SIEMENS

Data sheet

6ES7510-1SK03-0AB0



SIMATIC DP, CPU 1510SP F-1 PN for ET 200SP, central processing unit with 300 KB work memory for program and 1 MB for data, 1st interface: PROFINET IRT with 3-port switch, 6 ns bit performance, SIMATIC Memory Card required, BusAdapter required for port 1 and 2

Figure similar

General information	
Product type designation	CPU 1510SP F-1 PN
HW functional status	FS04
Firmware version	V4.0
FW update possible	Yes
Product function	
	Yes; I&M0 to I&M3
 Module swapping during operation (hot swapping) 	Yes; Multi-hot swapping
 Isochronous mode 	Yes; only with PROFINET; with minimum OB 6x cycle of 500 µs
SysLog	Yes
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	V20 (FW V4.0) / V18 (FW V3.0) or higher; configurable with older TIA Portal versions as 6ES7510-1SJ01-0AB0
Configuration control	
via dataset	Yes
Control elements	
Mode selector switch	1
Supply voltage	
Rated value (DC)	24 V
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 	10 ms
Input current	
Current consumption (rated value)	0.48 A
Current consumption, max.	0.7 A
Inrush current, max.	1.34 A; Rated value
l²t	0.3 A ² ·s
Power	
Infeed power to the backplane bus	8.05 W
Power loss	
Power loss, typ.	3.5 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	300 kbyte
integrated (for data)	1 Mbyte

Load memory	
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	6 ns
for word operations, typ.	7 ns
for fixed point arithmetic, typ.	9 ns
for floating point arithmetic, typ.	37 ns
CPU-blocks	
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
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.	1 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	300 kbyte
FC	
Number range	0 65 535
• Size, max.	300 kbyte
OB	
• Size, max.	300 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; With minimum OB 3x cycle of 250 μs
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
Counters, timers and their retentivity	24, op to o possible for r-blocks
S7 counter	2 048
Number Patentivity	2 040
Retentivity	V
— adjustable	Yes
IEC counter	April (april limited by the april
Number	Any (only limited by the main memory)
Retentivity	V
— adjustable	Yes
S7 times	
• 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.	256 kbyte; in total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 216 KB
Flag	
• Size, max.	16 kbyte
Size, max.Number of clock memories	16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte

Retentivity adjustable	Yes
Retentivity adjustable Retentivity propert	No
Retentivity preset Local data	140
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	04 kbyte, max. 10 kb per block
Number of IO modules	2 048; max. number of modules / submodules
I/O address area	2 040, max. number of modules / submodules
• 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.	288 byte; For input and output data respectively
Address space per station	
 Address space per station, max. 	2 560 byte; for central inputs and outputs; depending on configuration; 2 048
Hardware configuration	bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Hardware configuration	20: A distributed I/O system is absentaglised and sub-the list sensitive.
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also
	by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
• Via CM	1
Number of IO Controllers	
• integrated	1
• Via CM	0
Rack	OO ODIL OA madulas Lagrana madula (assumbas viiith assu Aur.) LACET
 Modules per rack, max. 	82; CPU + 64 modules + server module (mounting width max. 1 m) + 16 ET 200AL modules
 Quantity of operable ET 200SP modules, max. 	64
Quantity of operable ET 200AL modules, max.	16
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
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
• on DP, device	Yes; Via CM DP module
• in AS, master	Yes
• in AS, device	Yes
on Ethernet via NTP Interfaces	Yes
Interfaces	4
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1; Via CM DP module
Optical interface	Yes; Via SIMATIC BusAdapter
1. Interface	
Interface types	Very VA DOS and VA DA and VA DOS A DE A LEE DA DE DE
RJ 45 (Ethernet) Number of parts	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45
Number of ports	3; 1. integr. + 2. via BusAdapter

integrated switch	Yes
BusAdapter (PROFINET)	Yes; compatible BusAdapters: BA 2x RJ45, BA 2x M12, BA 2x FC, BA 2x LC, BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC
Protocols	Break is, Break s, Break solve, Break is is, Break in S
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
Media redundancy	Yes
PROFINET IO Controller	
Services	
— Isochronous mode	Yes
Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
Prioritized startup	Yes; Max. 32 PROFINET devices
Number of connectable IO Devices, max.	128; In total, up to 512 distributed I/O devices can be connected via AS-i, 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; in total across all interfaces
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
— PROFINET Security Class	1
Update time for IRT	
— for send cycle of 250 μs	$250~\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 μs of the isochronous OB is decisive
— 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 $\mu s:375~\mu s,625~\mu s3875~\mu s)$
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	
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
 activation/deactivation of I-devices 	Yes; per user program
 Asset management record 	Yes; per user program
— PROFINET Security Class	SNMP Configuration and DCP Read Only
2. Interface	
Interface types	
• RS 485	Yes; Via CM DP module
Number of ports	1
Protocols	
PROFIBUS DP master	Yes
PROFIBUS DP device	Yes

