6ES7517-3AP00-0AB0

Data sheet



SIMATIC S7-1500, CPU 1517-3 PN/DP, Central processing unit with work memory 2 MB for Program and 8 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 3rd interface: PROFIBUS, 2 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1517-3 PN/DP
HW functional status	FS10
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 250 μs (distributed) and 1 ms (central)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17 (FW V2.9) / V13 Update 3 (FW V1.6) or higher
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	6.1 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	1.55 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)	30 W
Power loss	
Power loss, typ.	24 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	2 Mbyte
→ integrated (ior program)	Z IVIDYIG

• integrated (for data)	8 Mbyte
Load memory	
 Plug-in (SIMATIC Memory Card), max. 	32 Gbyte
Backup	
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	2 ns
for word operations, typ.	3 ns
for fixed point arithmetic, typ.	3 ns
for floating point arithmetic, typ.	12 ns
CPU-blocks	
Number of elements (total)	12 000; 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.	8 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	1 Mbyte
FC	
Number range	0 65 535
• Size, max.	1 Mbyte
OB	4 Mb. 4-
Size, max. Number of free couls ORs	1 Mbyte
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 100 μs
Number of process alarm OBs Number of DDV4 plants OBs	50
Number of DPV1 alarm OBs Number of incohorage made OBs	3
Number of technology synchronous plarm ORs	3 2
Number of technology synchronous alarm OBs Number of starting OBs	100
Number of startup OBsNumber of asynchronous error OBs	4
Number of asynchronous error OBs	2
Number of synchronous error OBs Number of diagnostic alarm OBs	1
Nesting depth	•
per priority class	24
Counters, timers and their retentivity	27
S7 counter	0.040
Number Potontivity	2 048
Retentivity	Yes
— adjustable IEC counter	163
Number	Any (only limited by the main memory)
Retentivity	Any formy minited by the main memory)
— adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
Retentivity	, , , , , , , , , , , , , , , , , , , ,
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
Extended retentive data area (incl. timers, counters, flags),	8 Mbyte; When using PS 6 0W 24/48/60 V DC HF
max.	, ,
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 adjustable Retentivity preset	No
Local data	110
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	16 384; 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)	32 kbyte; Max. 32 KB via X1; max. 8 KB via X2 or X3
— Outputs (volume)	32 kbyte; Max. 32 KB via X1; max. 8 KB via X2 or X3
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	20
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	
• integrated	1
● 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	De inserteu in total
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	
• Type	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, glave	Yes Yes
in AS, slaveon Ethernet via NTP	Yes
	165
Interfaces Number of PROFINET interfaces	2
Number of PROFINE Linterfaces Number of PROFIBUS interfaces	2
1. Interface	
Interface types	Voc. V1
RJ 45 (Ethernet) Number of ports	Yes; X1 2
Number of portsintegrated switch	Yes
Protocols	1 65
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	V.
— 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.	512; 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, 	512
max. — of which in line, max.	512
Number of IO Devices that can be	8; in total across all interfaces
simultaneously activated/deactivated, max.	o, 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
- F 9	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
— 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	Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625
cycles	μs 3 875 μs)
Update time for RT	050 1 400
— 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	Von
	Yes
— Isochronous mode — IRT	No Voc
	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	1 00, per user program
Interface types	Voc. V2
RJ 45 (Ethernet) Number of parts	Yes; X2
Number of ports integrated quitable	1
• integrated switch	No
Protocols • IP protocol	Voe: IDv/
IP protocol PROFINET IO Controller	Yes; IPv4
PROFINET IO Controller PROFINET IO Dovice	Yes
PROFINET IO Device SIMATIC communication	Yes
SIMATIC communication Open IF communication	Yes Voc Ontionally also appropriated
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
Media redundancy	No
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
 Isochronous mode 	No
Direct data exchange	No

- IRT - PROFilenergy - Prioritized startup - Number of connectable IO Devices, max. - Number of connectable IO Devices, max. - Number of thich in ins., max of which in ins., max of which in ins., max of which in ins., max which		
- Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max Of which in line, max Number of 10 Devices that can be simultaneously activated/deactivated, max Updating fines - Number of 10 Devices per tool, max Updating fines - FROFINET IO Devices - Prof. Pr		
Number of connectable IO Devices, max. Number of connectable IO Devices for RT, max. Number of connectable IO Devices for RT, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Updating times Updating times Updating times Very Interface Ver	3,	
Number of connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times Updating times Updating times The max 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 RT for send cycle of 1 ms PROFINET IO Device Services PGOP communication Isochronous mode IRT FROFIneory PROFINET IO Device Number of IO Controllers with shared device, max activation/deactivation of I-devices Asset device Number of IO Controllers with shared device, max activation/deactivation of I-devices Asset haragement record PROFIBUS DP stave Number of ports Number of ports PROFIBUS DP master PROFIBUS DP mas	•	
