## SIEMENS

## Data sheet

## 6AG2512-1SK01-4AB0



SIPLUS ET 200SP CPU 1512SP F-1 PN rail based on 6ES7512-1SK01-0AB0 with conformal coating, -40...+70 °C, OT4 with ST1/2 (+85 °C for 10 minutes), no pluggable BusAdapter, central processing unit with work memory 300 KB for program and 1 MB for data, 1st interface, PROFINET IRT with 3-port switch, 48 ns bit performance, SIMATIC Memory Card required,

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General information	
Product type designation	CPU 1512SP F-1 PN
based on	6ES7512-1SK01-0AB0
Product function	
• I&M data	Yes; I&M0 to I&M3
<ul> <li>Module swapping during operation (hot swapping)</li> </ul>	Yes; Multi-hot swapping
Isochronous mode	Yes; Only with PROFINET; with minimum OB 6x cycle of 625 $\mu s$
Engineering with	
<ul> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	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	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	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 <sup>2</sup> ·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)	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.	48 ns
for word operations, typ.	58 ns
for fixed point arithmetic, typ.	77 ns
for floating point arithmetic, typ.	307 ns
CPU-blocks	007113
	4 000: Placks (OP, EP, EC, DP) and UPTa
Number of elements (total) DB	4 000; Blocks (OB, FB, FC, DB) and UDTs
	4. CO 000 subdivided inter sumber reason that can be used by the users 4
Number range	1 60 999; subdivided into: number range that can be used by the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999
<ul> <li>Size, max.</li> </ul>	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; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	100
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte; Available retentive memory for bit memories, timers, counters, DBs,
	and technology data (axes): 88 KB
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	
	64 kbyte; max. 16 KB per block

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Address area	
Number of IO modules	2 048; max. number of modules / submodules
I/O address area	
Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	0 KDyte
— Inputs (volume)	8 kbyte
— Outputs (volume)	
	8 kbyte
Subprocess images	60
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	
<ul> <li>integrated</li> </ul>	1
• Via CM	0
Rack	
<ul> <li>Modules per rack, max.</li> </ul>	80; CPU + 64 modules + server module (mounting width max. 1 m) + 16 ET 200AL modules; > 60 °C ambient temperature CPU + 32 modules + server module + 16 ET 200AL modules
<ul> <li>Quantity of operable ET 200SP modules, max.</li> </ul>	64; > 60 °C ambient temperature: 32 modules
<ul> <li>Quantity of operable ET 200AL modules, max.</li> </ul>	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	
• Туре	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 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	No
1. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X1 P3
Number of ports	1
BusAdapter (PROFINET)	No
Protocols	
IP protocol	Yes; IPv4

	Voo
PROFINET IO Controller     PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
Media redundancy      DEDELNET IO Controller	No
PROFINET IO Controller Services	
— PG/OP communication	Yes
— Isochronous mode	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
- Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	128; In total, up to 512 distributed I/O devices can be connected via AS-i,
Number of connectable to Devices, max.	PROFIBUS or PROFINET
— Of which IO devices with IRT, max.	64
- Number of connectable IO Devices for RT, max.	128
— of which in line, max.	128
- Number of IO Devices that can be simultaneously	8; in total across all interfaces
activated/deactivated, max.	
<ul> <li>Number of IO Devices per tool, max.</li> </ul>	8
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT	
— for send cycle of 250 µs	250 $\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 $\mu s$ of the isochronous OB is decisive
— for send cycle of 500 μs	500 µs to 8 ms
— for send cycle of 1 ms	1 ms to 16 ms
— for send cycle of 2 ms	2 ms to 32 ms
— for send cycle of 4 ms	4 ms to 64 ms
— With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 $\mu s$ : 375 $\mu s$ , 625 $\mu s$ 3 875 $\mu s)$
Update time for RT	
— for send cycle of 250 μs	250 µs to 128 ms
— for send cycle of 500 μs	500 µs to 256 ms
— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 2 ms	2 ms to 512 ms
— for send cycle of 4 ms	4 ms to 512 ms
PROFINET IO Device	
Services	
— 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.	4
<ul> <li>activation/deactivation of I-devices</li> </ul>	Yes; per user program
— Asset management record	Yes; per user program
nterface	
Interface types	Vac: Via CM DD module
RS 485	Yes; Via CM DP module
Number of ports	1
Protocols	Voc
PROFIBUS DP master	Yes
PROFIBUS DP device	Yes
SIMATIC communication	Yes
SIMATIC communication     PROFIBUS DP master	Yes
SIMATIC communication PROFIBUS DP master     Number of connections, max.	Yes 48; Of which 4 each reserved for ES and HMI
SIMATIC communication     PROFIBUS DP master	Yes

Evidentification		
- Isochronous mode No - activation/SackWallow of DP dov/ose Vis Istafic types Istafic	— PG/OP communication	Yes
	-	
Interface spips           IRU Add (Ethernet)           I 100 Maps         Yes           I Autonsgolation         Yes <t< td=""><td></td><td></td></t<>		
