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, BUSADAPTER NECESSARY FOR PORT 1 AND 2

Product type designation	
General information	
HW functional status	FS04
Firmware version	V1.8
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V13 SP1 Update 4
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)	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 loss

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 elements (total)	2 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements
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.	750 kbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	100 kbyte
FC	
• Number range	0 ... 65 535
• Size, max.	100 kbyte
OB	
• Size, max.	100 kbyte

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• 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 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	
— adjustable	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	
— adjustable	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; es sind 8 Taktmerkerbits, zusammengefasst in einem Taktmerkerbyte
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
Subprocess images	
• Number of subprocess images, max.	32
Address space per module	
• Address space per module, max.	32 byte; For input and output data respectively
Address space per station	
• Address space per station, max.	1 280 byte; for central inputs and outputs; depending on configuration

Hardware configuration	
Number of hierarchical IO systems	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; 1. integr. + 2. via BusAdapter
— integrated switch	Yes
— RJ 45 (Ethernet)	Yes; X1
— Bus adapter (PROFINET)	Yes; Applicable BusAdapters: 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
— Media redundancy	Yes

2. 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

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
• 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 "high performance" option, max.	64
— Number of connectable IO Devices for RT, max.	64
— of which in line, max.	64
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8
— 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
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
With IRT	
— 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	Yes
— MRP	Yes
— PROFIenergy	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4

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)

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
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Data record routing	Yes
— Isochronous mode	No

— Equidistance	No
— Number of DP slaves	125
— Activation/deactivation of DP slaves	Yes
Further protocols	
● MODBUS	Yes; MODBUS TCP
Media redundancy	
● Switchover time on line break, typ.	200 ms
● Number of stations in the ring, max.	50
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Only with PROFINET; with minimum OB 6x cycle of 625 μs
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, DBs, distributed I/Os, timers, counters
● Number of variables, max.	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
● Forcing	Yes
● Forcing, variables	Peripheral inputs/outputs
● Number of variables, max.	200
Diagnostic buffer	
● present	Yes
● Number of entries, max.	1 000
— of which powerfail-proof	500

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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; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Positioning axis	
— Number of positioning axes, max.	6; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Synchronized axes (relative gear synchronization)	
— Number of axes, max.	3; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• External encoders	
— Number of external encoders, max.	6; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• 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

Ambient conditions

Ambient temperature during operation

• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	0 °C
• vertical installation, max.	50 °C

Ambient temperature during storage/transportation

• min.	-40 °C

• max.	70 °C	

Configuration

Programming

Programming language

— LAD	Yes	
— FBD	Yes	
— 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	

Dimensions

Width	100 mm	
Height	117 mm	
Depth	75 mm	

Weights

Weight, approx.	310 g	

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