SIEMENS

Data sheet

6ES7515-2FM02-0AB0



SIMATIC S7-1500F, CPU 1515F-2 PN, central processing unit with work memory 750 KB for program and 3 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 30 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1515F-2 PN
HW functional status	FS01
Firmware version	V2.9
Product function	
• I&M data	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 μs (distributed) and 1 ms (central)
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V17 (FW V2.9) / V16 (FW V2.8) or higher; with older TIA Portal versions configurable as 6ES7515-2FM01-0AB0
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	6.1 cm
Control elements	
Number of keys	8
Mode buttons	2
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
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	0.8 A
Current consumption, max.	1.1 A
Inrush current, max.	2.4 A; Rated value
l²t	0.02 A ² ·s
Power	
Infeed power to the backplane bus	12 W
Power consumption from the backplane bus (balanced)	6.2 W
Power loss	
Power loss, typ.	6.3 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	

• integrated (for program)	750 kbyta
 integrated (for program) integrated (for data) 	750 kbyte
integrated (for data)	3 Mbyte
Load memory Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Plug-in (SilviATIC Memory Card), max. Backup	
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	30 ns
for word operations, typ.	36 ns
for fixed point arithmetic, typ.	48 ns
for floating point arithmetic, typ.	192 ns
CPU-blocks	
Number of elements (total)	8 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
Number range	1 60 999; subdivided into: number range that can be used by the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999
• Size, max.	3 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	500 kbyte
FC	
Number range	0 65 535
• Size, max.	500 kbyte
OB Olar man	
Size, max.	500 kbyte
Number of free cycle OBs	100
Number of time alarm OBs	20
Number of delay alarm OBs Number of evelia interrupt OBs	20 20: With minimum OR 2x avala of 500 up
Number of cyclic interrupt OBs Number of process alarm OBs	20; With minimum OB 3x cycle of 500 μs
 Number of process alarm OBs Number of DPV1 alarm OBs 	50 3
Number of DPV Falarm OBs Number of isochronous mode OBs	2
Number of technology synchronous alarm OBs	2
Number of technology synchronous alarm OBs Number of startup OBs	100
Number of asynchronous error OBs	4
Number of synchronous error OBs	2
Number of diagnostic alarm OBs	1
Nesting depth	
per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Extended retentive data area (incl. timers, counters, flags), max.	3 Mbyte; When using PS 6 0W 24/48/60 V DC HF
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	04 kbyte, max. To Kb per block
Number of IO modules	8 192; 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
Hardware configuration	
Number of distributed IO systems	64; 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	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	2
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
 Modules per rack, max. 	32; CPU + 31 modules
 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
	16
Clock synchronization	
• supported	No.
• in AS, master	Yes
	Yes
 in AS, slave 	
In AS, slave on Ethernet via NTP	Yes
	Yes Yes
• on Ethernet via NTP	Yes Yes
on Ethernet via NTP Interfaces	Yes Yes Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface	Yes Yes Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes Yes Yes 2
on Ethernet via NTP Interfaces I. Interface Interface types o RJ 45 (Ethernet)	Yes Yes Yes 2 Yes; X1
on Ethernet via NTP Interfaces I. Interface Interface types • RJ 45 (Ethernet) • Number of ports	Yes Yes Yes 2 Yes; X1 2
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes Yes Yes 2 Yes; X1
on Ethernet via NTP Interfaces Number of PROFINET interfaces I. Interface Interface types	Yes Yes Yes 2 Yes; X1 2 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes Yes Yes 2 2 Yes; X1 2 Yes
on Ethernet via NTP Interfaces I. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols	Yes Yes Yes 2 2 Yes;X1 2 Yes;IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes Yes Yes 2 2 Yes; X1 2 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces I. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols IP protocol PROFINET IO Controller	Yes Yes Yes 2 2 Yes;X1 2 Yes;IPv4 Yes

Web server	Yes
Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
ROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
	Yes
- PROFlenergy	Yes; per user program
— Prioritized startup	Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max.	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
— Of which IO devices with IRT, max.	64
 Number of connectable IO Devices for RT, max. 	256
— of which in line, max.	256
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8; in total across all interfaces
 Number of IO Devices per tool, max. 	8
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT	
— for send cycle of 250 μs	250 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
— 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 µs: 375 µs, 625 µs
······································	875 µs)
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
ROFINET 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
- activation/deactivation of I-devices	Yes; per user program
- Asset management record	Yes; per user program
nterface	
terface types	
• RJ 45 (Ethernet)	Yes; X2
Number of ports	1
integrated switch	No
rotocols	
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
 PROFINET IO Device 	Yes
	Yes
SIMATIC communication	
Open IE communication	Yes; Optionally also encrypted
Open IE communicationWeb server	Yes
Open IE communicationWeb serverMedia redundancy	
Open IE communication Web server Media redundancy ROFINET IO Controller	Yes
Open IE communicationWeb serverMedia redundancy	Yes

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		32
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- for send cycle of 1 ms 1 ms to 512 ms PROFINET IO Device - Services - - PGUP communication Yes - Isochronous mode No - Isochronous mode No - ROF Planergy Yes; per user program - PROFIshergy Yes; per user program - Prointized startup No - Shared device Yes; per user program - Asset management record Yes; per user program - Asset management record Yes; per user program Interface types Yes R4 (Ethernet) Yes • Asset functions in travel Yes • Asset functions in travel Yes • Autocrossing Yes • Industrial Ethernet status LED Yes • Number of connections reserved for ESHMI/web 10 • Number of connections	— Updating times	set for PROFINET IO, on the number of IO devices, and on the quantity of
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Services - PG/OP communication Yes PG/OP communication No	— for send cycle of 1 ms	1 ms to 512 ms
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- Prioritized strup No - 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 Indeface types Fermional Structure Ruface types Fermional Structure Ruface types Yes - Autocrossing Yes - Autocrossing Yes - Autocrossing Yes - Autocrossing Yes - Mumber of connections, max. 192; via integrated interfaces of the CPU and connected CPs / CMs - Number of connections, max. 192; via integrated interfaces of the CPU and connected CPs / CMs - Number of connections reserved for ES/HMI/web 10 - Number of connections, max. 192; via integrated interfaces of the CPU and connected CPs / CMs - Number of connections reserved for ES/HMI/web 10 - Number of connections, max. 192; via integrated interfaces - Number of connections reserved for ES/HMI/web 10 - Number of connections, supported Yes - MRP Yes - MRP Yes - MRP Yes, as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client - MRP Yes; as MRP ring node according to IEC 62439-2 Ed		
- Shared device Yes - Number of IO Controllers with shared device, max. 4 - activation/deactivation of 1-devices Yes, per user program - Asset management record Yes; per user program Interface types Test per user program RL4 SE (Element) Yes - Autoorgotistion Yes - Mumber of connections, max. 192; viz 1/ V2.6 Number of connections via integrated interfaces of the CPU and connected CPs / CMs 10 - Number of connections via integrated interfaces 108 - Number of connections via integrated interfaces 108 - Number of connections via integrated interfaces 108 - Number of sonarctions via integrated interfaces 108 - Number of sonarctins wia integrated interfaces 108 - Number of sonarctins Yes <td< td=""><td></td><td></td></td<>		
