6ES7510-1SJ01-0AB0

Data sheet



SIMATIC DP, CPU 1510SP F-1 PN for ET 200SP, Central processing unit with Work memory 150 KB for program and 750 KB for data, 1st interface: PROFINET IRT with 3-port switch, 72 ns bit performance, SIMATIC Memory Card required, BusAdapter required for Port 1 and 2

Product type designation CPU 1510SP F-1 PN HW functional status FS06 Firmware version V2.9 Product function • I&M data Yes; I&M0 to I&M3 • Module swapping during operation (hot swapping) • Isochronous mode Yes; Multi-hot swapping Yes; Only with PROFINET; with minimum OB 6x cycle of 625 µs Engineering with • STEP 7 TAI Portal configurable/integrated from version Configuration control via dataset Yes Control elements Mode selector switch 1 Supply voltage permissible range, lower limit (DC) 19.2 V permissible range, lower limit (DC) 28.8 V Reverse polarity protection Yes Mains buffering • Mains/voltage failure stored energy time Input current Current consumption (rated value) 0.6 A Current consumption (rated value) 0.9 A Inrush current, max. 0.9 A Inrush current, max. 4.7 A; Rated value Power Infeed power to the backplane bus 8.75 W Power Ioss, typ. 5.6 W Memory Number of slots for SIMATIC memory card 1 SIMM TIC memory card required Yes Work memory	General information	
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Inrush current, max. I²t O.14 A²-s Power Infeed power to the backplane bus Power loss Power loss, typ. Simaric memory Number of slots for SIMATIC memory card SIMATIC memory card required Work memory Yes	Current consumption (rated value)	0.6 A
Power Description Descri	Current consumption, max.	0.9 A
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Power loss, typ. 5.6 W Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes Work memory	Infeed power to the backplane bus	8.75 W
Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes Work memory	Power loss	
Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes Work memory	Power loss, typ.	5.6 W
Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes Work memory	Memory	
Work memory		1
Work memory	SIMATIC memory card required	Yes
• Integrated (for program) 150 kbyte	• integrated (for program)	150 kbyte
• integrated (for data) 750 kbyte	integrated (for data)	750 kbyte

Load momory	
Load memory	22 Chuto
Plug-in (SIMATIC Memory Card), max. Backup	32 Gbyte
maintenance-free	Yes
	165
CPU processing times	W0
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)	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.	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
ОВ	
• Size, max.	150 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 Failsafe, two RTGs with one "Cyclic interrupt OB" or one "Free
	cycle OB" (F-OB) each are possible
 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	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
Retentivity	, (July minute of the main monter)
— adjustable	Yes
Data areas and their retentivity	160
	120 khuto: Availahla rotartiva maman far hit
Retentive data area (incl. timers, counters, flags), max.	128 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB

E.	
Flag	16 khuta
Size, max. Number of clock magnetics.	16 kbyte
Number of clock memories Data blocks	8; 8 clock memory bit, grouped into one clock memory byte
Retentivity adjustable	Yes
Retentivity adjustable Retentivity preset	No
Local data	INO
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	of Royce, max. To ND per block
Number of IO modules	1.024; may number of modules / submodules
I/O address area	1 024; max. number of modules / submodules
	22 kbyto: All inpute are in the process image
• Inputs	32 kbyte; All inputs are in the process image
Outputs per integrated IO subsystem	32 kbyte; All outputs are in the process image
— Inputs (volume)	8 kbyte
— Outputs (volume) per CM/CP	8 kbyte
— Inputs (volume)	8 kbyte
— Outputs (volume) — Outputs (volume)	
— Outputs (volume) Subprocess images	8 kbyte
Number of subprocess images, max.	32
	JZ
Address space per module	288 byte: For input and output data respectively
Address space per module, max. Address space per station	288 byte; For input and output data respectively
·	2.560 byte: for control inputs and outputs: depending on configuration: 2
 Address space per station, max. 	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Hardware configuration	,
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration
names of distributed to eyetems	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	
Modules per rack, max.	80; 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
• 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
Optical interface	No
1. Interface	
Interface types	
• RJ 45 (Ethernet)	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 FC, BA 2x M12
Protocols	
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; MRP Automanager according to IEC 62439-2 Edition 2.0
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
 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.	64; In total, up to 256 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, 	64
max.	04
— of which in line, max.	64
 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
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 625 μs of the isochronous OB is decisive
— for send cycle of 500 μs	500 μs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive
— 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 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	Voc
— PG/OP communication	Yes
— Isochronous mode	No Voc
— IRT	Yes
— PROFlenergy	Yes; per user program

