SIEMENS

Data sheet



SIPLUS ET 200SP CPU 1512SP-1 PN rail based on 6ES7512-1DK01-0AB0 with conformal coating, -40...+60 °C, OT2 with ST1/2 (+70 °C für 10 minutes), central processing unit with work memory 200 KB for program and 1 MB for data, 1st interface, PROFINET IRT with 3-port switch, 48 ns bit performance, SIMATIC Memory Card required, BusAdapter required for port 1 and 2

Figure similar

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General information	
Product type designation	CPU 1512SP-1 PN
based on	6ES7512-1DK01-0AB0
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 625 μs
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
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 	5 ms
Input current	
Current consumption (rated value)	0.6 A
Current consumption, max.	0.9 A
Inrush current, max.	4.7 A; Rated value
l²t	0.14 A ² ·s
Power	
Infeed power to the backplane bus	8.75 W
Power loss	
Power loss, typ.	5.6 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	200 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.	48 ns
for word operations, typ.	58 ns
for fixed point arithmetic, typ.	77 ns
for floating point arithmetic, typ.	307 ns
CPU-blocks	507 NC
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
DB	4 000, Blocks (OB, 1 B, 1 O, BB) and OB 13
Number range	1 60 999; subdivided into: number range that can be used by the user: 1
- Number range	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.	200 kbyte
FC	
Number range	0 65 535
• Size, max.	200 kbyte
OB	
• Size, max.	200 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 500 μs
 Number of process alarm OBs 	50
 Number of DPV1 alarm OBs 	3
 Number of isochronous mode OBs 	1
 Number of technology synchronous alarm OBs 	2
 Number of startup OBs 	100
 Number of asynchronous error OBs 	4
 Number of synchronous error OBs 	2
Number of diagnostic alarm OBs	1
Nesting depth	
per priority class	24
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	V
— adjustable	Yes
IEC counter	Annu (and a libraite of has the greater and
Number Potentivity	Any (only limited by the main memory)
Retentivity	V
— adjustable	Yes
S7 times	2.049
Number Retentivity	2 048
— adjustable	Yes
•	res
IEC timer ● Number	Any (only limited by the main memory)
Retentivity	rany (only limited by the main memory)
— adjustable	Yes
— adjustable Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte; Available retentive memory for bit memories, timers, counters, DBs,
Netertitive data area (inci. timers, counters, hags), max.	and technology data (axes): 88 KB
Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
Retentivity adjustable	Yes
Retentivity preset	No
Local data	
per priority class, max.	64 kbyte; max. 16 KB per block

Address area	
Number of IO modules	2 048; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
Address space per module	
 Address space per module, max. 	288 byte; For input and output data respectively
Address space per station	
Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 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 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
• on DP, device	Yes; Via CM DP module
• in AS, master	Yes
• in AS, device	Yes
on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1; Via CM DP module
Optical interface	Yes; via BusAdapter
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 M12, BA 2x FC, BA 2x LC, BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC,

