SIEMENS

Data sheet

6ES7510-1SK03-0AB0

SIMATIC DP, CPU 1510SP F-1 PN for ET 200SP, central processing unit with work memory 300 KB for program and 1 MB for data, 1st interface: PROFINET IRT with 3-port switch, 25 ns bit performance, SIMATIC Memory Card required, BusAdapter required for port 1 and 2 * *** approvals and certificates according to entry 109816889 at support.industry.siemens.com to be observed! ****

General information	
Product type designation	CPU 1510SP F-1 PN
HW functional status	FS01
Firmware version	V3.0
 FW update possible 	Yes
Product function	
● I&M data	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
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V18 (FW V3.0); with older TIA Portal versions configurable 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)	0.51 A
Current consumption, max.	0.7 A
Inrush current, max.	1.34 A; Rated value
2 [†]	0.3 A ² ·s
Power	
Infeed power to the backplane bus	8.05 W
Power loss	
Power loss, typ.	6.5 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.	25 ns
for word operations, typ.	32 ns
for fixed point arithmetic, typ.	42 ns
for floating point arithmetic, typ.	170 ns
CPU-blocks	

Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
DB	4 000, DIUCKS (OD, FD, FC, DD) AIIU UDIS
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 DDV4 slorm OBs	50
Number of DPV1 alarm OBs Number of incohrangua mode OBs	3
Number of isochronous mode OBs Number of technology synchronous glarm OBs	1 2
Number of technology synchronous alarm OBsNumber of startup OBs	100
Number of startup OBs Number of asynchronous error OBs	4
Number of asynchronous error OBs Number of synchronous error OBs	2
Number of synchronous error Obs Number of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	21, op to a possible for it blooks
S7 counter • Number	2 048
	2 040
Retentivity — adjustable	Yes
IEC counter	165
Number	Any (only limited by the main memory)
Retentivity	7 try (orly limited by the main memory)
— 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,
Flan	counters, DBs, and technology data (axes): 216 KB
Flag ● Size, max.	16 kbyte
Size, max.Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	o, o slock memory bit, grouped into one clock memory byte
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	2 0/48: may number of modules / submodules
I/O address area	2 048; max. number of modules / submodules
	32 khyte: All innuts are in the process image
InputsOutputs	32 kbyte; All inputs are in the process image 32 kbyte; All outputs are in the process image
per integrated IO subsystem	52 hayte, All outputs are in the process image
— Inputs (volume)	8 kbyte
Outputs (volume)	8 kbyte
o superio (Totalillo)	· ···· , · · ·

per CM/CD	
per CM/CP	0 khyta
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	20
Number of subprocess images, max.	32
Address space per module	200 huta. Far input and autout data respectively.
Address space per module, max.	288 byte; For input and output data respectively
Address space per station	0.500 h. t f
 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	o to bytoo for E1 20001 moduloo 1 012 bytoo for E1 2007E moduloo
	20. A distributed I/O system is share starting and antiquity by the interrection
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	
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	the number of connectable DtD OM- is suitable to the
 Number of PtP CMs 	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	a. aa.io 01010
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	40
Number Clark our absorbination	16
Clock synchronization	Voo
• 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
PROFINET IO Controller	
Services	
— PG/OP communication	Yes

- Biotrichous mode - Direct data exchange - Direct data exchange - Direct data exchange - Direct data exchange - RET - PROFileneity - PROFileneity - PROFileneity - PROFileneity - Number of connectable to Devices, max Of which in direct max A whater of connectable to Devices for RT Mumber of connectable to Devices for RT Number of IO Devices that can be simultaneously activated discardantated Number of IO Devices that can be simultaneously activated discardantated Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - Updating times - Update sime for IRT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 250 µs - for send cycle of 1500 µs - for send cycle of 150 µs - for send cycle of 1500 µs - for send cycle of 250 µs - for send cycl	leachronous made	Voe
	— Isochronous mode	Yes Peruirement IDT and inachronous made (MDDD antional)