IRUS differented       Ves         • 100 Mitps       Yes         • Autorospitation       Yes         • Autorospitation       Yes         • Indicatinal Element status LED       Yes         • Transmission rate, max.       12 Molt/s         Profestation       Yes		Yes
• No Maps     Yes       • Autocrossing     Yes       • Autocrossing     Yes       • Industrial Ehernet status LED     Yes       • Transmission rate, max.     12 Mbit/s       Protection     Yes/V2.4 / V2.6       • Number of connections, max.     12 Mbit/s       • Number of connections, reserved for ESHMI.vuch     10       • Number of connections are connection served for FSHMI.vuch     10       • Number of connections are CPC-CM     22       • Number of connections are CPC-CM     23       • Number of connections are CPC-CM     32       • Number of connections are CPC-CM     32       • Number of connections, supported     No       • No are connuncation     Yes, encryption with TLS V1.3 pre-selected       • Statal regin, max.     Yes       • Orall are connuclation     Yes       • Statal regin, max.     See online help (SF communication, user data aize)       • Open Economication     Yes       • Open Economication     Yes       • Open Itenometaticon     Yes       • Opendit		
• Autocrossing     Yes       • Autocrossing     Yes       • Industal Elhernet status LED     Yes       • Transmission rate, max.     12 Motifs       ProCelsand     Yes       ProCelsand     12 Motifs       ProCelsand     12 Motifs       • Number of connections reserved for ESH-Milliveh     10       • Number of connections supported     83       • Number of ST routing paths     10       • Media redundancy     No       - MRPD     No       - MRPD     No       • MRP Interconnection, supported     No       • AMRP     Yes       • ST communication, as server     Yes       • ST communication, as server     Yes       • ST communication, as server     Yes       • Duel routing, max.     G4 Mylye       • Duel routing, max.     G4 Mylye       • Duel routing, max.     G4 Mylye       • Duel routing, max.     G	RJ 45 (Ethernet)	
• Autoocsaing         Yes           • Transmission rate, max.         12 Mables           Protection         12 Mables           Protection         Yes, V2.4 / V2.6           Number of connections, max.         128, via integrated interfaces of the CPU and connected CPS / CMs           • Number of connections reserved for ESHMI/web         10           • Number of connections per CP/CM         32           • Number of connections per CP/CM         32           • Number of connections, particulated interfaces         88           • Number of connections, particulated interfaces         80           • MRP         No         80           • MRP         No <t< td=""><td>-</td><td></td></t<>	-	
• Instruction rate, max.     12 Mbi/s       Procession     12 Mbi/s       Procession     12 Mbi/s       Procession     12 Mbi/s       Procession     12 Mbi/s       Number of connections, max.     12 Xai integrated interfaces of the CPU and connected CPs / CMs       Number of connections reserved for ES/MMI/veb     10       Number of connections via integrated interfaces     88       Number of connections via integrated interfaces     88       Number of connections via integrated interfaces     88       Number of ST routing paths     16       Returndamy mode     -       - Mcdia redundamy     No       - MRP     No       - MRP     No       - MRP     No       - MRP Communication     Yes, encrypton with TLS V1.3 pre-selected       STATO: Communication     Yes       STATO: Communication, as client     Yes       STATO: Communication, as client     Yes       STO communication     Yes       Stop client, max.     G4 kbyte       - Oral length, max.     G4 kbyte <td>-</td> <td></td>	-	
IPS 485       • Traditional orate, max.     12 Mbbi/s       PROFisate     Yes, V2.4 / V2.6       Number of connections, max.     128, via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections reserved for ESAMWeb     10       • Number of connections per CPCM     32       • Number of connections spectrame     No       • Number of connections per CPCM     No       • Number of connections spectrame     No       SIMATIC communication     Ves: encryption with TLS V1.3 pre-selected       • ST communication     Yes       • PCOP Pornunication     Yes       • Strop registrame     Yes       • Strop registrame     Yes       • Orab length, max.     See online help (ST communication. user data size)       Open Log Reserver     Yes <td>C C</td> <td></td>	C C	
		Yes
PROFisafe         Yes; V2.4 / V2.8           Number of connections, max.         128, via integrated interfaces of the CPU and connected CPs / CMs           Number of connections reserved for ES-MMI/web         10           Number of connections reserved for ES-MMI/web         10           Number of connections year integrated interfaces         83           Number of connections per CPICM         32           Number of connections per CPICM         10           Media redundancy         No           Media redundancy         No           — MRP interconnection, supported         No           — MRP interconnection, supported         No           — MRP interconnection, supported         No           — Status redundancy         No           — MRP interconnection, as elinet         Yes           — Order record routing         Yes; encryption with TLS V1.3 pre-selected           • S7 routing         Yes           • S7 communication, as elinet         Yes           • S7 communication, as elinet         Yes           • S7 communication, as elinet         Yes           • CPOIP         Yes           • UPO Proper Yes         Yes           • Data length, max.         Ge eonline help (S7 communication, user data size)           Open IL connunicati		