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 — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data 250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 μs of the isochronous OB is decisive 500 μs to 8 ms 1 ms to 16 ms 2 ms to 32 ms 4 ms to 64 ms		
PROFINET IO Device SIMATIC communication Yes Open IE Communication Yes Web server Yes Ned a redundancy Yes, INRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PGOP communication New Yes PROFINET IO Controller Services PGOP communication Yes Services PGOP communication Yes Yes PROFINET IO Controller Services PGOP communication Yes Ves PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Yes Services PROFINET IO Controller Yes Services PROFINET IO Controller Yes Requirement: IRT and isochronous mode (MRPD optional) Yes Yes Promitted startup Yes, Proving Interpropriam Yes, Max. 32 PROFINET Interpropriam Yes, Yes Yu CM DP module Not Author of ports Protection Yes Yes, You CM DP module Not Author of ports Protection Yes	• IP protocol	Yes; IPv4
• SIMATIC communication • Open IE communication • Web server • Media redundancy • Per Services - PGORP Controlled Services - PGORP Communication - Iscontroous mode - Iscontroous mo	PROFINET IO Controller	Yes
• Open IE communication • Ves Services • Media redundancy • Media redundancy • Ves; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services - PG(OP communication - Iscort consumments - Direct data exchange - Direct data exchange - PROFInergy - PROFInergy - PROFInergy - PROFInergy - Profitzed statup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which In Ide, max Number of connectable Io Devices for RT, max Of which in Inin, max Number of IO Devices that can be simultaneously activate/disearchived, max Number of IO Devices that can be simultaneously activate/disearchived, max Number of IO Devices for RT, max Updating times - To send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 150 μs - for send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 150 μs - for	PROFINET IO Device	Yes
Web server Media redundancy PROFINET IO Controller Services - PGOP communication - Isochronous mode - Direct date exchange - IRT - PROFilenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which IO devices with IRT, max Which I of Devices per tool, max Number of IO Devices per tool, max Updating times Update time for IRT - for send cycle of 250 µs - for send cycle of 2 ms - for send cycle of 2 ms - Whith IRT and parameterization of "odd" send cycles Update time for IRT - for send cycle of 500 µs - 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 500 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 500 µs - 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 4 ms - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 1 ms -	SIMATIC communication	Yes
PROFINE I of Controller Services - PGIOP communication - Isocritronous mode - Direct data exchange - PROFlenetry - PROFlenetry - PROFlenetry - Number of connectable IO Devices, max Number of connectable IO Devices, max Number of 10 Devices with IRT, max of which in line, max Number of 10 Devices that can be simultaneously activated/deactivated, max Number of 10 Devices per tool, max Updating times - For send cycle of 250 µs - for send cycle of 10 ms - for send cycle of 10 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 10 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles - for send cycle of 10 ms - for send cycle of 20 µs - for sen	Open IE communication	Yes; Optionally also encrypted
Services PGO/P communication Isochronous mode Per Color communication Isochronous mode Per Color communication Proficitized state suchange IRT PROFienerry Prioritized startup Prioritized s	Web server	Yes
PG/OP communication Yes	Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
- PG/OP communication - Isochronous mode - PROFlenergy - Prioritized startup - Number of connectable Io Devices, max Of which In Ilen, max Of which In Ilen, max Isochronous mode - Number of Io Devices that can be simultaneously achivated/deachivated, max Number of Io Devices per tool, max Updating times - In Tor send cycle of 250 μs - For send cycle of 250 μs - For send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - Yes, Pax user program - Yes, Via CM DP module - Interfaces - Yes, Via CM DP module - Yes, Via CM DP module - Prosecoles - Protocoles - Yes, Via CM DP module - Protocoles - Protocoles - Protocoles - Protocoles - Number of 10 Controllers with shared device, max Activation of t-devices - Asset management record - Yes, Via CM DP module - Protocoles - Protoc	ROFINET IO Controller	
Scorbronous mode	Services	
- Direct data exchange - IRT - PROFilenergy - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which In line, max Number of IO Devices that can be simultaneously activated/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 250 μs - For send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - For send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - For send cycle of 250 μs - For send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - For send cycle of 250 μs - For send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - For send cycle of 250 μs - For send cycle of 350 μs - For send cycle of 4 ms - For send cycle of 4 ms - For send cycle of 500 μs - Fo	— PG/OP communication	Yes
- IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which IO Devices for RT, max Of which IO Devices that can be simultaneously activated/deactivated/max Number of IO Devices per tool, max Updating times - Very Interface of PROFINET IO, on the number of IO devices, and on the quantity of configured user data For send cycle of 500 µs - For send cycle of 500 µs - For send cycle of 500 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 10 ms - For send cycle o	— Isochronous mode	Yes
PROFilenergy Prioritized startup Number of connectable IO Devices, max. Power of Connectable IO Devices, max. Power of Connectable IO Devices of RT, max. Number of connectable IO Devices for RT, max. Number of connectable IO Devices for RT, max. Number of Devices that can be simultaneously activated/deactivated, max. Number of IO Devices per tool, max. Number of IRT To resend cycle of 250 µs No send cycle of 1 ms No 16 ms No to 16 ms No to 18 ms No 18 ms to 16 ms No to 18 ms No 18 ms to 16 ms No to 18 ms No 19 ms to 19 ms No 19 ms to 512 ms No 19 ms to 512 ms No 19 ms to 512 ms No N	Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
Prioritized startup Number of connectable IO Devices, max. Number of connectable IO Devices with IRT, max. Number of Connectable IO Devices for RT, max. Of which in line, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices per tool, max. Number of IO Device per tool, max. Number of IO Device per tool, max. Number of IO Device per tool, max. Number of IO	— IRT	Yes
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PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of Connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices that can be simultaneously activated/deactivated, max. 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 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 cycles Update time for RT for send cycle of 250 µs With IRT and parameterization of "odd" send cycles Update time for RT for send cycle of 250 µs for send cycle of 350 µs 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 500 µs for send cycle of 4 ms with 151 ms FORINET IO Device Services PGIOP communication Ves PROFINET IO Device Services PGIOP communication Ves PROFInergy Services PROFINERTIO, on the umber of IO devices and on the umber of ID devices and on the umber of	 Prioritized startup 	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - 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 - for send cycle of 550 µs - for send cycle of 550 µs - 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 - 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 550 µs - for send cycle of 1 ms - for send cycle of 550 µs - for send cycle of 550 µs - 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 of 2 ms - for send cycle of 1 ms - for send c	— Number of connectable IO Devices, max.	
- of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max 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 - for send cycle of 500 µs - 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 500 µs - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 1 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 250 µs - for send cycle of 500 µs - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle of 500 µ	— Of which IO devices with IRT, max.	64
- Number of IO Devices that can be simultaneously activate/deactivated, max. - Number of IO Devices per tool, max. - Updating times - Updating times - 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 - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 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 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 cycle of 1 ms - For send cycle of 1 ms - For send cycle of 250 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 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 cycl	 Number of connectable IO Devices for RT, max. 	128
activeled/deactivated, max. - Number of IO Devices per tool, max. - Updating times - Updating times - Fro From Fine Times - Fro send cycle of 250 μs - 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 500 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" send cycles - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 500 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 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 500 μs - For send cycle of 4 ms - For send cycle of 500 μs - For send	— of which in line, max.	128