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• Industrial Ethernet status LED Yes Protocols PROFIsafe Yes; V2.4 / V2.6 Number of connections, max. 192; via integrated interfaces of the CPU and connected CPs / CMs • Number of connections reserved for ES/HMI/web 10 • Number of Sonnections via integrated interfaces 108 • Number of Sonnections via integrated interfaces 108 • Number of S7 routing paths 16 Redundancy mode - • H-Sync forwarding Yes Media redundancy only via 1st interface (X1) - MRP Interconnection, supported Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client - MRPD Yes; mRP Automanager according to IEC 62439-2 Edition 3.0 - MRPD Yes; mRP Automanager according to IEC 62439-2 Edition 3.0 - MRPD Yes; mRP Client - MRPD Yes; row for MRPD - Number of stations in the ring, max. 50 SIMATIC communication See online help (S7 communication, user data size) Open IE communication, as client Yes • User data per job, max. See online help (S7 communication, user data size) Open IE communication Yes - Data length, max.	-	
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Number of connections 192; via integrated interfaces of the CPU and connected CPs / CMs • Number of connections reserved for ES/HMI/web 10 • Number of connections via integrated interfaces 108 • Number of S7 routing paths 16 Redundancy mode - • H-Sync forwarding Yes Media redundancy only via 1st interface (X1) - MRP Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager, MRP Client - MRP Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 - MRPD Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 - MRPD 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 Yes • S7 conting Yes • S7 communication, as server Yes • User data per job, max. See online help (S7 communication, user data size) Open IE communication Yes - Data length, max. 64 kbyte - several passive connections per port, supported Yes		Yes: V2.4 / V2.6
• Number of connections reserved for ES/HMI/web10• Number of connections via integrated interfaces108• Number of S7 routing paths16Redundancy mode• H-Sync forwardingYes• Media redundancyonly via 1st interface (X1)- Media redundancyonly via 1st interface (X1)- MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client- MRP Interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• Diser data per job, max.See online help (S7 communication, user data size)• DEP IE communicationYes• TCP/IPYes• Data length, max,64 kbyte• ISO-on-TCP (RFC1006)Yes	Number of connections	
Number of connections via integrated interfaces108Number of S7 routing paths16Redundancy modeYesImage: Image: Image	 Number of connections, max. 	192; via integrated interfaces of the CPU and connected CPs / CMs
Number of S7 routing paths16Redundancy mode• H-Sync forwardingYesMedia redundancyonly via 1st interface (X1)- Media redundancyonly via 1st interface (X1)- MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client- MRPDYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 routingYes• S7 routing according to IEC 62439-2 Edition 2.0, MRP• S7 routingYes• ST routingYes• S7 routingYes• S7 routingYes• S7 routingYes• S7 routingYes• Dene IE communication, as clientYes• TCP/IPYes- Data length, max.64 kbyte- Data length, max.64 kbyte- Sto-on-TCP (RFC1006)Yes	 Number of connections reserved for ES/HMI/web 	10
Redundancy mode Yes Media redundancy only via 1st interface (X1) - MRP Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client - MRP Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 - 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 Yes • S7 routing Yes • S7 communication, as client Yes • User data per job, max. See online help (S7 communication, user data size) Open IE communication Yes • Data length, max. 64 kbyte - several passive connections per port, supported Yes • ISO-on-TCP (RFC1006) Yes	 Number of connections via integrated interfaces 	108
• H-Sync forwardingYesMedia redundancyonly via 1st interface (X1)- Media redundancyonly via 1st interface (X1)- MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client- MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes\$7 routingYes\$7 communication, as serverYes\$7 communication, as clientYesUser data per job, max.See online help (S7 communication, user data size)Open IE communicationYes- TCP/IPYes- Data length, max.64 kbyte- several passive connections per port, supportedYes+ ISO-on-TCP (RFC1006)Yes	Number of S7 routing paths	16
Media redundancy only via 1st interface (X1) - 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 Yes • S7 communication, as server 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 - several passive connections per port, supported Yes • ISO-on-TCP (RFC1006) Yes	Redundancy mode	
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MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0 MRPDYes; Requirement: IRT Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	Media redundancy	
MRP Client- MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	— Media redundancy	only via 1st interface (X1)
MRPDYes; Requirement: IRT Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD Number of stations in the ring, max.50SIMATIC communication50SToutingYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	— MRP	
- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes		
Number of stations in the ring, max.50SIMATIC communicationSimatic communication• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)• TCP/IPYes• TCP/IPYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes		
• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- pata length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	- Number of stations in the ring, max.	50
• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- pata length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes		
• 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- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	S7 routing	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 - several passive connections per port, supported Yes • ISO-on-TCP (RFC1006) Yes	• S7 communication, as server	Yes
Open IE communication • TCP/IP Yes - Data length, max. 64 kbyte - several passive connections per port, supported Yes • ISO-on-TCP (RFC1006) Yes	 S7 communication, as client 	Yes
TCP/IP Yes Data length, max. 64 kbyte - several passive connections per port, supported Yes ISO-on-TCP (RFC1006) Yes	• User data per job, max.	See online help (S7 communication, user data size)
- Data length, max. 64 kbyte - several passive connections per port, supported Yes • ISO-on-TCP (RFC1006) Yes	Open IE communication	
 several passive connections per port, supported ISO-on-TCP (RFC1006) Yes 	• TCP/IP	Yes
• ISO-on-TCP (RFC1006) Yes	— Data length, max.	64 kbyte
	- several passive connections per port, supported	Yes
- Data length, max. 64 kbyte	ISO-on-TCP (RFC1006)	Yes
	— Data length, max.	64 kbyte

- Data length, max. 2 kbyle: 1 472 bytes for UDP broadcast - UDP multicast Yes: Max. 5 multicast circuits • DHCP Yes • DNS Yes • DNS Yes • DND Yes • DDCP Yes • DDCP Yes • DCP Yes • DCP Yes • DCP Yes • DCO Yes • Encryption Yes • Runtime loense required Yes • Prof DA Client Yes • OPC UA Yes • OPC UA Client Yes • Number of connections, max. 10 - Number of connections, max. 10 - Number of dennersits for one call of OPC_UA_NodesetHandleListOPC_UA_ReadListOPC_UTA. 200 - Number of dennersits for one call of OPC_UA_NodesetHandleListOPC_UA_ReadListOPC_UA_ReadListOPC_UA_NodesetHandleListOPC 300 - Number of denners for one call of OPC_UA_NodesetHandleListOPC 5 - Number of denners for one call of OPC_UA_NodesetHandleListOPC 20 - Number of denners for one call of OPC_UA_NodesetHandleListOPC 5 - Number of engisterable method calls of OPC_UA_NodesetHandleListOPC 5 - Number of engisterable method calls of OPC_UA_NodesetHandleListOPC 5 - Number of engisterable metho		
UDP multicastYes, Max. 5 multicast circuits• DHCPYes• DNSYes• SNMPYes• SDMPYes• DCPYes• LDDPYes• LTTPSYes• HTTPYes• HTTPYes• HTTPYes• HTTPYes• HTTPYes• Runtime license requiredYes• DPC UAYes• Runtime license requiredYes• OPC UAYes• Runtime license requiredYes• Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic25	Yes	• UDP
 DHCP Ves DNS Yes SNMP Yes SDP Ves COP Ves Corption Ves Corption Ves Corption Ves Standard and user pages HTTP Ves Standard and user pages OPC UA Cleant South authentication Ves Corpc Ua Client Ves OPC UA Client Ves OPC UA Standard and user pages OPC UA South authentication Ves South authentication Number of connections, max. Io Number of connections, max. Io Number of connections, max. Number of connections, max. Number of elements for one call of OPC_UA_NedGetHandeList/OPC_UA_ReadList/OPC_UA Number of elements for one call of OPC_UA_NedGetHandeList, max. Number of annutaneous calls of the client Instructions for data call of the client Number of inputs/outputs when calling OPC_UA_MethodCett and calls of OPC_UA_MethodCett and calls of OPC_UA_MethodCettin max. Number of inputs/outputs when calling OPC_UA_MethodCettin max. Available security policies: None, Basic12BRsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic256Rsa15, Basic	2 kbyte; 1 472 bytes for UDP broadcast	— Data length, max.