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		No
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Redundancy mode # H-Sync forwarding Media redundancy — Media redundancy — MRP MRP MRP (Lient — MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager MRP Client — MRP Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 SIMATIC communication PG/OP communication PG/OP communication 9 PG/OP communication 9 PG or Sor communication 9 ST communication, as server 9 ST communication, as client 9 User data per job, max. Den IE communication 1 TCPIP — Data length, max. 9 Data length, max. 9 Liso-on-TCP (RFC1006) — Data length, max. 9 UDP — Data length, max. 9 UDP Wes 9 DNS 9 SNMP 9 CP 9 DNS 9 SNMP 9 CP 9 DNS 9 SNMP 9 CP 9 LIDP 1 Pes Encryption Ves Optional PG/OP communication Yes Yes PS SNMIP Yes PS PS PS PS PS PS PS PS PS P	· ·	
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- Switchover time on line break, typ Number of stations in the ring, max. 50 SIMATIC communication • PG/OP communication • Yes; encryption with TLS V1.3 pre-selected • S7 routing • Data record routing • S7 communication, as server • S7 communication, as client • S7 communication, as client • S7 communication, as client • User data per job, max. See online help (S7 communication, user data size) Open IE communication • TCP/IP - Data length, max several passive connections per port, supported • ISO-on-TCP (RFC1006) - Data length, max. • UDP - Data length, max UDP multicast • DHCP • DNS • SNMP • DCP • LLDP • Encryption Web server	• • • • • • • • • • • • • • • • • • • •	
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 Data length, max. UDP multicast PHCP DNS SNMP DCP Yes DCP Yes LLDP Encryption Web server 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 78 multicast circuits Yes Yes Yes Yes Encryption Yes Yes Optional Web server	— Data length, max.	64 kbyte
 UDP multicast DHCP DNS SNMP DCP LLDP Encryption Yes; max. 78 multicast circuits Yes Yes Yes Yes Yes Optional Web server	-	
 UDP multicast DHCP DNS SNMP DCP LLDP Encryption Yes; max. 78 multicast circuits Yes Yes Yes Yes Yes Optional Web server	— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
 DNS SNMP DCP LLDP Encryption Web server Yes Yes Yes; Optional	-	
● SNMP Yes ● DCP Yes ● LLDP Yes ● Encryption Yes; Optional Web server Web server	• DHCP	Yes
● SNMP Yes ● DCP Yes ● LLDP Yes ● Encryption Yes; Optional Web server Yes	• DNS	Yes
LLDP YesEncryption Yes; OptionalWeb server	• SNMP	Yes
LLDP YesEncryption Yes; OptionalWeb server	• DCP	Yes
• Encryption Yes; Optional Web server		
Web server		
		Yes; Standard and user pages
HTTPS Yes; Standard and user pages		
• web API		
— Number of sessions, max. 50		50

 number of simultaneous HTTP calls, max. 	4
— HTTP request body, max.	131 072 byte
OPC UA	,
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
User authentication	"anonymous" or by user name & password
 Number of connections, max. 	4
 Number of nodes of the client interfaces, recommended max. 	1 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max. 	300
 Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max. 	20
— Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
 Number of simultaneous calls of the client instructions for session management, per connection, max. 	1
 Number of simultaneous calls of the client instructions for data access, per connection, max. 	5
 Number of registerable nodes, max. 	5 000
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC UA Server	Yes; data access (read, write, subscribe), method call, alarms & condition (A&C), custom address space, role-based access control
 Application authentication 	Yes
— Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
User authentication	"anonymous" or by user name & password
GDS support (certificate management)	Yes
Number of sessions, max.	32
Number of accessible variables, max.	50 000
Number of registerable nodes, max.	10 000
Number of subscriptions per session, max.	50
— Sampling interval, min.	100 ms
— Publishing interval, min.	200 ms
Number of server methods, max.	20; max. 20 concurrently running jobs each for asynchronous instructions OPC_UA_ServerMethodPre and OPC_UA_ServerMethodPost
 Number of inputs/outputs per server method, max. Number of monitored items, recommended max. 	4 000; for 1 s sampling interval and 1 s send interval
Number of monitored items, recommended max. Number of server interfaces, max.	4 000; for 1 s sampling interval and 1 s send interval 10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"
 Number of nodes for user-defined server interfaces, max. 	15 000
Alarms and Conditions	Yes
— Number of program alarms	100
Number of alarms for system diagnostics	50
Further protocols	
MODBUS	Yes; MODBUS TCP
67 message functions	
Number of login stations for message functions, max.	32
number of subscriptions, max.	250
number of tags/attributes for subscriptions, max.	2 000
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
 Number of program alarms 	600
 Number of alarms for system diagnostics 	100