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 — for send cycle of 500 μs — for send cycle of 100 μs — for send cycle of 1 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 — in the set is in the case of IRT with isochronous mode, the minimum update time of 500 μs of the isochronous OB is decisive Update time of 500 μs of 16 ms — with IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 250 μs to 128 ms — for send cycle of 500 μs — for send cycle of 4 ms — 1 ms to 512 ms — for send cycle of 4 ms — yes to 250 μs — for send cycle of 4 ms — yes to 250 μs — for send cycle of 4 ms — yes to 250 μs — for send cycle of 4 ms — yes per user program — services — PG/OP communication — lsochronous mode — No — IRT — PROFInergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Yes; per user program — Asset management record 2 Interface Interfa		8; in total across all interfaces
set for PRCFINET I O, 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 1 ms — for send cycle of 1 ms — for send cycle of 4 ms — for send cycle of 4 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 250 μs — for send cycle of 250 μs — for send cycle of 250 μs — 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 1 ms — 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 4 ms — the send cycle of 2 ms — for send cycle of 4 ms — PROFINET IO Device Services — PG/OP communication — Isochronous mode — IRT — PROFlenergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record Pes; per user program Interface PRS 485 — Number of ports Protocols 250 μs to 128 ms 250 μs to 128 ms 250 μs to 128 ms 500 μs to 256 ms 1 ms to 512 ms Psome Services - PG/OP communication — Yes — Number of IO Controllers with shared device, max. — 4 - 4 set management record Pes; per user program 2 Interface PRS 485 — Number of ports 1 Protocols	 Number of IO Devices per tool, max. 	8
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 2 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 2 ms — with IRT and parameterization of "odd" send cycles — For send cycle of 250 µs — for send cycle of 500 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 4 ms — for send cycle of 500 µs — for send cycle of 4 ms — for send cycle of 500 µs —	— Updating times	
- 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 4 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 500 µs - for send cycle of 500 µs - With IRT and parameterization of "odd" send cycles - For send cycle of 500 µs - for send cycle of 2 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 - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - 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 2 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 500 µs - for send cycle	Update time for IRT	oomigarod door data
update time of 500 μs of the isochronous OB is decisive — 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 — Vith IRT and parameterization of "odd" send cycles — 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 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 800 μs — for send cycle of 900 μs — for send cycle of 1 μs — for send cycle of 900 μs — for send cycle of 900 μs — for send cycle of 1 μs — for send cycle of 250 μs — for send cycle of 1 μs — for send	•	250 us to 4 ms: Note: In the case of IRT with isochronous mode, the minimum
- for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 875 μs) 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 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 9 ms - for send cycle of 1 ms - for send cycle of 12 ms - for send		update time of 500 μs of the isochronous OB is decisive
- 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 - With IRT and parameterization of "odd" send cycles - 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 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of 5 ms - For send cycle of 6 ms - For send cycle of 1 ms - For send cycle of 250 μs - For send cycle of 1 ms - For send cycle of 250 μs - For send cycle of 1 ms - For send cycle of 250 μs - For send cycle of 250 μ	— for send cycle of 500 μs	500 μs to 8 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 2 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - FOFINET IO Device - PG/OP communication - Isochronous mode - IRT - PROFlenergy - 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 - Shared bypes - RS 485 - Number of ports - Number of ports - Ves; Via CM DP module - Number of ports - Trotocols	— for send cycle of 1 ms	1 ms to 16 ms
- With IRT and parameterization of "odd" send cycles 875 μs) 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 1 ms - for send cycle of 2 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 4 ms - for send cycle of 2 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 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 500 μs - for send cycle of 500	— for send cycle of 2 ms	2 ms to 32 ms
Update time for RT for send cycle of 250 µs	— for send cycle of 4 ms	4 ms to 64 ms
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 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 500 µs - for send cycle of 4 ms - PROFINET IO Device Services - PG/OP communication - Yes - Isochronous mode - IRT - Yes - PROFIenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - Yes; per user program - Asset management record - Yes; per user program - Asset management record - Yes; per user program - RS 485 - Number of ports - RS 485 - Number of ports - Number of ports - 1	 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
- 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 3 ms - for send cycle of 4 ms - for send cycle of 5 ms - for send cycl	Undate time for RT	δ/ο 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 - PROFINET IO Device Services - PG/OP communication - Yes - Isochronous mode - No - IRT - Yes - PROFlenergy - Yes; per user program - Shared device - 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 - Interface - Interface - Number of ports - Interface types - Number of ports - Number of ports - Truck of 1 ms - 1 ms to 512 ms - 2 ms - 4 ms to 512 ms - For condition -	·	250 us to 128 ms
- for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms 2 ms to 512 ms - for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device Services - PG/OP communication - Isochronous mode - IRT - PROFIenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record PRS 485 Number of ports - Number of ports - Ves; Via CM DP module - Ves; Via CM DP module - Number of ports - Number of ports		
for send cycle of 2 ms for send cycle of 4 ms for send cycle of 4 ms for send cycle of 4 ms PROFINET IO Device Services PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max activation/deactivation of I-devices Asset management record Interface Interface types RS 485 Number of ports Number of ports Number of ports RS Ves; Via CM DP module Number of ports Number of ports RS ves; Via CM DP module Number of ports PG/OP communication A ms to 512 ms A ms to 512 ms A ms to 512 ms Ves		
— for send cycle of 4 ms PROFINET IO 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 — activation/deactivation of I-devices Yes; per user program — Asset management record Yes; per user program 2. Interface types • RS 485 • Number of ports • Number of ports 1 Protocols	•	
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 • Number of ports 1 Protocols	•	
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 1 Protocols	·	4 III3 to 312 III3
- 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 • Number of ports • Number of ports 1 Protocols		
- Isochronous mode No - IRT Yes - PROFlenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max. 4 - activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program 2. Interface Interface types • RS 485 • Number of ports • Number of ports 1 Protocols		Yes
 — IRT — PROFlenergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record ✓ Yes; per user program ✓ Protocols Protocools Yes; Via CM DP module Number of ports Protocools 		
- 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 • Number of ports • Number of ports 1 Protocols		
- 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 • Number of ports Protocols		
 Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record Number of ports Protocols 4 Yes; per user program Yes; per user program Yes; via CM DP module 1 Protocols		
 — activation/deactivation of I-devices		
— Asset management record 2. Interface Interface types RS 485 Number of ports Protocols Yes; per user program Yes; Via CM DP module 1		
2. Interface Interface types • RS 485 • Number of ports Protocols 2. Interface Yes; Via CM DP module 1		
Interface types • RS 485 • Number of ports Protocols Yes; Via CM DP module 1	-	1 65, por user program
RS 485 Number of ports Protocols Yes; Via CM DP module 1 Protocols		
Number of ports 1 Protocols	•	Vas: Via CM DP modula
Protocols		
	· · · · · · · · · · · · · · · · · · ·	
▼ FNOFIDUS DE ITIASIEI YES		Von
PROFIBUS DP device Yes		
SIMATIC communication Yes		Yes
PROFIBUS DP master 40: Of which 4 and because of a FO and UMI		40. Of which 4 and account (50 11111
Number of connections, max. 48; Of which 4 each reserved for ES and HMI 485. In the latest the second of th		
 max. number of DP devices 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 	 max. number of DP devices 	