• DNSYes• SNMPYes• DCPYes• LLDPYes• LLDPYes• HTTPYes• HTTPYes• HTTPYes• HTTPYes• HTTPSYes• CPC UAYes• Runtime license requiredYes• OPC UA ClientYes• Application authenticationYes• Application authenticationYes• Authendr of the client linefraces.2000• Number of connections, max.10• Number of elements for one call of OPC_UA_NedGetHandleList/OPC_UA_ReadList/OPC_UA300• Number of elements for one call of OPC_UA_NameSpaceBetIndexit, max.10• Number of elements for one call of OPC_UA_NameSpaceBetIndexit, max.5000• Number of elements for one cal	Yes; Max. 5 multicast circuits	— UDP multicast
• SNMPYes• DCPYes• EncryptionYes: OptionalWebserverVes: Standard and user pages• HTTPYes: Standard and user pages• HTTPYes: Standard and user pagesOPC UAYes• Runtime license requiredYes• CPC UA ClientYes• Application authenticationYes- Security policiesAvailable security policies: None, Basic 126Rsa15, Basic256Rsa15, Basic256Sha256- User authenticationYes- Number of connections, max.10- Number of deements for one call of OPC_UA_Indectisuty policies: None, Basic 126Rsa15, Basic256Rsa15, Bas	Yes	• DHCP
 DCP Yes Encryption Yes, Standard and user pages HTTP HTTPS Yes, Standard and user pages CPC UA CPC UA Cleart Application authentication Security policies Application authentication Yes Security policies Application authentication Yes Security policies Application authentication Yes Application authentication Yes Security policies Application authentication Yes Security policies Security policies	Yes	• DNS
• LLDPYes• EncryptionYes; OptionalWeb server•• HTTPYes; Standard and user pages• HTTPSYes; Standard and user pages• OPC UA ClientYes;• Ronthne license requiredYes;• OPC UA ClientYes- Application authenticationYes;- User authentication*anonymous" or by user name & password- Number of connections, max.10- Number of connections, max.2000- Number of elements for one call of OPC; UA_NedGetHandeList/OPC-UA_ReadLis/OPC-UA_NedGetHandeList, max.2000- Number of elements for one call of OPC; UA_NedGetHandeList, max.2000- Number of elements for one call of OPC; UA_NedGetHandeList, max.10- Number of elements for one call of OPC; UA_NedGetHandeList, max.20- Number of elements for one call of OPC; UA_NedGetHandeList, max.100- Number of elements for one call of OPC; UA_NedGetHandeList, max.5000- Number of elements for one call of OPC; UA_NethonGetHandeList, max.5000- Number of registerable nodes, max.5000- Number of registerable method calls of OPC; UA_NethonGetHandeList, max.5000- Number of registerable nodes, max.5000- Number of registerable method calls of OPC; UA_NethonGetHandeList, max.100- Number of registerable nodes, max.5000- Number o	Yes	• SNMP
• Encryption Yes; Optional Wessever Ves; Standard and user pages • HTTPS Yes; Standard and user pages OPC UA Ves; Standard and user pages • OPC UA Client Yes • Application authentication Yes - Application authentication Yes - Application authentication Yes - Number of connections, max. 10 - Number of ondes of the client interfaces, recommended max. 2000 recommended max. 2000 - Number of elements for one call of OPC_UA_VerteedetHandleList/OPC_UA_ReadList/OPC_UA_ReadList/OPC_UA_NeadSectiontexts, max. 3000 - Number of elements for one call of OPC_UA_VerteedetHandleList, max. 10 - Number of simultaneous calls of the client instructions for esize many and the client instructions for data access, per connection, max. 100 - Number of simultaneous calls of the client instructions for data access, per connection, max. 5000 - Number of simultaneous calls of the client instructions for data access, per connection, max. 5000 - Number of registerable method calls of 100 00°C_UA_MethodCall, max. 5000 - Number of registerable method calls of 00°C_UA_MethodCall, max. 5000 100 100 100 100 <td>Yes</td> <td>• DCP</td>	Yes	• DCP
Web server Yes; Standard and user pages • HTTPS Yes; Standard and user pages OPC UA Yes • OPC UA Client Yes • Application authentication Yes - Security policies Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic556Rs256 - User authentication "anonymous" or by user name & password - Number of connections, max. 10 - Number of ones of the client interfaces, recommended max. 300 - Number of elements for one call of OPC_UA_Noc6eCHardexList, max. 300 - Number of elements for one call of OPC_UA_Noc6eCHardexList, max. 10 - Number of elements for one call of OPC_UA_MethodEHardeList, max. 100 - Number of elements for one call of OPC_UA_MethodEHardeList, max. 100 - Number of elements for one call of OPC_UA_MethodEHardeList, max. 100 - Number of simultaneous calls of the client interfaces, per connection, max. 5000 - Number of registerable nodes, max. 5000	Yes	• LLDP