PROFisale         Yes; V2.4 / V2.6           Number of connections, max.         128, via integrated interfaces of the CPU and connected CPs / CMs           Number of connections, max.         128, via integrated interfaces of the CPU and connected CPs / CMs           Number of connections integrated interfaces         88           Number of connections integrated interfaces         88           Number of connections per CPICM         32           INAMER of STruting paths         10           Reduindeny mode         10           I-HSync forwarding         No           Media redundancy         No           - MRP Interconnection, supported         No           - MRP Communication         Yes; encryption with TLS V1.3 pre-selected           ISMMTIC communication, as ever         Yes           IST communication, as client         Yes           ISD-constructation, as client         Yes           ISD-constructation         Yes           ISD-constate eight         Yes <tr< td=""><td></td><td>12 Mbit/s</td></tr<>		12 Mbit/s
Number of connections.         128, via integrated interfaces of the CPU and connected CPs / CMs           Number of connections reserved for ESI-MM/web         10           Number of connections reserved for ESI-MM/web         10           Number of connections or PCPCM         32           Number of S7 routing paths         16           Redundancy mode	Protocols	
Number of connections, max.     128, via integrated Interfaces of the CPU and connected CPs / CMs     Number of connections integrated Interfaces     88     Number of connections per CPICM     32     Second ST routing paths     10     Redundancy mode	PROFIsafe	Yes; V2.4 / V2.6
Number of connections reserved for ESrHML/web     Number of connections or linegrated Interfaces     Number of connections or CP/CM     S2     Number of S7 routing paths     Interface of S7 routing paths     H-Sync forwarding     No     Media redundancy		
• Number of connections par CP/CM32• Number of connections par CP/CM32• Number of S7 routing paths16Redurating pathsNo• H-Sync forwardingNo• Media redundancyNo- Media redundancyNo- MRPNo- MRPNo- MRP interconnection, supportedNo- MRP interconnection, supportedNo- MRP interconnection, supportedNo- MRP interconnection, as serverYes, encryption with TLS V1.3 pre-selected• S7 routingYes• Data record routingYes• S7 communicationYes• S7 communication, as serverYes• S7 communication, as clientYes• Data length, max.See online help (S7 communication, user data size)Open LE communicationYes• Data length, max.64 kbyte- several passive connections per port, supportedYes• Data length, max.64 kbyte• Data length, max.64 kbyte• Data length, max.2 kbyte; 1472 bytes for UDP broadcast• UDPYes• Data length, max.2 kbyte; 1472 bytes for UDP broadcast• UDPYes• Data length, max.2 kbyte; 1472 bytes for UDP broadcast• UDPYes• DRCPYes• DRCPYes• DRCPYes• DRCPYes• DRCPYes• DRCPYes• DRCPYes• DRCPYes• DRCPYes <td></td> <td></td>		
• Number of connections per CP/CM32• Number of ST routing paths16• Hedundancy modeNo• Hedia redundancyNo- Media redundancyNo- MRPNo- MRP interconnection, supportedNo- MRPCNoSIMUTIC communicationYes, encryption with TLS V1.3 pre-selected• FG/CP communicationYes, encryption with TLS V1.3 pre-selected• ST routingYes• Data record routingYes• Data record routingYes• ST communication, as serverYes• Data record routingYes• Dear length, max.G4 kbyte• Dear length, max.G4 kbyte• Dub relight, max.Yes• Dub relight, max.Yes• Dub relight, max.Yes• Dub relight, max.Yes• Dub routicastYes• Dub routic		
• Number of S7 routing paths     16       Redundancy mode	0	
Redundancy mode     No       H-Sync forwarding     No       Media redundancy     No      MRP     No      MRP interconnection, supported     No      MRPD     No       SIMATIC communication     Yes; encryption with TLS V1.3 pre-selected       • PG/GOP communication     Yes; encryption with TLS V1.3 pre-selected       • S7 communication     Yes; encryption with TLS V1.3 pre-selected       • S7 communication, as server     Yes       • S7 communication, as server     Yes       • S7 communication, as server     Yes       • User data per job, max.     See conline help (S7 communication, user data size)       Open Ecommunication     Yes       • User data per job, max.     Set keyle       • Data length, max.     Set keyle       • UDP     Yes       • SID-on-TCP (RC+1006)     Yes       • UDP     Yes       • UDP multicast     Yes for UDP broadcast       • UDP     Yes       • Data length, max.     Skyte; 1472 bytes for UDP broadcast       • UDP     Yes       • DD multicast     Yes       • DNS     Yes       • Encryption     Yes <td>-</td> <td></td>	-	