Services	
 PG/OP communication 	Yes
— Equidistance	No
 Isochronous mode 	No
 activation/deactivation of DP devices 	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	12 Moto
PROFIsafe	No
Number of connections	NO
	120: via integrated interfaces of the CDLL and connected CDs / CMs
 Number of connections, max. Number of connections reserved for ES/HMI/web 	128; via integrated interfaces of the CPU and connected CPs / CMs
	10
Number of connections via integrated interfaces Number of connections per CR/CM	88
Number of C7 souting paths	32
Number of S7 routing paths	16
Redundancy mode	Ver
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	30
PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
Data record routing	
S .	Yes
S7 communication, as server S7 communication, as server	Yes
S7 communication, as client	Yes
User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	V
• TCP/IP	Yes
— Data length, max.	64 kbyte
— several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	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	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes
 Application authentication 	Yes
Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
OPC UA Runtime license required OPC UA Client Application authentication	Yes; "Small" license required Yes Yes

	Basic256Sha256
— User authentication	"anonymous" or by user name & password
Number of connections, max.	4
Number of connections, max. — Number of nodes of the client interfaces, recommended max.	1 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max. 	300
 Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max. 	20
Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
 Number of simultaneous calls of the client instructions for session management, per connection, max. 	1
 Number of simultaneous calls of the client instructions for data access, per connection, max. 	5
 Number of registerable nodes, max. 	5 000
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC UA Server	Yes; Data access (read, write, subscribe), method call, 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, max.	20
Number of monitored items, recommended max.	1 000; 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. 	1 000
Alarms and Conditions	Yes
— Number of program alarms	100
Number of alarms for system diagnostics	50
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
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" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
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
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of variables, max.	inputation outputs, memory site, 200, distributed 1/00, difficio, countero
of which status variables, max.	200: per job
of which status variables, max. of which control variables, max.	200; per job 200; per job
— or which control variables, max.	200, poi juu
	Voc
Forcing	Yes