• HTTP Yes; Standard and user pages • HTTPS Yes; Standard and user pages OPC UA • Runtime license required 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. 10 - Number of ondes of the client interfaces, recommended max. 2000 - Number of elements for one call of OPC_UA_NeeGetInducList, max. 20 - Number of elements for one call of OPC_UA_NameSpaceGetInducList, max. 20 - Number of elements for one call of OPC_UA_NameSpaceGetInducList, max. 10 - Number of elements for one call of OPC_UA_NameSpaceGetInducList, max. 10 - Number of elements for one call of OPC_UA_NameSpaceGetInducList, max. 100 - Number of registerable nodes, max. 5 000 - Number of registerable method calls of OPC_UA_MethodCall, max. 100 - Number of registerable method calls of OPC_UA_MethodCall, max. 100 - Number of sessions, max. 100 - Security policies Yes; Data access (read, write, subscribe), method ca	Yes; Optional	Encryption
• HTTPS Yes; Standard and user pages OPC UA • Ves • Runtime license required Yes • OPC UA Client Yes - Application authentication Yes - Security policies Available security policies: None, Basic 128Rsa15, Basic 256Rsa15, Basic 256Rsa15		Web server
• HTTPS Yes; Standard and user pages OPC UA • Ves • Runtime license required Yes • OPC UA Client Yes - Application authentication Yes - Security policies Available security policies: None, Basic 128Rsa15, Basic 256Rsa15, Basic 256Rsa15	Yes; Standard and user pages	• HTTP
OPC UA • Runtime license required Yes • OPC UA Client Yes - Application authentication Yes - Security policies Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa256 - User authentication "anonymous" or by user name & password - Number of connections, max. 10 - Number of elements for one call of OPC_UA_NodeCeHandleList/OPC_UA_ReadList/OPC_I - Number of elements for one call of 00 OPC_UA_NodeCeHandleList, max. 20 - Number of elements for one call of 00 OPC_UA_NedecHandleList, max. 10 - Number of elements for one call of 00 OPC_UA_MethodCell+andleList, max. 100 - Number of elements for one call of 100 OPC_UA_MethodCell+andleList, max. 1 - Number of elements for one call of 100 OPC_UA_MethodCall+andleList, max. 5 - Number of registerable nodes, max. 5 - Number of registerable nodes, max. 5 - Number of registerable nodes, max. 5 - Application authentication Yes - Application authentication Yes		
• Runtime license required Yes • OPC UA Client Yes - Application authentication Yes - Security policies Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Rsa256 - User authentication "anonymous" or by user name & password - Number of connections, max. 10 - Number of elements for one call of OPC_UA_NodeCetHandleList/OPC_UA_ReadList/OPC_Imax. 300 - Number of elements for one call of OPC_UA_MethodCetHandleList, max. 20 - Number of elements for one call of OPC_UA_MethodCetHandleList, max. 100 - Number of elements for one call of OPC_UA_MethodCetHandleList, max. 100 - Number of elements for one call of OPC_UA_MethodCetHandleList, max. 100 - Number of elements for one call of OPC_UA_MethodCetHandleList, max. 100 - Number of simultaneous calls of the client instructions for basesion management, per connection, max. 1 - Number of registerable netdoe calls of OPC_UA_MethodCall, max. 5 - Number of inputs/outputs when calling OPC_UA_MethodCall, max. 20 - Security policies: Yes; Data access (read, write, subscribe), method call, custom address s - Security policies Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 - User authentication "anonymous" or by user name & password - Number of registerable noteds, max. 48 <td></td> <td></td>		
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- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basi		
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Number of connections, max.10 Number of nodes of the client interfaces, recommended max.2 000 Number of elements for one call of OPC_LA_NodeGetHandleList/OPC_UA_ReadList/OPC_UA 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 elements for one call of OPC_UA_MethodGetHandleList, max.100 Number of simultaneous calls of the client instructions for data access, per connection, max.1 Number of registerable nodes, max.5 000 Number of eigisterable method calls of OPC_UA_MethodCall, max.100 Number of eigisterable method calls of OPC_UA_MethodCall, max.20 Number of registerable method calls of OPC_UA_MethodCall, max.5 000 Number of sinultaneous Number of registerable method calls of OPC_UA_MethodCall, max.20 Number of eigisterable method calls of Security policiesYes: Data access (read, write, subscribe), method call, custom address s Basic256Sha256 ApplicationYes Number of sessions, max.48 Number of subscriptions per session, max.20 Number of su	Basic256Sha256	
 Number of nodes of the client interfaces, recommended max. Number of elements for one call of OPC_UA_NodeCetHandleListOPC_UA_ReadListOPC_UA_NodeCetHandleListOPC_UA_ReadRistOPC ReadListOPC_UA_ReadListOPC_UA_ReadListOPC_UA_ReadListOPC_UA_ReadListOPC_UA_ReadCistOPC_UA_ReadCistOPC_UA_ReadCistOPC ReadListOPC ReadListOPC_UA_ReadCistOPC_UA_ReadCistOPC ReadListOPC RE		
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OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max.20- Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.100- 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- Number of registerable method calls of OPC_UA_MethodCall, max.100- Number of inputs/outputs when calling OPC_UA_MethodCall, max.20- Number of inputs/outputs when calling OPC_UA_MethodCall, max.20- Security policiesYes; Data access (read, write, subscribe), method call, custom address s a Application authentication- Security policies"anonymous" or by user name & password- Number of registerable nodes, max.100- Number of inputs/outputs when calling OPC_UA_MethodCall, max.Yes; Data access (read, write, subscribe), method call, custom address s Maible security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of registerable nodes, max.20- Number of registerable nodes, max.20- Number of sessions, max.20- User authentication"anonymous" or by user name & password- Number of registerable nodes, max.20- Number of subscriptions per session, max.20- Number of subscriptions per session, max.20- Sam	2 000	
OPC_UA_NameSpaceGetIndexList, max.100- 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.20OPC UA ServerYes; Data access (read, write, subscribe), method call, custom address s- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication'anonymous' or by user name & password- Number of registerable nodes, max.20- Security policies48- Number of accessible variables, max.100 000- Number of registerable nodes, max.20 000- Number of registerable nodes, max.20 000- Number of subscriptions per session, max.20 000- Number of subscriptions per session, max.20 000- Number of registerable nodes, max.20 000- Number of registerable nodes, max.20 000- Number of subscriptions per session, max.20 000- Number of subscriptions per sess	300	OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I
OPC_UA_MethodGetHandleList, max.1 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 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 Number of inputs/outputs when calling OPC_UA_MethodCall, max.Yes; Data access (read, write, subscribe), method call, custom address s Application authentication Security policiesYes; Data access (read, write, subscribe), method call, custom address s Number of sessions, max.48 Number of sessions, max.100 000 Number of registerable nodes, max.20 000 Number of registerable nodes, max.20 000 Security policiesanonymous" or by user name & password Number of subscriptions per session, max.20 000 Publishing interval, min.200 ms	20	
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- Number of simultaneous calls of the client instructions for data access, per connection, max.5- Number of registerable nodes, max.5000- Number of registerable method calls of OPC_UA_MethodCall, max.100- Number of inputs/outputs when calling OPC_UA_MethodCall, max.20- Number of inputs/outputs when calling OPC_UA_MethodCall, max.Yes; Data access (read, write, subscribe), method call, custom address s- Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of sessions, max.48- Number of registerable nodes, max.20 000- Number of subscriptions per session, max.20 000- Number of subscriptions per session, max.20 nos- Number of subscriptions per session, max.20 nos	1	instructions for session management, per connection,
 Number of registerable modes, max. Number of registerable method calls of OPC_UA_MethodCall, max. Number of inputs/outputs when calling OPC_UA_MethodCall, max. OPC UA Server Application authentication Security policies Security policies Ves Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 User authentication Number of sessions, max. Number of registerable nodes, max. Number of registerable nodes, max. Number of subscriptions per session, max. Subscriptions per set set set set set s	5	- Number of simultaneous calls of the client
 Number of registerable method calls of OPC_UA_MethodCall, max. Number of inputs/outputs when calling OPC_UA_MethodCall, max. OPC UA_MethodCall, max. OPC UA Server Application authentication Security policies Security policies Ves Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 User authentication Number of sessions, max. Number of accessible variables, max. Number of registerable nodes, max. Number of subscriptions per session, max. Sampling interval, min. Publishing interval, min. 20 	5 000	
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. OPC UA Server Application authentication Security policies Security policies Ves Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 User authentication Number of sessions, max. Number of accessible variables, max. Number of registerable nodes, max. Number of subscriptions per session, max. Sampling interval, min. Publishing interval, min. 		— Number of registerable method calls of