PROFilenergy Prioritized startup Provinch for devices with IRT, max. Of which for devices with IRT, max. Number of connectable ID Devices for RT, max. Of which in line, max. Updatine for IRT For send cycle of 250 μs For send cycle of 1 ms For send cyc	9	
- Prioritized startup - Number of connectable (D Devices, max.) - Of which ID devices with IRT, max Number of connectable (D Devices for RT, max.) - Number of iO Devices that can be amultaneously activated/deactivated, max In which in line, max In which in line, max In which of ID Devices per tool. max Number of IO Devices per tool. max Updating times - For send cycle of 250 µs - For send cycle of 500 µs - For send cycle of 500 µs - For send cycle of 4 ms - With IRT and parameterization of 'odd' sed cycles - For send cycle of 500 µs - For send cycle of 4 ms - With IRT and parameterization of 'odd' sed cycles - For send cycle of 500 µs - For send cycle of 4 ms - With IRT and parameterization of 'odd' sed cycles - For send cycle of 4 ms - For send cycle of 500 µs - For send cy		
- Number of connectable (D Devices, max. - Of which ID devices with IRT, max Number of connectable (D Devices for RT, max of which in line, max - Number of 100 Devices that can be simultaneously activated decactivated, max Number of 10 Devices per tool, max Updating times - Updating times - For send cycle of 250 µs - For send cycle of 500 µs - For send cycle of 1 ms - For send cycle of 1 ms - With IRT and parameterization of "odd" send - With IRT and parameterization of "odd" send - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 1 ms - With IRT and parameterization of "odd" send - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 3 ms - For send cycle of 500 µs - For send cycle of 1 ms - For	0,	, , , ,
- Of which In devices with IRT, max Number of connectable (O Devices for RT, max In which in line, max In which of In (Devices that can be simultaneously activated/deacd/vated, max Number of IO Devices bat can be simultaneously activated/deacd/vated, max Updating times - Updating times - Updating times - Updating times - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 100 µs - For send cycle of 100 µs - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 100 µs - For send cycle of 1	·	•
- Number of connectable IO Devices for RT, max of which in line, max Number of ID Devices that can be simultaneously activated/deactivated, max Number of ID Devices per tool, max Updating times - Updating times - Updating times - Update time for IRT - for send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 260 μs - for send cycle of 1 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles of 1 ms - for send cycle of 4 ms - for send cycle of 250 μs - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles of 1 ms - for send cycle of 250 μs - for send cycle of 350 μs - for send cycle of 4 ms - for s	 Number of connectable IO Devices, max. 	
max. — of which in line, max. — Number of Io Devices that can be simultaneously activate/deactivated, max. — Number of Io Devices per tool, max. — Updating times Update time for IRT — for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 4 ms — with IRT and parameterization of "odd" send cycles Update time for IRT — for send cycle of 500 µs — for send cycle	 Of which IO devices with IRT, max. 	64
28	•	128
## State of Devices that can be simultaneously advised/deactivated, max. - Number of IO Devices per tool, max. - Updating times Updating times Updating		
simultaneously activated/deactivated, max. — Number of 10 Devices per tool, max. — Updating times — Updating times — Update time for IRT — for send cycle of 250 µs — for send cycle of 250 µs — for send cycle of 350 µs — for send cycle of 350 µs — for send cycle of 350 µs — for send cycle of 4 ms — for send cycle of 4 ms — with IRT and parameterization of "odd" send cycles — for send cycle of 4 for send cycle of 500 µs — for send cycle of 500 µs — for send cycle of 4 ms — with IRT and parameterization of "odd" send cycles — for send cycle of 500 µs — for send cyc	— of which in line, max.	128
- Number of IO Devices per tool, max. - Updating times - Update time for IRT - For send cycle of 250 µs - For send cycle of 500 µs - For send cycle of 2 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 2 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 500 µs - For send cycle of 500 µs - For send cycle of 2 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 4 ms - For send cycle of 500 µs - For send cycle of		8; in total across all interfaces
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 25 up to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 us of the isochronous mode, the minimum update time of 500 us of the isochronous mode, the minimum update time of 500 us of the isochronous mode, the minimum update time of 500 us of the isochronous mode, the minimum update time of 500 us of the isochronous mode, the minimum update time of 625 us of the isochronous mode, the minimum update time of 625 us of the isochronous of B is decisive 1 ms to 16 ms - for send cycle of 2 ms - for send oycle of 4 ms - With IRT and parameterization of "odd" send oycles Update time for RT - for send cycle of 500 us - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of		
share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data — for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 100 µs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles — With IRT and parameterization of "odd" send cycles — for send cycle of 1 ms — with IRT and parameterization of "odd" send cycles — for send cycle of 250 µs — for send cycle of 2 ms — in send cycle of 2 ms — for send cycle of 4 ms — in send cycle of 500 µs — for send cycle of 500 µs — for send cycle of 1 ms — in send cycle of 2 ms — in send cycle of 2 ms — in send cycle of 4 ms — in send cycle of 500 µs — for send cycle of 500 µs — for send cycle of 1 ms — in send cycle of 2 ms — in send cycle of 2 ms — in send cycle of 2 ms — in send cycle of 3 ms — in send cycle of 4 ms — in send cycle of 4 ms — in send cycle of 500 µs — in send cycle	·	
Update time for IRT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles - with IRT and parameterization of "odd" send cycles - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles - for send cycle of 2 ps - for send cycle of 2 ps - with IRT and parameterization of "odd" send cycles - with IRT and parameterization of "odd" send cycles - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 250 µs - for send cycle of 20 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 500 µs	— Updating times	share set for PROFINET IO, on the number of IO devices, and on the
for send cycle of 250 µs minimum update time of 500 µs of the slockronous OB is decisive for send cycle of 500 µs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 4 ms for send cycle of 4 ms for send cycle of 4 ms for send cycle of 500 µs for send cycle of 250 µs for send cycle of 250 µs for send cycle of 250 µs for send cycle of 500 µs for send cycle of 500 µs for send cycle of 500 µs for send cycle of 1 ms for send cycle of 4 ms for send cycle of 500 µs for send cy	Update time for IRT	quantity or configurou accordate
minimum update time of 500 µs of the isochronous OB is decisive - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - with IRT and parameterization of "odd" send cycles Update time for RT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle o	•	250 us to 4 ms. Note: In the case of IRT with isochronous mode, the
- for send cycle of 500 µs minimum update time of 625 µs of the isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive - for send cycle of 1 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles Update time for RT - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 50	— τοι σότια σ <u>γοίο</u> οι 200 μο	
minimum update time of 625 µs of the isochronous OB is decisive 1 ms to 16 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time for RT - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 4 ms - For send cycle of 5 ms - For send cycle	— for send cycle of 500 us	
- for send cycle of 2 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycle image. - With IRT and parameterization of "odd" send cycle image. - For send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle o		
- for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycle of 4 ms - With IRT and parameterization of "odd" send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 8 ms - for send cycle of 9 ms - process - PGOP communication - lsochronous mode - No - services - Number of ports - process - proc	— for send cycle of 1 ms	1 ms to 16 ms
for send cycle of 4 ms With IRT and parameterization of "odd" send cycles With IRT and parameterization of "odd" send cycles Update time for RT for send cycle of 250 µs for send cycle of 500 µs for send cycle of 500 µs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 2 ms for send cycle of 4 ms for send cycle of 2 ms for send cycle of 4 ms for send cycle of 500 µs For send cycle of 2 ms for send cycle of 500 µs For send cycl		2 ms to 32 ms
- With IRT and parameterization of "odd" send cycles Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle of 5 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle - for send cyc	•	4 ms to 64 ms
Light Li	•	