No               Media redundancy               — Media redundancy               — Media redundancy               — MRP               — MRP               — MRP               — MRP               — MRP               — MRP               • PG/OP communication               • S7 outing               • S7 outing               • S7 outing               • S7 communication, as server               • S7 communication, as cellent               • User data per job, max.               • Optimulation, as cellent               • TCP/IP               • TCP/IP               • TCP/IP               • Data length, max.               • G4 kbyte               - Data length, max.               • Optimulaticast               • Data length, max.               • UDP               - Data length, max.               • UDP               • DAGE               • DDR               • DICP               Ves		16
Media redundancy     No	-	
- Media redundancy     No       - MRP     No       - MRP Interconnection, supported     No       - MRPO     No       SIMATIC communication     Yes; encryption with TLS V1.3 pre-selected       • FIGACP communication     Yes; encryption with TLS V1.3 pre-selected       • ST routing     Yes       • Or Core Communication, as server     Yes       • ST communication, as client     Yes       • Stat are prob. max.     See online help (S7 communication, user data size)       Open IE communication     Yes       • TCP/IP     Yes       • Data length, max.     64 kbyte       - several passive connections per port, supported     Yes       • Data length, max.     64 kbyte       • UDP     Yes       • Data length, max.     64 kbyte       • UDP     Yes       • Data length, max.     64 kbyte       • UDP     Yes       • Data length, max.     64 kbyte       • UDP multicast     Yes; Max.5 multicast circuits       • DATO     Yes       • NINS     Yes       • NINF     Yes; Standard and user pages       • DCP     Yes; Standard and user pages       • ILDP     Yes; Standard and user pages       • ILDP     Yes; Standard and user pages       • OPCUA     Yes	H-Sync forwarding	No
	Media redundancy	
	— Media redundancy	No
MRPD         No           SIMATIC communication	— MRP	No
SIMATIC communication       Yes: encryption with TLS V1.3 pre-selected         • FC/OP communication       Yes         • S7 routing       Yes         • Bata record routing       Yes         • 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       Yes         • TCP/IP       Yes         • Data length, max.       64 kbyte         • UDP       Yes         • Data length, max.       64 kbyte         • UDP       Yes         • Data length, max.       64 kbyte         • UDP       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         • DCP       Yes         • DNS       Yes         • SNMP       Yes         • DCP       Yes         • LDP       Yes; Optional         Web server       Yes; Standard and user pages         • HTTPS       Yes         • PoPC UA Client       Yes <td><ul> <li>MRP interconnection, supported</li> </ul></td> <td>No</td>	<ul> <li>MRP interconnection, supported</li> </ul>	No
• 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         • S7 communication, as client       Yes         • User data per job, max.       See online help (S7 communication, user data size)         Open IE communication       -         • TCP/IP       Yes         • Data length, max.       G4 kbyte         - Data length, max.       G4 kbyte         - Data length, max.       G4 kbyte         • UDP       Yes         - Data length, max.       G4 kbyte         • UDP multicast       Yes         - Data length, max.       2 kbyte; 1 472 bytes for UDP broadcast         - UDP multicast       Yes: Max. 5 multicast circuits         • DUP       Yes         • DDP multicast       Yes; Max. 5 multicast circuits         • DHCP       Yes         • DNS       Yes         • DCP       Yes         • DCP       Yes; Standard and user pages         • DCP       Yes; Standard and user pages         • HTTP       Yes; Standard and user pages         • OPC UA	— MRPD	No
• S7 routingYes• Data record routingYes• Data record routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communication• Deta length, max.G4 kbyle- Data length, max.G4 kbyle- several passive connections per port, supportedYes• ISO-on-TCP (RC 1006)Yes- Data length, max.G4 kbyle• UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes• DARYes• DNSYes• SNMPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• LLDPYes• EncryptionYes; Standard and user pages• HTTPSYes; Standard and user pages• DPC UAYes• Application authenticationYes• Application authenticationYes• DAR authenticationYes• User authenticationYes• User authentication*anonymous" or by user name & password• Number of connections, max.4	SIMATIC communication	
• Data record routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communication• TCP/IPYes• Data length, max.64 kbyte- Data length, max.64 kbyte- Data length, max.64 kbyte• Dota length, max.64 kbyte• DDPYes- Data length, max.64 kbyte• UDPYes- Data length, max.7 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes• DHCPYes• DHCPYes• DNSYes• DDPYes• DLPYes• LLDPYes• LLDPYes• LLDPYes• HTTPYes; Standard and user pages• HTTPYes; Standard and user pages• HTTPSYes• OPC UA ClientYes• Application authenticationYes• Application authenticationYes• User authenticationYes• User authenticationYes• User authenticationYes• User authenticationYes• User authenticationYes• User authenticationYes or by user name & password	<ul> <li>PG/OP communication</li> </ul>	Yes; encryption with TLS V1.3 pre-selected
