SIEMENS

SIMATIC DP, CPU 1510SP-1 PN FOR ET 200SP, CENTRAL
PROCESSING UNIT WITH WORKING MEMORY 100 KB FOR
PROGRAM AND 750 KB FOR DATA, 1. INTERFACE, PROFINET
IRT WITH 3 PORT SWITCH, 72 NS BIT-PERFORMANCE, SIMATIC
MEMORY CARD NECESSARY

Product type designation	
General information	
Engineering with	
Configuration control	
for dataset	Yes
Display	
Backlighting	
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 buffering time	5 ms
Input current	
Current consumption (rated value)	0.6 A
Inrush current, max.	4.7 A; Rated value
I²t	0.14 A²·s
Power	
Infeed power to the backplane bus	8.75 W

Power losses	
Power loss, typ.	5.6 W

Memory	
Number of slots for SIMATIC memory card	1
SIMATIC Memory Card required	Yes
Work memory	
• integrated (for program)	100 kbyte
• integrated (for data)	750 kbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes

CPU processing times	
for bit operations, typ.	72 ns
for word operations, typ.	86 ns
for fixed point arithmetic, typ.	115 ns
for floating point arithmetic, typ.	461 ns

CPU-blocks	
Number of blocks (total)	2 000
number of elements (total)	2 000
DB	
• Number, max.	2 000; Number range: 1 to 65535
• Size, max.	750 kbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
• Number, max.	1 998; Number range: 1 to 65535
• Size, max.	100 kbyte
FC	
• Number, max.	1 999; Number range: 1 to 65535
• Size, max.	100 kbyte
OB	
• Size, max.	100 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of time interrupt OBs	20
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number isochronous mode OBs	1
• Number of technology synchronous alarm OBs	2
• 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

Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	
— can be set	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	
— can be set	Yes
S7 times	
• Number	2 048
Retentivity	
— can be set	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
— can be set	Yes

Data areas and their retentivity	
retentive data area in total (incl. times, counters, flags), max.	128 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB
Flag	
• Number, max.	16 kbyte
• Number of clock memories	8
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	1 024; 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)	8 kbyte
— Outputs (volume)	8 kbyte

per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Process image	
Subprocess images	
• Number of subprocess images, max.	32
Digital channels	
Analog channels	

Hardware configuration

Number of IO subsystems	20
Number of DP masters	
• via CM	1
Number of IO Controllers	
• Integrated	1
• via CM	0
Rack	
• Modules per rack, max.	64; CPU + 64 modules + server module (mounting width max. 1 m)
• Rack, number of rows, 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
• Deviation per day, max.	10 s; Typ.: 2 s
• Backup time	6 wk; At 40 °C ambient temperature, typically
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes; Via CM DP module
• to DP, slave	Yes; Via CM DP module
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes

Interfaces

Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1; Via CM DP module
1. Interface	
Interface types	

— Number of ports	3
— Integrated switch	Yes
— RJ 45 (Ethernet)	Yes
Protocols	
— PROFINET IO Controller	Yes
— PROFINET IO Device	Yes
— SIMATIC communication	Yes
— Open IE communication	Yes
— Web server	Yes
— Media redundancy	Yes
2nd interface	
Interface types	
— Number of ports	1
— RS 485	Yes; Via CM DP module
Protocols	
— SIMATIC communication	Yes
— PROFIBUS DP master	Yes
— PROFIBUS DP slave	Yes
3rd interface	
Interface types	
Protocols	
4th interface	
Interface types	
Protocols	
5. Interface	
Interface types	
Protocols	
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s
Protocols	
Number of connections	
• Number of connections, max.	64
• Number of connections reserved for ES/HMI/web	10

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• Number of connections via integrated interfaces	64
• Number of S7 routing paths	16
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
— PROFIenergy	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO devices, max.	64; In total, up to 189 distributed I/O devices can be connected via PROFIBUS or PROFINET
— of which IO Devices with IRT and the option "high performance", max.	64
— Max. number of connectable IO devices for RT	64
— of which in line, max.	64
— Maximum number of IO devices that can be activated/deactivated at the same time.	8
— Max. number of IO devices per tool	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
with RT	
— for send cycle of 250 µs	250 µs to 128 ms
— 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
for IRT with the "high performance" option	
— for send cycle of 250 µs	250 µs to 4 ms
— 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
— For IRT with the "high performance" option and parameter assignment for so-called "odd-numbered" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3.875 µs)
PROFINET IO Device	

Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT, supported	Yes
— MRP, supported	Yes
— PROFIenergy	Yes
— Shared device	Yes
— Number of IO controllers with shared device, max.	4

Submodules	

SIMATIC communication	
• S7 communication, as server	Yes
• S7 communication, as client	Yes
• User data per job, max.	See online help (S7 communication, user data size)

S7 basic communication	

Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
— several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes

Web server	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined pages

PROFIBUS DP master	
• Number of connections, max.	48

Further protocols	
• MODBUS	Yes; MODBUS TCP

Media redundancy	
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50

Isochronous mode	

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Isochronous operation (application synchronized up to terminal)	Yes

S7 message functions

Number of login stations for message functions, max.	32
Block related messages	Yes
Number of configurable alarms, max.	5 000
Number of simultaneously active alarms in alarm pool	
• Number of reserved user alarms	300
• Number of reserved alarms for system diagnostics	100
• Number of reserved alarms for motion technology objects	80

Test commissioning functions

Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 3 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• of which status variables, max.	200; per job
• of which control variables, max.	200; per job
Forcing	
• Forcing	Yes
• Force, variables	Inputs, outputs
• Number of variables, max.	200
Diagnostic buffer	
• present	Yes
• Number of entries, max.	1 000
— Of which powerfail-proof	500
Traces	
• Number of configurable Traces	4; Up to 512 KB of data per trace are possible

Interrupts/diagnostics/status information

Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Monitoring of the supply voltage (PWR-LED)	Yes
• Connection display LINK TX/RX	Yes

supported technology objects

Motion	Yes
• Speed-controlled axis	
— Number of speed-controlled axes, max.	6; Max. number of speed-controlled axes (requirement: there must be no other motion technology objects created)
• Positioning axis	
— Number of positioning axes, max.	6; Max. number of positioning axes (requirement: there must be no other motion technology objects created)
• Synchronized axes (relative gear synchronization)	
— Number of axes, max.	3; Max. number of synchronous axes (requirement: there must be no other motion technology objects created)
• External encoders	
— Number of external encoders, max.	6; Max. number of external encoders (requirement: there must be no other motion technology objects created)
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes
Counting and measuring	
• High-speed counter	Yes

Standards, approvals, certificates

Highest safety class achievable in safety mode	

Ambient conditions

Ambient temperature in operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Air pressure	
Relative humidity	
Vibrations	
Extended ambient conditions	
Relative humidity	
Resistance	

Configuration

programming	
Programming language	
— LAD	Yes
— FBD	Yes

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— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
• User program protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Cycle time monitoring	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time

Connection method	
ET-Connection	

Dimensions	
Width	100 mm
Height	117 mm
Depth	75 mm

Weights	
Weight, approx.	310 g
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