



SIMATIC DP, CPU 1512SP F-1 PN FOR ET 200SP, CENTRAL PROCESSING UNIT WITH WORKING MEMORY 300 KB FOR PROGRAM AND 1 MB FOR DATA, 1. INTERFACE: PROFINET IRT WITH 3 PORT SWITCH, 48 NS BIT-PERFORMANCE, SIMATIC MEMORY CARD NECESSARY, BUSADAPTER NECESSARY FOR PORT 1 AND 2

General information	
Product type designation	CPU 1512SP F-1 PN
HW functional status	FS01
Firmware version	V1.8
Engineering with	
<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> 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
I ² t	0.14 A ² ·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	
<ul style="list-style-type: none"> integrated (for program) 	300 kbyte
<ul style="list-style-type: none"> integrated (for data) 	1 Mbyte

Load memory	
<ul style="list-style-type: none"> Plug-in (SIMATIC Memory Card), max. 	32 Gbyte

Backup	
<ul style="list-style-type: none"> maintenance-free 	Yes

CPU processing times	
for bit operations, typ.	48 ns
for word operations, typ.	58 ns
for fixed point arithmetic, typ.	77 ns
for floating point arithmetic, typ.	307 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	
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> Size, max. 	1 Mbyte; For DBs with absolute addressing, the max. size is 64 KB

FB	
<ul style="list-style-type: none"> Number range 	0 ... 65 535
<ul style="list-style-type: none"> Size, max. 	300 kbyte

FC	
<ul style="list-style-type: none"> Number range 	0 ... 65 535
<ul style="list-style-type: none"> Size, max. 	300 kbyte

OB	
<ul style="list-style-type: none"> Size, max. 	300 kbyte
<ul style="list-style-type: none"> 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; Up to 8 possible for F-blocks
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Counters, timers and their retentivity

S7 counter

• Number	2 048
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Retentivity

— adjustable	Yes
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IEC counter

• Number	Any (only limited by the main memory)
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Retentivity

— adjustable	Yes
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S7 times

• Number	2 048
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Retentivity

— adjustable	Yes
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IEC timer

• Number	Any (only limited by the main memory)
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Retentivity

— adjustable	Yes
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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
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Flag

• Number, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bits, 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
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Address area	
Number of IO modules	2 048; 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 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
• 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
• to DP, master	Yes; Via CM DP module
• to DP, slave	Yes; Via CM DP module

- in AS, master
- in AS, slave
- on Ethernet via NTP

Yes
Yes
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
Functionality	
• 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
Functionality	
• 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.	88
• Number of connections reserved for ES/HMI/web	10

• Number of connections via integrated interfaces	88
• 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
— PROFINergy	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	128; In total, up to 253 distributed I/O devices can be connected via PROFIBUS or PROFINET
— Of which IO devices with IRT, 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
— 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 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
— 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	
— 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
PROFINET IO Device	
Services	
— PG/OP communication	Yes

— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT	Yes
— MRP	Yes
— PROFINergy	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, DB, times, 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 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
- Monitoring of the supply voltage (PWR-LED)
- Connection display LINK TX/RX

Yes
Yes
Yes

Supported technology objects

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; incl. failsafe
— FBD	Yes; incl. failsafe
— 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
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Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	310 g
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