• S7 communication, as server     Yes       • S7 communication, as client     Yes       • User data per job, max.     See online help (S7 communication, user data size)       Open E: communication     FOP/IP       • TCP/IP     Yes       • Data length, max.     64 kbyle       - Data length, max.     64 kbyle       - Data length, max.     64 kbyle       • DDP     Yes       • Data length, max.     64 kbyle       • UDP     Yes       - Data length, max.     2 kbyle; 1472 byles for UDP broadcast       - UDP multicast     Yes; Max. 5 multicast circuits       • DHCP     Yes       • DHCP     Yes       • DNS     Yes       • SNMP     Yes       • DCP     Yes       • DLDP     Yes       • DLDP     Yes       • DCP     Yes       • DRS     Yes       • DRS     Yes       • DCP     Yes       • DCP     Yes       • Encryption     Yes; Standard and user pages       • HTTP     Yes       • HTTP     Yes       • HTTP     Yes       • OPC UA     Yes       • Application authentication     Yes       • Application authentication     Yes       • Security	S7 routing	Yes
• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open E communication• Detal length, max.64 kbyte- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes- Data length, max.64 kbyte• DDPYes- Data length, max.64 kbyte• DDPYes- Data length, max.64 kbyte• DDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP mutticastYes; Max. 5 multicast circuits• DHCPYes• DNSYes• DNSYes• DDPYes• DPYes• DPYes• DPYes• DPYes• DPYes• DP <td><ul> <li>Data record routing</li> </ul></td> <td>Yes</td>	<ul> <li>Data record routing</li> </ul>	Yes
• User data per job, max.See online help (S7 communication, user data size)Open Er communication• TCP/IPYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes- Data length, max.64 kbyte• UDPYes- Data length, max.64 kbyte• Data length, max.64 kbyte• UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP muticastYes; Max. 5 muticast circuits• DHCPYes• DNSYes• DLCPYes• EncryptionYes; Standard and user pages• HTTPYes; Standard and user pages• HTTPYes• Runtime license requiredYes• Runtime license requiredYes• Application authenticationYes• Application authenticationYes• Security policies: None, Basic 128Rsa 15, Basic 256Rsa 15, Basic 256Rsa 15, Basic 256Rsa 256• User authenticationYes onry yous" or by user name & password• User authentication4	<ul> <li>S7 communication, as server</li> </ul>	Yes
Open IE communication         Yes           • 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.         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           • DNS         Yes           • DLP         Yes           • DLP         Yes           • DNS         Yes           • DLP         Yes           • DLP         Yes           • DLP         Yes           • LLDP         Yes           • Encryption         Yes; Optional           Web server         -           • HTTPS         Yes; Standard and user pages           • HTTPS         Yes           • OPC UA         Yes           • OPC UA         Yes           • OPC UA         Yes <td><ul> <li>S7 communication, as client</li> </ul></td> <td>Yes</td>	<ul> <li>S7 communication, as client</li> </ul>	Yes
• TCP/IPYes- Data length, max.64 kbyte- several passive connections per port, supportedYes- ISO-on-TCP (RFC1006)Yes- Data length, max.64 kbyte- UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes; Max. 5 multicast circuits- UDP multicastYes- DHCPYes- DDSYes- DCPYes- DCPYes- DCPYes- DLPYes- DLPYes- DLPYes- DLPYes- DLPYes- DLPYes- DLPYes- DLPYes- DLPYes- DCPYes- EncryptionYes; Standard and user pages- HTTPSYes; Standard and user pages- HTTPSYes; Standard and user pages- OPC UAYes- Application authenticationYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa15		See online help (S7 communication, user data size)
- Data length, max.64 kbyte- several passive connections per port, supportedYes- Several passive connections per port, supportedYes- Data length, max.64 kbyte- Data length, max.64 kbyte- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes; Max. 5 multicast circuits- DHCPYesSNMPYes- DDSYes- DCPYes- LLDPYes- EncryptionYes; OptionalWeb serverYes; Standard and user pages- HTTPSYes; Standard and user pages- HTTPSYes; Standard and user pages- OPC UAYes- Application authenticationYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic2	Open IE communication	
several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)YesData length, max.64 kbyte• UDPYesData length, max.2 kbyte; 1 472 bytes for UDP broadcastData length, max.2 kbyte; 1 472 bytes for UDP broadcastDDP multicastYes; Max. 5 multicast circuits• DDPYes• DDPYes• DDRSYes• DNSYes• DNSYes• DCPYes• DCPYes• LLDPYes• EncryptionYes; OptionalWeb serverYes; Standard and user pages• HTTPSYes; Standard and user pages• DPC UAYes• Runtime license requiredYes• Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of connections, max.4	• TCP/IP	Yes
• ISO-on-TCP (RFC1006)Yes- Data length, max.64 kbyte• UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes; Max. 5 multicast circuits• DHCPYes• DNSYes• DNSYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• DCPYes• EncryptionYes; OptionalWeb serverYes; Standard and user pages• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• OPC UAYes• Runtime license requiredYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa256- User authentication"anonymous" or by user name & password- Number of connections, max.4	— Data length, max.	64 kbyte