— Shared device	Yes
Number of IO Controllers with shared device,	4
max.	*
 activation/deactivation of I-devices 	Yes; per user program
 Asset management record 	Yes; per user program
2. Interface	71
Interface types	
• RS 485	Yes; Via CM DP module
 Number of ports 	1
Protocols	
PROFIBUS DP master	Yes
 PROFIBUS DP slave 	Yes
 SIMATIC communication 	Yes
PROFIBUS DP master	
 Number of connections, max. 	48; Of which 4 each reserved for ES and HMI
Number of DP slaves, max.	125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Services	
— PG/OP communication	Yes
— Equidistance	No
— Isochronous mode	No
 Activation/deactivation of DP slaves 	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	
Protocols Number of connections	
Protocols Number of connections • Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web	10
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces	10 64
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM	10 64 32
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths	10 64
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode	10 64 32 16
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding	10 64 32
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy	10 64 32 16 Yes
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy — Media redundancy	10 64 32 16 Yes Yes; only via BusAdapter
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy Media redundancy MRP	10 64 32 16 Yes Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP interconnection, supported	10 64 32 16 Yes Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP interconnection, supported MRPD	10 64 32 16 Yes: Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP interconnection, supported MRPD Switchover time on line break, typ.	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max.	10 64 32 16 Yes: Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy Media redundancy MRP SIMATIC communication	10 64 32 16 Yes Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication S7 routing	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication Trouting Data record routing	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication S7 routing Data record routing S7 communication, as server	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication S7 routing Data record routing S7 communication, as server S7 communication, as client	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes Yes
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication S7 routing Data record routing S7 communication, as server S7 communication, as client User data per job, max.	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication S7 routing Data record routing S7 communication, as server S7 communication, as client User data per job, max. Open IE communication	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes Yes Yes Yes See online help (S7 communication, user data size)
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP MRP Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication S7 routing Data record routing S7 communication, as server S7 communication, as client User data per job, max. Open IE communication TCP/IP	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes Yes See online help (S7 communication, user data size)
Protocols Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections per CP/CM Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication S7 routing Data record routing S7 communication, as server S7 communication, as client User data per job, max. Open IE communication	10 64 32 16 Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes Yes Yes Yes See online help (S7 communication, user data size)

• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	res, Optional
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	res, standard and assir pages
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes
Application authentication	Yes
Application authentication 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, max. 	1 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C 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 per connection (except OPC_UA_ReadList,OPC_UA_WriteList,OPC_UA_M max. 	1
Number of simultaneous calls of the client instructions OPC_UA_ReadList,OPC_UA_WriteList and OPC_UA_MethodCall_max	5
OPC_UA_MethodCall, max. — Number of registerable nodes, max.	5 000
Number of registerable modes, max. - Number of registerable method calls of	100
OPC_UA_MethodCall, max. — Number of inputs/outputs when calling	20
OPC_UA_MethodCall, max.	
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
Application authentication	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 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. 	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
 Number of server methods, max. 	20
 Number of inputs/outputs per server method, 	20
max.	
— Number of monitored items, max.— Number of server interfaces, max.	1 000; 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 interfered may	1 000
interfaces, max. • Alarms and Conditions	Yes
Number of program alarms	100
Number of program aranis Number of alarms for system diagnostics	50
Further protocols	30
MODBUS	Yes; MODBUS TCP
S7 message functions	163, MODBOO TOI
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm"
Number of comigurable program messages, max.	block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
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 	80
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	No
Number of breakpoints	8
Status/control	
Status/control variable	Yes; without fail-safe
 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; without fail-safe
 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
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 Control	Yes; Note: The number of technology objects affects the cycle time of
Number of available Motion Control resources for	the PLC program; selection guide via the TIA Selection Tool 800
technology objects	800
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) 	5
 Number of positioning axes at motion control cycle of 8 ms (typical value) 	10
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
PID-Temp Counting and accounting	Yes; PID controller with integrated optimization for temperature
Counting and measuring • High-speed counter	Yes
Standards, approvals, certificates	Tes
Highest safety class achievable in safety mode	2
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 repa	
 Low demand mode: PFDavg in accordance with SIL3 	< 2.00E-05
High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09
Ambient conditions	
Ambient temperature during operation	
 horizontal installation, min. 	-25 °C; No condensation
 horizontal installation, max. 	60 °C
 vertical installation, min. 	-25 °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 installation altitudes > 2 000 m, see manual
Configuration	
Programming	
Programming language	
Programming language	Voc. incl. failenfo
Programming language — LAD	Yes; incl. failsafe
Programming language — LAD — FBD	Yes; incl. failsafe
Programming language — LAD — FBD — STL	Yes; incl. failsafe Yes
Programming language — LAD — FBD — STL — SCL	Yes; incl. failsafe Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH	Yes; incl. failsafe Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection	Yes; incl. failsafe Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH	Yes; incl. failsafe Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection	Yes; incl. failsafe Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection	Yes; incl. failsafe Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection	Yes; incl. failsafe Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection	Yes; incl. failsafe Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Omplete protection	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Complete protection Cycle time monitoring	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection • Protection level: Complete protection Cycle time monitoring • lower limit	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection • Protection level: Complete protection Cycle time monitoring • lower limit • upper limit	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection Cycle time monitoring • lower limit • upper limit Dimensions Width	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection Cycle time monitoring • lower limit • upper limit Dimensions Width Height	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection Cycle time monitoring • lower limit • upper limit Dimensions Width Height Depth	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Complete protection Cycle time monitoring • lower limit • upper limit Dimensions Width Height Depth Weights	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection Cycle time monitoring • lower limit • upper limit Dimensions Width Height Depth	Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye