Data sheet

6ES7515-2AM02-0AB0



SIMATIC S7-1500, CPU 1515-2 PN, central processing unit with 500 KB work memory 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 1515-2 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 $500~\mu s$ (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 6ES7515-2AM01-0AB0
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)	F00 khyto
• integrated (for program)	500 kbyte
• integrated (for data)	3 Mbyte
Load memory Plug-in (SIMATIC Memory Card), max.	22 Chuta
	32 Gbyte
maintenance-free	Yes
	Tes
CPU processing times	22
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	5 Mbyte, 1 of DD5 With absolute addressing, the max. Size is 64 ND
Number range	0 65 535
• Size, max.	500 kbyte
• Size, max.	ovo rayto
Number range	0 65 535
Size, max.	500 kbyte
• Size, max.	ovo rayto
• Size, max.	500 kbyte
Number of free cycle OBs	100
Number of time alarm OBs	20
Number of time alarm OBs Number of delay alarm OBs	20
•	
Number of cyclic interrupt OBs Number of process clarm OBs	20; With minimum OB 3x cycle of 500 μs
Number of process alarm OBs Number of DDV4 slarm OBs	50
Number of DPV1 alarm OBs Number of incohrange mode OBs	3
Number of isochronous mode OBs	2
Number of technology synchronous alarm OBs	2
Number of startup OBs	100
Number of asynchronous error OBs	4
 Number of synchronous error OBs 	2
Number of diagnostic alarm OBs	1
Nesting depth	
per priority class	24
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— 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
Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max.	

• 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	o mayte, max. To the per block
Number of IO modules	9.100; may number of modules / submodules
	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
N 1 (10 0 1 iii	inserted in total
Number of IO Controllers	
• integrated	2
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be
Dools	inserted in total
Rack	20. CDLL 24 modules
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	31013
Time of day	
Clock	
• Type	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
Number	16
Clock synchronization	
• supported	Yes
• in AS, master	Yes
• in AS, slave	Yes
on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
1. Interface	
Interface types	V V
• RJ 45 (Ethernet)	Yes; X1
 Number of ports 	2
integrated switch	Yes
Protocols	
IP protocol	Yes; IPv4
 PROFINET IO Controller 	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted

Web server	Yes
Media redundancy	Yes
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— 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. 	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	$250~\mu s$ 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 $\mu s: 375~\mu s, 625~\mu s 3 875~\mu s)$
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
activation/deactivation of I-devices	Yes; per user program
— Asset management record	Yes; per user program
2. Interface	
Interface types	V V0
• RJ 45 (Ethernet)	Yes; X2
Number of ports	1
• integrated switch	No
Protocols	Vest ID: 4
IP protocol IPDOFINIET IO Controller	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device CIMATIC communication	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
Media redundancy	No
PROFINET IO Controller	
Services	
 PG/OP communication 	Yes

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Industrial Ethernet status LED Protocols PROFisafe No Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces of the CPU and connected CPs / CMs Number of S7 routing paths 16 Redundancy only via 1st interface (X1) - MRP Media redundancy - MRP interconnection, supported Yes; as MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client - MRPD Yes; Requirement: IRT - Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication PG/OP communication PG/OP communication PG/OP communication PG/OP communication, as server S7 communication, as server S7 communication, as client PG/OP IE communication PG/OP IE communication PG/OP IE communication PG/OP Communication PG/OP Communication PG/OP Communication PG/OP Communication PG/OP Communicati	-	
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PROFIsafe Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web 10 Number of connections via integrated interfaces 108 Number of ST routing paths 16 Redundancy mode H-Sync forwarding Yes Media redundancy — Media redundancy — Media redundancy — MRP Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication ST routing Yes ST communication, as server Yes ST communication, as client Yes See online help (S7 communication, user data size) Open IE communication PCP/IP — Data length, max. — Several passive connections per port, supported Yes		165
Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections via integrated interfaces Number of S7 routing paths Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number of S7 routing Number		No
Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of Sr routing paths Nedia redundancy Nedia redundancy Nedia redundancy Nedia redundancy NRP NRP Number of Stations, supported NRPD Number of stations in the ring, max. Number of stations in the ring, max. Number of stations, as server Sr routing Sr routing Sr communication, as client Sr communication, as client Nedia redundancy NRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD Number of stations in the ring, max. Nedia redundancy Yes; encryption with TLS V1.3 pre-selected Yes Sr routing Yes Sr communication, as server Yes See online help (Sr communication, user data size) Open IE communication TCP/IP Data length, max. See online help (Sr communication, user data size) Yes Yes Ak byte Yes		INU
Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Yes Media redundancy — Media redundancy — Media redundancy — MRP — 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; as MRP ring node according to IEC 62439-2 Edition 3.0 — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication Yes; encryption with TLS V1.3 pre-selected S7 routing Yes S7 communication, as server Yes S7 communication, as client User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP — Data length, max. — several passive connections per port, supported Yes		102: via integrated interfaces of the CDLL and connected CDs / CMs
Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP MRP MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP Client MRP D MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication, as server S7 communication, as server S7 communication, as selient Uses according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD SIMATIC communication PG/OP communication Yes; encryption with TLS V1.3 pre-selected 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 TCP/IP Data length, max. Several passive connections per port, supported Yes		
Number of S7 routing paths Redundancy mode		
Redundancy mode • H-Sync forwarding Media redundancy — Media redundancy — MRP MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client — MRP interconnection, supported — MRPD MRPD Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication • PG/OP communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. See online help (S7 communication, user data size) Open IE communication • TCP/IP — Data length, max. — several passive connections per port, supported Yes		
Media redundancy Media redundancy MRP MRP MRP MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP Client MRP interconnection, supported MRPD Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 MRPD Yes; Requirement: IRT Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication ST communication, as server ST communication, as client User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP Data length, max. several passive connections per port, supported Yes Only via 1st interface (X1) Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; entry humpless for MRPD Yes; encryption with TLS V1.3 pre-selected Yes Yes Open IE communication, user data size)		10
Media redundancy — Media redundancy — MRP — MRP — MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client — MRP interconnection, supported — MRP interconnection, supported — MRPD — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication — PG/OP communication — PG/OP communication — S7 routing — S7 communication, as server — S7 communication, as client — User data per job, max. See online help (S7 communication, user data size) Open IE communication — TCP/IP — Data length, max. — several passive connections per port, supported Only via 1st interface (X1) Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 SIMATIC communication Yes; encryption with TLS V1.3 pre-selected Yes — S7 communication, as server Yes — See online help (S7 communication, user data size) Open IE communication — TCP/IP — Data length, max. — several passive connections per port, supported	•	Voc
- Media redundancy - MRP - MRP - MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client - MRP interconnection, supported - MRPD - MRPD - Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 - MRPD - Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication - PG/OP communication - PG/OP communication - S7 routing - S7 communication, as server - S7 communication, as client - User data per job, max. See online help (S7 communication, user data size) Open IE communication - TCP/IP - Data length, max several passive connections per port, supported - Ves; encryption with TLS V1.3 pre-selected - Yes - G4 kbyte - Yes - Several passive connections per port, supported - Yes	· ·	1 53
- MRP - MRP interconnection, supported - MRP client - MRP interconnection, supported - MRPD - Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication - PG/OP communication - PG/OP communication - S7 routing - S7 communication, as server - S7 communication, as client - S8 communication, as client - S9 communication - TCP/IP - Data length, max several passive connections per port, supported - Yes - S9 connections per port, supported - Yes - S9 communication - Yes - S9 communicat	·	only via 1st interface (V1)
- MRP interconnection, supported - MRPD - Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. Open IE communication • TCP/IP - Data length, max several passive connections per port, supported Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD Yes; encryption with TLS V1.3 pre-selected Yes; encryption with TLS V1.3 pre-selected Yes See online help (S7 communication, user data size)	Madia radundanay	
- Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication PG/OP communication PG/OP communication Yes; encryption with TLS V1.3 pre-selected S7 routing Yes S7 communication, as server Yes S7 communication, as client User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP - Data length, max several passive connections per port, supported Yes	•	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager;
— Number of stations in the ring, max. SIMATIC communication PG/OP communication Yes; encryption with TLS V1.3 pre-selected S7 routing Yes S7 communication, as server S7 communication, as client Yes User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP Data length, max. See online help (S7 communication, user data size) Yes A kbyte Yes	— MRP — MRP interconnection, supported	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
SIMATIC communication PG/OP communication Yes; encryption with TLS V1.3 pre-selected S7 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 TCP/IP Yes — Data length, max. — several passive connections per port, supported Yes	— MRP— MRP interconnection, supported— MRPD	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT
 PG/OP communication Yes; encryption with TLS V1.3 pre-selected S7 routing Yes S7 communication, as server S7 communication, as client User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP Pata length, max. See online help (S7 communication, user data size) Yes Open IE communication TCP/IP Yes See online help (S7 communication, user data size) 	 — MRP — MRP interconnection, supported — MRPD — Switchover time on line break, typ. 	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD
 S7 routing S7 communication, as server S7 communication, as client See online help (S7 communication, user data size) Open IE communication TCP/IP Data length, max. See online help (S7 communication, user data size) Yes TCP/IP See online help (S7 communication, user data size) Yes See online help (S7 communication, user data size) Yes See online help (S7 communication, user data size) 	— MRP — MRP interconnection, supported — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max.	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD
S7 communication, as server S7 communication, as client S7 communication, as client User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP Yes Data length, max. See online help (S7 communication, user data size) Yes Yes Yes Yes	— MRP — MRP interconnection, supported — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50
 S7 communication, as client User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP — Data length, max. — several passive connections per port, supported Yes Yes 	 — MRP — MRP interconnection, supported — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication ◆ PG/OP communication 	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected
User data per job, max. See online help (S7 communication, user data size) Open IE communication TCP/IP Yes — Data length, max. — several passive connections per port, supported Yes	- MRP - MRP interconnection, supported - MRPD - Switchover time on line break, typ. - Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes
Open IE communication • TCP/IP — Data length, max. — several passive connections per port, supported Yes Yes 64 kbyte Yes	MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes
● TCP/IP Yes — Data length, max. 64 kbyte — several passive connections per port, supported Yes	- MRP - MRP interconnection, supported - MRPD - Switchover time on line break, typ. - Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes
 Data length, max. several passive connections per port, supported Yes 	MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max.	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes
— several passive connections per port, supported Yes	MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. Open IE communication	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes See online help (S7 communication, user data size)
	MRP MRP interconnection, supported MRPD Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. Open IE communication	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes See online help (S7 communication, user data size)
• ISO on TCP (PEC1006)	- MRP - MRP interconnection, supported - MRPD - Switchover time on line break, typ. - Number of stations in the ring, max. SIMATIC communication • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. Open IE communication • TCP/IP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes See online help (S7 communication, user data size)
• ISO-on-TCP (RFC1006) Yes	MRP MRPD Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication PG/OP communication S7 routing S7 communication, as server S7 communication, as client User data per job, max. Open IE communication TCP/IP Data length, max several passive connections per port, supported	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50 Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes See online help (S7 communication, user data size) Yes 64 kbyte

— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	тез, Ориона
	Vac. Chandard and user name
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes; "Medium" license required
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 nodes of the client interfaces, recommended max. 	2 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max. 	300
Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.	20
Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
Number of simultaneous calls of the client instructions for session management, per connection, max.	1
Number of simultaneous calls of the client instructions for data access, per connection, max.	5
Number of registerable nodes, max.	5 000
Number of registerable method calls of OPC_UA_MethodCall, max.	100
Number of inputs/outputs when calling OPC UA MethodCall, max.	20
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
Application authentication	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
GDS support (certificate management)	Yes
— Number of sessions, max.	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
 Number of server methods, max. 	50
 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 the type "Reference namespace"
 Number of nodes for user-defined server interfaces, max. 	5 000
Alarms and Conditions	Yes
Number of program alarms	200
	100
Number of alarms for system diagnostics	11/1/
Number of alarms for system diagnostics Further protocols	
Number of alarms for system diagnostics Further protocols MODBUS	Yes; MODBUS TCP

Equidistance	Yes
S7 message functions	100
	64
Number of login stations for message functions, max.	
Program alarms	Yes
Number of configurable program messages, max.	10 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
 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
 Variables 	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
 Number of variables, max. 	
— of which status variables, max.	200; per job
 of which control variables, max. 	200; per job
Forcing	
• Forcing	Yes
• Forcing, variables	Peripheral inputs/outputs
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	, op 10 0 12 12 0 10 10 10 10 10 10 10 10 10 10 10 10 1
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
• ENTON EED	165
• MAINT LED	Yes
MAINT LED STOP ACTIVE LED	Yes
• STOP ACTIVE LED	Yes
STOP ACTIVE LED Connection display LINK TX/RX	
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects	Yes Yes
STOP ACTIVE LED Connection display LINK TX/RX	Yes
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects	Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis — Number of positioning axes at motion control cycle	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160 40
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value)	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160 40
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value) Controller	Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160 40 7
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value) Controller PID_Compact	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160 40 7 14 Yes; Universal PID controller with integrated optimization
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value) Controller PID_Compact PID_SStep	Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160 40 7 14 Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves
STOP ACTIVE LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam per cam track per probe Positioning axis Number of positioning axes at motion control cycle of 4 ms (typical value) Number of positioning axes at motion control cycle of 8 ms (typical value) Controller PID_Compact	Yes Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 2 400 40 80 160 80 20 160 40 7 14 Yes; Universal PID controller with integrated optimization

High-speed counter	Yes
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 $^{\circ}\text{C};$ Display: 40 $^{\circ}\text{C},$ at an operating temperature of typically 40 $^{\circ}\text{C},$ 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
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	Yes
 Copy protection 	Yes
Block protection	Yes
Access protection	
 protection of confidential configuration data 	Yes
 Password for display 	Yes
 Protection level: Write protection 	Yes
 Protection level: Read/write protection 	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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