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Application authenticationYes- Security policiesAvailable security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256- User authentication"anonymous" or by user name & password- Number of sessions, max.48- Number of accessible variables, max.100 000- Number of registerable nodes, max.20 000- Number of subscriptions per session, max.20- Sampling interval, min.100 ms- Publishing interval, min.200 ms	Yes: Data access (read, write, subscribe), method call, custom address space	
Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256— User authentication"anonymous" or by user name & password— Number of sessions, max.48— Number of accessible variables, max.100 000— Number of registerable nodes, max.20 000— Number of subscriptions per session, max.20— Number of subscriptions per session, max.200 ms		
Number of sessions, max.48 Number of accessible variables, max.100 000 Number of registerable nodes, max.20 000 Number of subscriptions per session, max.20 Sampling interval, min.100 ms Publishing interval, min.200 ms	Available security policies: None, Basic128Rsa15, Basic256Rsa15,	
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Number of accessible variables, max.100 000 Number of registerable nodes, max.20 000 Number of subscriptions per session, max.20 Sampling interval, min.100 ms Publishing interval, min.200 ms		
Number of registerable nodes, max.20 000 Number of subscriptions per session, max.20 Sampling interval, min.100 ms Publishing interval, min.200 ms		
Number of subscriptions per session, max.20 Sampling interval, min.100 ms Publishing interval, min.200 ms		
— Sampling interval, min. 100 ms — Publishing interval, min. 200 ms		-
— Publishing interval, min. 200 ms		
	50	— Number of server methods, max.
- Number of inputs/outputs per server method, max. 20		
 Number of monitored items, recommended max. 2 000; 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 type "Reference namespace" 	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"	 Number of server interfaces, max.
— Number of nodes for user-defined server interfaces, 5 000 max.	5 000	max.
Further protocols		
MODBUS Yes; MODBUS TCP	Yes; MODBUS TCP	
Isochronous mode		Isochronous mode
Equidistance Yes	Yes	Equidistance
S7 message functions		S7 message functions
Number of login stations for message functions, max. 64	64	Number of login stations for message functions, max.
Program alarms Yes	Yes	
	10 000; Program messages are generated by the "Program_Alarm" block,	Number of configurable program messages, max.

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	ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	3 000
	200
Number of program alarms	800
Number of alarms for system diagnostics	200
 Number of alarms for motion technology objects 	160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 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, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters
 Number of variables, max. 	
- of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
• Forcing	Yes; without fail-safe
Forcing, variables	peripheral inputs/outputs (without fail-safe)
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	3 200
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED • RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
STOP ACTIVE 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	2 400
Required Motion Control resources	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) 	7
 — Number of positioning axes at motion control cycle of 8 ms (typical value) 	14
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	PLo
 Performance level according to ISO 13849-1 	PLe

• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time	e of 100 hours)
 Low demand mode: PFDavg in accordance with SIL3 	< 2.00E-05
 High demand/continuous mode: PFH in accordance with SIL3 	< 1.00E-09
Ambient conditions	
Ambient temperature during operation	
 horizontal installation, min. 	-25 °C; No condensation
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	-25 °C; No condensation
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
 Password for display 	Yes
Protection level: Write protection	Yes; Specific write protection both for Standard and for Failsafe
 Protection level: Read/write protection 	Yes
 Protection level: Write protection for Failsafe 	Yes
 Protection level: Complete protection 	Yes
programming / cycle time monitoring / header	
lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	70 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	830 g
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