for send cycle of 250 µs		
for send cycle of 250 µs	Update time for RT	
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 4 ms to 512 ms for send cycle of 4 ms 4 ms to 512 ms for send cycle of 4 ms 4 ms to 512 ms FORFINET IO Device Services PG/OP communication Yes Isochronous mode No Isor IRT Yes PROFlenergy Yes; per user program Shared device Yes Number of IO Controllers with shared device, max. activation/deactivation of I-devices Yes; per user program Asset management record Yes; per user program Asset management record Yes; per user program Asset management record Yes; per user program RS 485 Yes; Via CM DP module Number of ports 1 PROFIBUS DP master Yes -	— for send cycle of 250 μs	250 µs to 128 ms
- for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - PG/OP communication - Isochronous mode - IRT - Yes - PROFIenergy - Shared device - Number of IO Controllers with shared device, - Max activation/deactivation of I-devices - Asset management record - Yes; per user program - Asset management record - Yes; per user program - Asset management record - Yes; per user program - Nest program - Number of ports - Number of ports - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP slave - SIMATIC communication - Yes - PROFIBUS DP master - Number of connections, max Number of DP slaves, max Number of DP slaves, max Number of DP slaves, max PG/OP communication - Equidistance - Isochronous mode - Activation/deactivation of DP slaves - No - Activation/deactivation of DP slaves - Interface types RJ 45 (Ethemet) - 100 Mbps - Yes	·	
for send cycle of 2 ms		•
for send cycle of 4 ms PROFINET I/O Device Services PG/OP communication Yes Isochronous mode No IRT Yes PROFlenergy Yes; per user program Shared device Yes; per user program Shared device Yes; per user program Asset management record Yes; per user program RS 485 Number of ports RS 485 Number of ports PROFIBUS DP master Yes PROFIBUS DP master Yes PROFIBUS DP slave Yes SIMATIC communication Yes SIMATIC communication Yes ROFIBUS DP master Number of connections, max Asset management PROFIBUS or PROFINET Services PG/OP communication Yes PG/OP communication Yes ROFIBUS or PROFINET Services PG/OP communication Yes ROFIBUS or PROFINET Services PG/OP communication Yes Requidistance No Activation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) 100 Mbps Activation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) 100 Mbps No		
PROFINET IO Device Services - PG/OP communication Yes - Isochronous mode No - IRT Yes - PROFlenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program 2. Interface Interface types - RS 485 Yes; Via CM DP module - Number of ports - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP slave - SIMATIC communication Yes - Number of connections, max Simulation of DP slaves, max Assert max Assert max Asset max Yes - PROFIBUS DP master - Number of connections, max Simulation of the via the profibus of the profi		
Services - PG/OP communication Yes - Isochronous mode No - IRT Yes - PROFlenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program 2. Interface Interface types - RS 485 Yes; Via CM DP module - Number of ports - Number of ports - PROFIBUS DP master - PROFIBUS DP master - SIMATIC communication - PROFIBUS DP master - Number of connections, max Number of DP slaves, max Number of DP slaves, max PROFIBUS OP communication - PROFIBUS DP master - Number of DP slaves, max Number of DP slaves, max Number of DP slaves, max PROFIBUS or PROFINET Services - PG/OP communication - Equidistance - Isochronous mode - Activation/deactivation of DP slaves - Yes - Interface types RJ 45 (Ethernet) - 100 Mbps - Yes		
Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max Activation/deactivation of I-devices Asset management record Asset management record Asset management record RS 485 Number of ports Number of ports PROFIBUS DP master PROFIBUS DP slave SIMATIC communication Number of connections, max Number of connections, max Number of DP slaves, max Number of DP slaves, max Number of DP slaves, max PG/OP communication Equidistance Isochronous mode Activation/deactivation of DP slaves RU 48; Of which 4 each reserved for ES and HMI REQUIDING TO PROFIBUS or PROFINET PG/OP communication Services Services Services Servi		Yes
- IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record 2. Interface Interface types - RS 485 - Number of ports - PROFIBUS DP master - PROFIBUS DP master - Number of connections, max SIMATIC communication - Number of DP slaves, max Number of DP slaves, max RS- Ves - PROFIBUS DP master - Number of DP slaves, max Number of DP slaves, max Number of DP slaves, max PROFIBUS DP master - PROFIBUS DP maxer - PROFIBUS DP maxer - Number of connections, max Number of DP slaves, max Number of DP slaves, max Rejudistance - Interface types - PROFIDED SP May PROFINET - PROFIDED SP MAY P		
- PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record 2. Interface Interface types • RS 485 • Number of ports • PROFIBUS DP master • PROFIBUS DP master • SIMATIC communication PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max. • Number of DP slaves, max. - PG/OP communication - Equidistance - Isochronous mode - Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) • 100 Mbps Yes; per user program Yes; per		
Shared device Number of IO Controllers with shared device, max activation/deactivation of I-devices Asset management record Yes; per user program Asset management record Yes; per user program Asset management record Yes; per user program		
Number of IO Controllers with shared device, max. activation/deactivation of I-devices Yes; per user program Asset management record Yes; per user program 2. Interface Interface types RS 485 RS 485 Number of ports PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max Number of DP slaves, max Number of DP slaves, max PG/OP communication Equidistance Isochronous mode Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) 100 Mbps Yes; Via CM DP module Yes Yes; Via CM DP module Yes PROFIBUS DP master Yes PROFIBUS DP master No humber of connections, max PROFIBUS OF PROFIBUS or PROFINET Services PG/OP communication Equidistance No No Activation/deactivation of DP slaves PG/OP slaves PG/OP communication P		
max. — activation/deactivation of I-devices Yes; per user program — Asset management record Yes; per user program 2. Interface Interface types • RS 485 • Number of ports 1 Protocols • PROFIBUS DP master • PROFIBUS DP slave • SIMATIC communication PROFIBUS DP master • Number of connections, max. • Number of connections, max. • Number of DP slaves, max. 125; In total, up to 512 distributed I/O devices can be connected via ASi, PROFIBUS or PROFINET Services — PG/OP communication Yes — Equidistance — Isochronous mode — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) • 100 Mbps Yes		
activation/deactivation of I-devices Asset management record 7 yes; per user program 7 yes; via CM DP module 1 yes 1 yes 1 yes 1 PROFIBUS DP master 1 yes 1 PROFIBUS DP slave 2 yes 3 yes 3 yes 48; Of which 4 each reserved for ES and HMI 48; Of which 4 each reserved for ES and HMI 48; Of which 4 each reserved for ES and HMI 7 yes 8 yes 1 yes	·	7
- Asset management record 2. Interface Interface types • RS 485 • Number of ports 1 Protocols • PROFIBUS DP master • PROFIBUS DP slave • SIMATIC communication PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. Services - PG/OP communication - Equidistance - Isochronous mode - Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) • 100 Mbps Yes, Via CM DP module Yes, Via CM DP module 1 Yes, Via CM DP module 1 Yes Yes Yes Yes Yes No - PROFIBUS DP master • Number of connections, max. 48; Of which 4 each reserved for ES and HMI 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Yes - PG/OP communication Yes No - Activation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) • 100 Mbps		Yes: per user program
2. Interface Interface types • RS 485 • Number of ports Protocols • PROFIBUS DP master • PROFIBUS DP slave • SIMATIC communication PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max. • Number of DP slaves, max. Services - PG/OP communication Yes - Equidistance - Isochronous mode - Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) • 100 Mbps Yes, Via CM DP module Yes, Via CM DP module Yes, Via CM DP module Yes Yes Yes Yes Yes Yes No No As', Of which 4 each reserved for ES and HMI 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services - PG/OP communication Yes - Ruivation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) • 100 Mbps		
Interface types RS 485 Number of ports Protocols PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Requidistance PG/OP communication Yes PServices PG/OP communication Yes PROFIBUS DP master No As; Of which 4 each reserved for ES and HMI 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services PG/OP communication Yes Equidistance No Activation/deactivation of DP slaves PS Services PS Services PG/OP communication Yes PS Services PS		100, por usor program
RS 485 Number of ports Number of ports Protocols PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Number of DP slaves, max. PROFIBUS OP master Number of DP slaves, max. Number of DP slaves, max. PROFIBUS or PROFIBUS or PROFINET Services PROFIBUS or PROFINET Yes		