 Number of alarms for motion technology objects 	160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	Yes
Number of breakpoints	8
Profiling	Yes
Status/control	100
Status/control variable	Yes; without fail-safe
• Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times,
a Number of veriables, may	counters
Number of variables, max.— of which status variables, max.	200: par job
	200; per job
— of which control variables, max.	200; per job
Forcing	Voc. without fail cafe
• Forcing	Yes; without fail-safe
• Forcing, variables	peripheral inputs/outputs (without fail-safe)
Number of variables, max.	200
Diagnostic buffer	Ver
• present	Yes
Number of entries, max.	1 000
— of which powerfail-proof	500
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
 Monitoring of the supply voltage (PWR-LED) 	Yes
Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Number of available Motion Control resources for	1 120
technology objects	1 120
Required Motion Control resources	
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
Positioning axis	
Number of positioning axes at motion control cycle of 4 ms (typical value)	11
Number of positioning axes at motion control cycle of 8 ms (typical value)	14
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	. 55, . 75 controllor mar integration optimization for temperature
High-speed counter	Yes
Standards, approvals, certificates	1.00
Ecological footprint	
· · · · · · · · · · · · · · · · · · ·	Voc
environmental product declaration Clobal warming potential	Yes
Global warming potential (total) (CO2 ag	92.2 kg
— global warming potential, (total) [CO2 eq]	83.2 kg
 global warming potential, (during production) [CO2 	22.3 kg

,			
eq] — global warming potential, (during operation) [CO2	61.9 kg		
eq]	61.8 kg		
— global warming potential, (after end of life cycle)[CO2 eq]	-0.949 kg		
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 time	e 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		
product functions / security / header			
PROFINET Security Class	1		
signed firmware update	Yes		
Secure Boot	Yes		
safely removing data	Yes		
Ambient conditions			
Ambient temperature during operation			
horizontal installation, min.	-30 °C; No condensation		
• horizontal installation, max.	60 °C		
 vertical installation, min. 	-30 °C; No condensation		
 vertical installation, max. 	50 °C		
Altitude during operation relating to sea level			
Installation altitude above sea level, max.	5 000 m; Restrictions for installati	ion altitudes > 2 000 m	. see manual
configuration / header	, , , , , , , , , , , , , , , , , , , ,		,
configuration / programming / header			
Programming language			
— LAD	Yes; incl. failsafe		
— FBD			
	Yes; incl. failsafe		
— STL	Yes		
— SCL	Yes		
— CFC	No		
— GRAPH	Yes		
Know-how protection			
 User program protection/password protection 	Yes		
 Copy protection 	Yes		
Block protection	Yes		
Access protection			
 protection of confidential configuration data 	Yes		
 Protection level: Write protection 	Yes		
 Protection level: Read/write protection 	Yes		
 Protection level: Write protection for Failsafe 	Yes		
 Protection level: Complete protection 	Yes		
 User administration 	Yes; device-wide and centralized		
Number of users	100		
Number of groups	100		
Number of roles	50		
programming / cycle time monitoring / header			
• lower limit	adjustable minimum cycle time		
• upper limit	adjustable maximum cycle time		
Dimensions			
Width	100 mm		
Height	117 mm		
Depth	75 mm		
Weights	70111111		
	265 a		
Weight, approx.	265 g		
Classifications			
		Version	Classification
	eClass	14	27-24-26-07

eClass	12	27-24-26-07
eClass	9.1	27-24-26-07
eClass	9	27-24-26-07
eClass	8	27-24-26-07
eClass	7.1	27-24-26-07
eClass	6	27-24-26-07
ETIM	9	EC001603
ETIM	8	EC001603
ETIM	7	EC001603
IDEA	4	3565
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval

Manufacturer Declara-<u>tion</u>







Miscellaneous



General Product Approval

For use in hazardous locations

<u>KC</u>





<u>FM</u>

CCC-Ex



For use in hazardous locations

Functional Saftey

Marine / Shipping



Miscellaneous

CCC-Ex



Type Examination Cer-tificate



Marine / Shipping







NK / Nippon Kaiji Ky-okai





Marine / Shipping

other

Environment

CCS (China Classification Society)





Profibus

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last modified:

12/8/2024