Data length, max.64 kbyte• UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes; Max. 5 multicast circuits• DHCPYes• DHCPYes• DNSYes• DNSYes• DNSYes• DNSYes• DCPYes• DLDPYes• DLDPYes• DLDPYes• DLDPYes• DCPYes OptionalWeb serverYes; Optional• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• HTTPSYes; Standard and user pages• DPC UAYes• Runtime license requiredYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Ba	<ul> <li>— several passive connections per port, supported</li> </ul>	Yes
• UDPYes- Data length, max.2 kbyte; 1 472 bytes for UDP broadcast- UDP multicastYes; Max. 5 multicast circuits• DHCPYes• DHCPYes• DNSYes• DNSYes• SNMPYes• DCPYes• LLDPYes• EncryptionYes; OptionalWeb serverYes; Standard and user pages• HTTPSYes; Standard and user pages• HTTPSYes; Standard and user pages• HTTPSYes; Standard and user pages• PC UAYes• Runtime license requiredYes• Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of connections, max.4	<ul> <li>ISO-on-TCP (RFC1006)</li> </ul>	Yes
- Data length, max.2 kbyte; 1472 bytes for UDP broadcast- UDP multicastYes; Max. 5 multicast circuits• DHCPYes; Max. 5 multicast circuits• DHCPYes• DNSYes• SNMPYes• DCPYes• DCPYes; Optional• EncryptionYes; OptionalWeb serverYes; Standard and user pages• HTTPSYes; Standard and user pages• HTTPSYes; Standard and user pages• PCC UAYes• Runtime license requiredYes• OPC UA ClientYes• Application authenticationYes• Security policiesYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of connections, max.4	— Data length, max.	64 kbyte
-UDP multicastYes; Max. 5 multicast circuits•DHCPYes•DNSYes•SNMPYes•DCPYes•DCPYes•LLDPYes•EncryptionYes; OptionalWeb serverYes; Standard and user pages•HTTPSYes; Standard and user pages•HTTPSYes; Standard and user pages•HTTPSYes; Standard and user pages•DCP UAYes; Standard and user pages•OPC UA CilentYes•OPC UA CilentYes·OPC UA Cileition authenticationYes·OPC uathenticationYes·Our user authenticationYes·Our user authentication'anonymous'' or by user name & password·Our user or connections, max.4	• UDP	Yes
• DHCPYes• DNSYes• SNMPYes• DCPYes• LLDPYes• EncryptionYes OptionalWeb serverYes Standard and user pages• HTTPsYes Standard and user pages• HTTPsYes Standard and user pages• DCP UA ClientYes• Application authenticationYes• Security policiesYes• User authenticationYes• User authenticationYes </td <td>— Data length, max.</td> <td>2 kbyte; 1 472 bytes for UDP broadcast</td>	— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
• DNSYes• SNMPYes• DCPYes• LLDPYes Optional• EncryptionYes OptionalWebserverYes Standard and user pages• HTTPSYes Standard and user pages• HTTPSYes Standard and user pages• DCP UAYes• Runtime license requiredYes• Application authenticationYes- Security policiesYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa256- User authentication*anonymous" or by user name & password- Number of connections, max.4	— UDP multicast	Yes; Max. 5 multicast circuits
• SNMPYes• DCPYes• LLDPYes• EncryptionYes OptionalWebserverYes; Optional• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• DCP UAYes• Runtime license requiredYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication*anonymous" or by user name & password- Number of connections, max.4	• DHCP	Yes
• DCPYes• LLDPYes• EncryptionYes; OptionalWeb serverYes; Standard and user pages• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• DPC UAYes; Standard and user pages• Runtime license requiredYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication*anonymous" or by user name & password- Number of connections, max.4	• DNS	Yes
LLDPYesEncryptionYes; OptionalWeb server• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• DPC UA• Runtime license requiredYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication*anonymous" or by user name & password- Number of connections, max.4	• SNMP	Yes
• EncryptionYes; OptionalWeb server• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• HTTPSYes; Standard and user pagesOPC UAYes• Runtime license requiredYes• OPC UA ClientYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of connections, max.4	• DCP	Yes
Web server         • HTTP       Yes; Standard and user pages         • HTTPS       Yes; Standard and user pages         OPC UA       Yes         • Runtime license required       Yes         • OPC UA Client       Yes         - Application authentication       Yes         - Security policies       Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256         - User authentication       "anonymous" or by user name & password         - Number of connections, max.       4	• LLDP	Yes
• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pagesOPC UAYes; Standard and user pages• Runtime license requiredYes• OPC UA ClientYes• OPC UA ClientYes- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of connections, max.4	Encryption	Yes; Optional
• HTTPS       Yes; Standard and user pages         OPC UA          • Runtime license required       Yes         • OPC UA Client       Yes         - Application authentication       Yes         - Security policies       Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Sha256         - User authentication       "anonymous" or by user name & password         - Number of connections, max.       4	Web server	
OPC UA         • Runtime license required       Yes         • OPC UA Client       Yes         - Application authentication       Yes         - Security policies       Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256         - User authentication       "anonymous" or by user name & password         - Number of connections, max.       4	• HTTP	Yes; Standard and user pages
<ul> <li>Runtime license required</li> <li>Ves</li> <li>OPC UA Client</li> <li>Application authentication</li> <li>Security policies</li> <li>Ves</li> <li>Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</li> <li>User authentication</li> <li>"anonymous" or by user name &amp; password</li> <li>Number of connections, max.</li> </ul>	• HTTPS	Yes; Standard and user pages
OPC UA Client Yes     Application authentication Yes     Security policies Available security policies: None, Basic128Rsa15, Basic256Rsa15,     Basic256Sha256     User authentication "anonymous" or by user name & password     Number of connections, max.	OPC UA	
— Application authentication       Yes         — Security policies       Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256         — User authentication       "anonymous" or by user name & password         — Number of connections, max.       4	Runtime license required	Yes
- Security policies       Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256         - User authentication       "anonymous" or by user name & password         - Number of connections, max.       4	OPC UA Client	Yes
— User authentication     Basic256Sha256       — Number of connections, max.     "anonymous" or by user name & password	<ul> <li>Application authentication</li> </ul>	Yes
- Number of connections, max.	— Security policies	
	— User authentication	"anonymous" or by user name & password
Number of nodes of the client interfaces 4,000	- Number of connections, max.	4
- number of houes of the client interfaces, 1000	<ul> <li>— Number of nodes of the client interfaces,</li> </ul>	1 000

recommended max.	
<ul> <li>— Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_L max.</li> </ul>	300
<ul> <li>— Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.</li> </ul>	20
<ul> <li>— Number of elements for one call of OPC_UA_MethodGetHandleList, max.</li> </ul>	100
<ul> <li>— Number of simultaneous calls of the client instructions for session management, per connection, max.</li> </ul>	1
<ul> <li>— Number of simultaneous calls of the client instructions for data access, per connection, max.</li> </ul>	5
<ul> <li>Number of registerable nodes, max.</li> </ul>	5 000
<ul> <li>— Number of registerable method calls of OPC_UA_MethodCall, max.</li> </ul>	100
<ul> <li>— Number of inputs/outputs when calling OPC_UA_MethodCall, max.</li> </ul>	20
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
- Number of sessions, max.	32
<ul> <li>Number of accessible variables, max.</li> </ul>	50 000
<ul> <li>Number of registerable nodes, max.</li> </ul>	10 000
<ul> <li>Number of subscriptions per session, max.</li> </ul>	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
- Number of server methods, max.	20
<ul> <li>Number of inputs/outputs per server method, max.</li> </ul>	20
<ul> <li>Number of monitored items, recommended max.</li> </ul>	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"
<ul> <li>— Number of nodes for user-defined server interfaces, max.</li> </ul>	1 000
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 mossage functions	

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; without fail-safe
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
<ul> <li>Number of variables, max.</li> </ul>	
— of which status variables, max.	200; per job
<ul> <li>— of which control variables, max.</li> </ul>	200; per job
Forcing	
Forcing	Yes; without fail-safe
<ul> <li>Forcing, variables</li> </ul>	Peripheral inputs/outputs
<ul> <li>Number of variables, max.</li> </ul>	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	1 000
— of which powerfail-proof	500
Traces	

<ul> <li>Number of configurable Traces</li> </ul>	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	A the second
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
<ul> <li>Monitoring of the supply voltage (PWR-LED)</li> </ul>	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
<ul> <li>Number of available Motion Control resources for technology objects</li> </ul>	800
<ul> <li>Required Motion Control resources</li> </ul>	
— 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	
<ul> <li>— Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	5
<ul> <li>— Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	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	
High-speed counter	Yes
Isolation	
Isolation Isolation tested with	750 V DC (type test) and according to EN 50155 (routine test)
	750 V DC (type test) and according to EN 50155 (routine test)
Isolation tested with	750 V DC (type test) and according to EN 50155 (routine test)
Isolation tested with Standards, approvals, certificates	750 V DC (type test) and according to EN 50155 (routine test)
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode	
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode • Performance level according to ISO 13849-1	PLe
Isolation tested with 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 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations.