 Number of ports Protocols PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Number of DP slaves, max. PROFIBUS or PROFINET Services PG/OP communication Equidistance Isochronous mode Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes PJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes 		
Protocols PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Services PG/OP communication PG/OP communic		
 PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. PROFIBUS or PROFIBUS or PROFINET Services PG/OP communication Equidistance Isochronous mode Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) PROFIBUS or PROFINET Yes No Yes Yes Interface types RJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes 	Number of ports	1
 PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Services — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) 100 Mbps Yes 		
 SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Services — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) ■ 100 Mbps Yes 	 PROFIBUS DP master 	Yes
PROFIBUS DP master ● Number of connections, max. ● Number of DP slaves, max. 125; In total, up to 512 distributed I/O devices can be connected via ASi, PROFIBUS or PROFINET Services — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves PJ 45 (Ethernet) ■ 100 Mbps Yes	 PROFIBUS DP slave 	Yes
 Number of connections, max. Number of DP slaves, max. Number of DP slaves, max. 125; In total, up to 512 distributed I/O devices can be connected via ASi, PROFIBUS or PROFINET Services — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) 100 Mbps Yes Yes Yes Yes 	SIMATIC communication	Yes
 Number of DP slaves, max. 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) ■ 100 Mbps Yes 	PROFIBUS DP master	
i, PROFIBUS or PROFINET Services	 Number of connections, max. 	48; Of which 4 each reserved for ES and HMI
Services - PG/OP communication Yes - Equidistance No - Isochronous mode No - Activation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) • 100 Mbps Yes	 Number of DP slaves, max. 	
 — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) ■ 100 Mbps Yes 		i, PROFIBUS or PROFINET
 — Equidistance — Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) ■ 100 Mbps Yes 	Services	
— Isochronous mode — Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) ■ 100 Mbps Yes	 PG/OP communication 	Yes
— Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) ● 100 Mbps Yes Yes	— Equidistance	No
Interface types RJ 45 (Ethernet) • 100 Mbps Yes	 Isochronous mode 	No
RJ 45 (Ethernet) • 100 Mbps Yes	 Activation/deactivation of DP slaves 	Yes
RJ 45 (Ethernet) • 100 Mbps Yes	Interface types	
• 100 Mbps Yes		
		Vas
▼ Autoriegotiation	·	100
		Yes

 Autocrossing 	Yes
Industrial Ethernet status LED	Yes
RS 485	
Transmission rate, max.	12 Mbit/s
Protocols	
PROFIsafe	Yes; V2.4 / V2.6
Number of connections	100, \$2.77 \$2.0
Number of connections, max.	128; via integrated interfaces of the CPU and connected CPs / CMs
Number of connections reserved for ES/HMI/web	10
 Number of connections via integrated interfaces 	88
 Number of connections per CP/CM 	32
Number of S7 routing paths	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
 Media redundancy 	Yes; only via BusAdapter
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
 MRP interconnection, supported 	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
 Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
— Number of stations in the ring, max.	50
SIMATIC communication	V
PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
Data record routing	Yes
S7 communication, as server	Yes
S7 communication, as client	Yes
User data per job, max. Open IE communication	See online help (S7 communication, user data size)
TCP/IP	Yes
— Data length, max.	64 kbyte
several passive connections per port,	Yes
supported	
• 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. 78 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	Vac IICaalii liaanaa rasuira d
Runtime license required ODC LIA Client	Yes; "Small" license required
OPC UA Client Application outboutienties	Yes; Data Access (registered Read/Write), Method Call
Application authentication Security policies	Yes Available security policies: None Pasic128Psa15 Pasic256Psa15
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
User authentication	"anonymous" or by user name & password
— Number of connections, max.— Number of nodes of the client interfaces,	4 1 000
— Number of nodes of the client interfaces, recommended max.	1 000
Number of elements for one call of	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C max.	
