40; per axis 80; per axis 160; per cam 20; per cam 160; per cam 160; per cam track 40; per probe		
 Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis 2 400 40; per axis 80; per axis 80; per axis 90; per cam 160; per cam 160; per cam track 40; per probe 		Voc
technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis Positioning axis 40; per axis 80; per axis 80; per axis 20; per cam 160; per cam 40; per cam track 40; per probe		
 Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis 40; per axis 80; per axis 80; per external encoder 20; per cam 160; per cam track 40; per probe 40; per probe		£ 100
 per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam per cam track per probe Positioning axis 40; per axis 80; per axis 80; per external encoder 20; per cam 160; per cam track 40; per probe 		
 per positioning axis per synchronous axis per external encoder per output cam per cam track per probe Positioning axis 80; per axis 80; per external encoder 20; per cam 160; per cam track 40; per probe Positioning axis 	•	40; per axis
 per synchronous axis per external encoder per output cam per cam per cam track per probe Positioning axis 		
 — per external encoder — per output cam — per cam track — per probe Positioning axis 80; per external encoder 20; per cam 40; per cam track 40; per probe 		
 — per output cam — per cam track — per probe ◆ Positioning axis 20; per cam 40; per cam track 40; per probe 		
 — per cam track — per probe ◆ Positioning axis 160; per cam track 40; per probe 		
— per probe◆ Positioning axis	·	
Positioning axis	·	
		· , p · · · p · · · · ·
— Number of positioning axes at motion control 5	Number of positioning axes at motion control	5
cycle of 4 ms (typical value)		
Number of positioning axes at motion control		12
cycle of 8 ms (typical value)		
Controller	Controller	
PID_Compact Yes; Universal PID controller with integrated optimization	PID_Compact	Yes; Universal PID controller with integrated optimization
PID_3Step Yes; PID controller with integrated optimization for valves	PID_3Step	Yes; PID controller with integrated optimization for valves

PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	· ·
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	
 Performance level according to ISO 13849-1 	PLe
SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair	ir 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	
• min.	0 °C
• max.	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
 horizontal installation, min. 	0 °C
 horizontal installation, max. 	60 °C
 vertical installation, min. 	0 °C
vertical installation, max.	50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Vibrations	v
Operation, tested according to IEC 60068-2-6 The standard of IEC 60068-2-6 The standar	Yes
Transport, tested acc. to IEC 60068-2-6 Shock testing	Yes
	Yes
tested according to IEC 60068-2-6 tested according to IEC 60068-2-37	Yes
tested according to IEC 60068-2-27 tested according to IEC 60068-2-20	Yes
 tested according to IEC 60068-2-29 Storage/transport, tested acc. to IEC 60068-2-27 	Yes
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Operating systems	Windows England Chandard 7 D C4 hit
pre-installed operating system	Windows Embedded Standard 7 P 64-bit
Configuration	
Programming Programming Income	
Programming language	Veg incl faileafa
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— CFC — GRAPH	No Yes
Know-how protection	160
User program protection/password protection	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
Protection level: Write protection	Yes
Protection level: Read/write protection	Yes
Protection level: Read/write protection Protection level: Complete protection	Yes
Cycle time monitoring	
• 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