Forcing, variables	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
 Number of entries, max. 	1 000
— of which powerfail-proof	500
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 the PLC
	program; selection guide via the TIA Selection Tool
Number of available Motion Control resources for technology objects.	800
technology objects	
Required Motion Control resources Per speed controlled axis.	40
— 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	Yes; PID controller with integrated optimization for temperature
Counting and measuring	э э э э э э э э э э э э э э э э э э э
High-speed counter	Yes
Isolation	
Isolation tested with	750 V DC (type teet) and according to EN 50155 (routine teet)
	750 V DC (type test) and according to EN 50155 (routine test)
Standards, approvals, certificates	
Railway application	Voc. FMC for roll vobiolog
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
● EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT1, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	60 °C; = Tmax; +70 °C for 10 min (OT1, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
vertical installation, max.	50 °C; = Tmax
Altitude during operation relating to sea level	

Installation altitude above sea level, max.	2 000 m
Ambient air temperature-barometric pressure-altitude	Tmin Tmax at 1 140 hPa 795 hPa (-1 000 m +2 000 m)
elative humidity	
 With condensation, tested in accordance with IEC 60068- 2-38, max. 	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
esistance	
Coolants and lubricants	
 Resistant to commercially available coolants and lubricants 	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
 to biologically active substances according to EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna) Class 3B3 on request
 to chemically active substances according to EN 60721-3-3 	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
 Against mechanical environmental conditions acc. to EN 60721-3-3 	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00 0AA0)
Use on land craft, rail vehicles and special-purpose vehicles	
 to biologically active substances according to EN 60721-3-5 	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna) Class 5B3 on request
 to chemically active substances according to EN 60721-3-5 	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00 0AA0)
 against mechanical environmental conditions in agriculture acc. to ISO 15003 	Yes; level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)
Usage in industrial process technology	
 Against chemically active substances acc. to EN 60654-4 	Yes; Class 3 (excluding trichlorethylene)
 Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04 	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
 Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04 	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
 Coatings for printed circuit board assemblies acc. to EN 61086 	Yes; Class 2 for high reliability
 Protection against fouling acc. to EN 60664-3 	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
 Military testing according to MIL-I-46058C, Amendment 7 	Yes; Discoloration of coating possible during service life
 Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC- CC-830A 	Yes; Conformal coating, Class A
nfiguration / header	
onfiguration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
(now-how protection	
User program protection/password protection	Yes
Copy protection	Yes
Block protection	Yes
access protection	
protection of confidential configuration data	Yes
Protection level: Write protection	Yes
·	Yes
	. 55
 Protection level: Read/write protection Protection level: Complete protection 	Yes

• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	100 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	310 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

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