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours)
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application EN 50121-3-2	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application EN 50121-3-2 EN 50121-4	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2;
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application EN 50121-3-2 EN 50121-4 EN 50124-1	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application EN 50121-3-2 EN 50121-4 EN 50125-1	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC Yes; Rail vehicles - see ambient conditions
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application EN 50121-3-2 EN 50121-4 EN 50125-1 EN 50125-2	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC Yes; Rail vehicles - see ambient conditions Yes; Stationary electrical equipment - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode Performance level according to ISO 13849-1 SIL acc. to IEC 61508 SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 Railway application EN 50121-3-2 EN 50121-4 EN 50125-1 EN 50125-2 EN 50125-3	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC Yes; Rail vehicles - see ambient conditions Yes; Stationary electrical equipment - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track) Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim Low demand mode: PFDavg in accordance with SIL3 High demand/continuous mode: PFH in accordance with SIL3 Railway application • EN 50121-3-2 • EN 50124-1 • EN 50125-1 • EN 50125-2 • EN 50125-3 • EN 50155	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC Yes; Rail vehicles - see ambient conditions Yes; Stationary electrical equipment - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track) Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
Isolation tested with Standards, approvals, certificates Highest safety class achievable in safety mode • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 • SIL in accordance with EN 50126, 50128, 50129 Probability of failure (for service life of 20 years and repair tim - Low demand mode: PFDavg in accordance with SIL3 - High demand/continuous mode: PFH in accordance with SIL3 Railway application • EN 50121-3-2 • EN 50124-1 • EN 50125-1 • EN 50125-2 • EN 50125-3 • EN 50155 • EN 61373	PLe SIL 3 SIL 2; a higher safety integrity level is possible if tested and approved for the specific application under consideration of all local regulations. e of 100 hours) < 2.00E-05 < 1.00E-09 Yes; EMC for rail vehicles Yes; EMC for signal and telecommunications systems Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC Yes; Rail vehicles - see ambient conditions Yes; Stationary electrical equipment - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track) Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
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	50.80 T
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)
Relative humidity	
<ul> <li>With condensation, tested in accordance with IEC 60068- 2-38, max.</li> </ul>	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and	No
lubricants	
Use in stationary industrial systems	
— to biologically active substances according to EN	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna);
60721-3-3	Class 3B3 on request
<ul> <li>— to chemically active substances according to EN 60721-3-3</li> </ul>	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
<ul> <li>— to mechanically active substances according to EN 60721-3-3</li> </ul>	Yes; Class 3S4 incl. sand, dust, *
Use on land craft, rail vehicles and special-purpose vehicles	
<ul> <li>— to biologically active substances according to EN 60721-3-5</li> </ul>	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
<ul> <li>— to chemically active substances according to EN 60721-3-5</li> </ul>	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
<ul> <li>— to mechanically active substances according to EN 60721-3-5</li> </ul>	Yes; Class 5S3 incl. sand, dust; *
Usage in industrial process technology	
<ul> <li>Against chemically active substances acc. to EN 60654-4</li> </ul>	Yes; Class 3 (excluding trichlorethylene)
<ul> <li>Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04</li> </ul>	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	
<ul> <li>— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04</li> </ul>	* 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
<ul> <li>Protection against fouling acc. to EN 60664-3</li> </ul>	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
configuration / header	
configuration / programming / header	
Programming language	
	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— FBD — STL	Yes
— STL — SCL	Yes
— SCL — GRAPH	Yes
Know-how protection	
User program protection/password protection	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
Protection level: Write protection	Yes
Protection level: write protection     Protection level: Read/write protection	Yes
Protection level: Read/white protection     Protection level: Complete protection	Yes
protection level. Complete protection     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.	470 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776

last modified:

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