 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
 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
 Number of inputs/outputs per server method, max. 	20
 Number of monitored items, recommended max. 	4 000; for 1 s sampling interval and 1 s send interval
Number of server interfaces, max.	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
•	Voc
Alarms and Conditions	Yes
Number of program alarms	100
Number of alarms for system diagnostics	50
Further protocols	
	Yes; MODBUS TCP
Further protocols	
Further protocols • MODBUS	
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max.	Yes; MODBUS TCP
Further protocols • MODBUS S7 message functions	Yes; MODBUS TCP
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm"
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max.	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100
Further protocols	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering)	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering)	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients)
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe),
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max.	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max.	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max.	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing • Forcing	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job Yes; without fail-safe
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing • Forcing • Forcing, variables	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job Yes; without fail-safe peripheral inputs/outputs (without fail-safe)
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing • Forcing	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job Yes; without fail-safe
Further protocols MODBUS Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms Number of program alarms Number of alarms for system diagnostics Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control Status/control Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing, variables	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job Yes; without fail-safe peripheral inputs/outputs (without fail-safe)
Further protocols • MODBUS S7 message functions Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. Forcing • Forcing • Forcing, variables • Number of variables, max.	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job Yes; without fail-safe peripheral inputs/outputs (without fail-safe)
Further protocols MODBUS Number of login stations for message functions, max. Program alarms Number of configurable program messages, max. Number of loadable program messages in RUN, max. Number of simultaneously active program alarms Number of program alarms Number of alarms for system diagnostics Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control Status/control Status/control Status/control variable Variables Number of variables, max. of which status variables, max. Forcing Forcing Forcing Forcing, variables, max. Diagnostic buffer	Yes; MODBUS TCP 32 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 2 500 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters 200; per job 200; per job Yes; without fail-safe peripheral inputs/outputs (without fail-safe) 200

— 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 socileble Metics Oceans accounts for	the PLC program; selection guide via the TIA Selection Tool
 Number of available Motion Control resources for 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	14
cycle of 8 ms (typical value)	17
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	
Counting and measuring • High-speed counter	Yes
•	Yes
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode	
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 	PLe
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508	PLe SIL 3
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and reparation) 	PLe SIL 3 ir time of 100 hours)
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance	PLe SIL 3
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa	PLe SIL 3 ir time of 100 hours)
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in	PLe SIL 3 ir time of 100 hours) < 2.00E-05
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions	PLe SIL 3 ir time of 100 hours) < 2.00E-05
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3	PLe SIL 3 ir time of 100 hours) < 2.00E-05
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min.	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max.	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, min.	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max.	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max. Altitude during operation relating to sea level	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, max. Vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max.	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. Altitude during operation relating to sea level • Installation altitude above sea level, max. configuration / header	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C
High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. Altitude during operation relating to sea level • Installation altitude above sea level, max. configuration / header configuration / programming / header	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. vertical installation, min. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. vertical installation, max. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. vertical installation, max. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes Yes Yes Yes
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection 	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes Yes Yes Yes Yes Yes
 High-speed counter Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 Probability of failure (for service life of 20 years and repa Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Ambient conditions Ambient temperature during operation horizontal installation, min. horizontal installation, max. vertical installation, max. Installation altitude above sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection	PLe SIL 3 ir time of 100 hours) < 2.00E-05 < 1.00E-09 -30 °C; No condensation 60 °C -30 °C; No condensation 50 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; yes Yes Yes Yes

 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
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	
Weight, approx.	265 g

9/22/2022 🖸