max. — Number of I/O Devices per tool, max. — Number of I/O Devices per tool, max. — Number of I/O Devices per tool, max. — Updating times Update time for RT — to 1 send cycle of 1 ms PROFINET I/O Devices Services — PG/OP communication — Isochronous mode — Isochronous mode — Isochronous mode — Isochronous mode — Number of I/O Controllers with shared device, max. — activation/deachvation of Ir-devices — Asset management record — Yes; per user program — Number of I/O Controllers with shared device, max. — activation/deachvation of I-devices — Asset management record — Yes; per user program — Yes; per		AS-i, PROFIBUS or PROFINET
- Number of I/O Devices that can be simultaneously advisade/dachavted max Number of I/O Devices per tool, max Updating times - Updating times - Update time for RT - for send cycle of 1 ms - row row send cycle of 1 ms - row	•	128
simultaneously advisated/deachvated, max. - Number of IO Devices per tool, max. - Updating times The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data Update time for RT - for send cycle of 1 ms PGOFINET IO Device Services - PGIOP communication - Isochronous mode - IRT - Isochronous mode - IRT - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deachvation of I-devices - Asset management record Interface types - RS 485 - Number of ports - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP master - Number of ports - PROFIBUS DP slave - SIMATIC communication - Yes - PROFIBUS DP slave - SIMATIC communication - Yes - PROFIBUS DP slave - Number of ports- Interface types - Isochronous mode - Requisitance - Isochronous mode - Requisitance - Isochronous mode - Activation/deactivation of DP slaves - PGOFIBUS DP slaves - Activation/deactivation of DP slaves -	— of which in line, max.	128
- Number of IO Devices per tool, max. - Update time for RT - For send cycle of 1 ms - PROFINET IO Device Services - PGOP communication - Isochronous mode - Number of IO Octrollers with shared device, max a citvation/deactivation of I-devices - RS et Mass - RS 45 - Number of ports - PROFIBUS DP master - Number of Do connections, max Number of Do connections of DP slaves - Number of Do connections and DP slaves - RS 45 - Number of DP slaves, max Number of DP slaves - Number of DP slaves, max Number of DP slaves - Activation/deactivation of DP slaves - RS 45 - Number of DP slaves, max Activation/deactivation of DP slaves - PGOP Communication - PGOP Slaves, max Number of DP slaves by Se - PGOP communication - PGOP communication - PGOP communication - Yes - PGOP communication - Yes - PGOP communication - Yes - Activation/deactivation of DP slaves - Number of connections wax Number of connections reserved for ES/HMIlweb - Number of connections vas integrated interfaces - Number of connections reserved for ES/HMIlweb - Number of connections vas integrated interfaces - Number of connections vas integrated interfaces - Number of connections vas integrated interfaces - Number of connections vas		8; in total across all interfaces
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Update time for RT — for send cycle of 1 ms PROFINET IO Device Services — PGC/P communication — lsccbronous mode — No — lsccbronous mode — No — IRT — No — PROFlenergy — Prioritized startup — Profice of the startup — Profice of the startup — Shared device — Number of IO Controllers with shared device, max. — activation/descluvation of I devices — Asset management record 3. Interface Interface types — RS 485 — Number of ports — 1 Profices — PROFIBUS DP master — Number of connections, max. — Number of ports — PGG/P communication — Equidistance — PGG/P communication — Equidistance — Services — PGG/P communication — Equidistance — However the startus LED — PGG/P communication — Equidistance — Activation/descluvation of DP slaves — Activation/descluvation of DP slaves — No — Autonegotiation — PGG/P startus — No — Number of connections, max. — 12 Mbit/s PROFIGUS No Number of connections max. — Notation max.	— Updating times	share set for PROFINET IO, on the number of IO devices, and on the
PROFINET IO Device Services - PC/OP communication - Isochronous mode - INT - INT - PROFlenergy - Prioritized startup No - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - Asset management record - Start Asset management record - Asset management record - Asset management record - Start Asset management record	Update time for RT	quality of collingation accordance
Services - PG/OP communication - Isochronous mode - IRT - No - IRT - PROFlenergy - Prioritized startup - No - Shared device - Mumber of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Startorface Interface types - RS 485 - Number of ports - PROFIBUS DP master - PROFIBUS DP slave - SIMATIC communication - PROFIBUS DP slave - SIMATIC communication - Yes - PROFIBUS DP master - Number of concections, max Number of DP slaves, max Number of DP slaves, max Services - PG/OP communication - Equidistance - Services - PG/OP communication - Equidistance - Activation/deactivation of DP slaves - Activation/deactivation of DP slaves - Activation/deactivation of DP slaves - Autoreopolation -	— for send cycle of 1 ms	1 ms to 512 ms
	PROFINET IO Device	
Isochronous mode IRT	Services	
- IRT - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record 3. Interface Interface types - R3 485 - Namber of ports - PROFIBUS DP master - PROFIBUS DP master - Number of connections, max Number of DP slaves, max Number of DP slaves, max R4 FROFIBUS OP recommunication - Equidistance - Ligidistance - L	— PG/OP communication	Yes
PROFIlenergy Prioritized startup Shared device and the startup	— Isochronous mode	No
- Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record 3. Interface Interface types - RS 485 - Number of ports - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP slave - SIMATIC communication PROFIBUS DP master - Number of connections, max Number of DP slaves, max Number of DP slaves, max PG/OP communication Services - PG/OP communication - Equidistance - Activation/deactivation of DP slaves - Autocrossing - Industrial Ethernet status LED - Autocrossing - Industrial Ethernet status LED - PROFIBUS - Number of connections, max Number of connections - Autocrossing - Industrial Ethernet status LED - PROFIBUS - Transmission rate, max Number of connections - Number of connections was reparted interfaces - Number of connections was reparted interfaces - Number of connections was reparted interfaces - Number of connections - Number of connections was reparted interfaces - Number of connections - Number of connections was reparted interfaces - Number of connections was reparted interfaces - Number of connections - Number of connec	— IRT	No
Shared device		Yes; per user program
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max. — activation/deactivation of I-devices — Asset management record 3. Interface Interface types RS 485 Number of ports PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of Designer PROFIBUS DP master Number of Designer Number of Designer PROFIBUS DP master Number of Designer Number of Designer PROFIBUS DP master Number of Designer Number of Connections, max. Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections reserved for ES/HMI/web Number of Connections reserved for ES/HMI/web Number of S' routing paths Number of S' routing paths Redundancy mode H-Sync forwarding Media redundancy	— Shared device	Yes
	•	4
- Asset management record Yes; per user program 3. Interface types RS 485 RS 485 Number of ports PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. ASI, FROFIBUS or PROFIBUS DP interface PROFIBUS OF master Number of DP slaves, max. ASI, PROFIBUS or PROFINET Services PGOP communication Yes PROFIBUS or PROFINET Services PGOP communication Yes Asi, PROFIBUS or PROFINET Services PROFIBUS or PROFIBUS or PROFINET Services PROFIBUS or PROFIBUS or PROFIBUS or PROFINET Services PROFIBUS or PRO		Voc. nor upor program
Interface types • RS 485 • Number of ports 1 Protocols • PROFIBUS DP master • PROFIBUS DP slave • No • SIMATIC communication • PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • Number of DP slaves, max. • PG/OP communication • Yes • Equidistance • Yes • Lactivation/deactivation of DP slaves Interface types RJ 45 (Ethemet) • 100 Mbps • Autocrossing • Autocrossing • Industrial Ethernet status LED • Yes • Autocrossing • Industrial Ethernet status LED • Yes RS 485 • Transmission rate, max. Protocols PROFisafe No Number of connections, max. • Number of connections reserved for ES/HMII/web • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy		
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Number of DP slaves, max. Services - PG/OP communication		48: for the integrated PROFIBLIS DP interface
AS-I, PROFIBUS or PROFINET Services — PG/OP communication Yes — Equidistance Yes — Isochronous mode Yes — Activation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) • 100 Mbps Yes • Autonegotiation Yes • Autocrossing Yes • Industrial Ethernet status LED Yes RS 485 • Transmission rate, max. 12 Mbit/s Protocols PROFIsafe No Number of connections, max. • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes		
PG/OP communication Equidistance Isochronous mode Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) 100 Mbps Autoregotiation Autocrossing Autocrossing Autocrossing Autocrossing Autocrossing Autocrossing Industrial Ethernet status LED RS 485 Transmission rate, max Transmission rate, max It Mbit/s Protocols PPOFIsafe Number of connections, max Number of connections, max Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Yes Mcdia redundancy Yes Activation/deactivation of DP slaves Yes Yes Activation/deactivation of DP slaves Activation/deactivation of DP slaves Yes Activation/deactivation of DP slaves Yes Activation of DP slaves Yes Activation of DP slaves Activa	• Number of Dr. Slaves, max.	
- Equidistance - Isochronous mode - Activation/deactivation of DP slaves Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Autoreossing • Industrial Ethernet status LED RS 485 • Transmission rate, max. Protocols POFIsafe No Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes Yes Yes Yes No No No No No No Redundancy mode Yes Yes Yes Yes	Services	
Isochronous mode Yes Activation/deactivation of DP slaves Yes Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED Yes RS 485 • Transmission rate, max. Protocols PROFIsafe No Number of connections, max. • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes Yes Yes Yes Yes Yes Yes Ye	— PG/OP communication	Yes
	— Equidistance	Yes
Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED RS 485 • Transmission rate, max. Protocols PROFIsafe No Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes Yes Yes Yes Yes Yes Yes Ye	 Isochronous mode 	Yes
RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED RS 485 • Transmission rate, max. Protocols PROFIsafe No Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes Yes Yes Yes 12 Mbit/s No No No No 228 320; via integrated interfaces of the CPU and connected CPs / CMs 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Redundancy mode • H-Sync forwarding Media redundancy	 Activation/deactivation of DP slaves 	Yes
• 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED RS 485 • Transmission rate, max. Protocols PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes Yes Yes Yes No No No Redundancy mode • H-Sync forwarding Yes Media redundancy	Interface types	
• 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED RS 485 • Transmission rate, max. Protocols PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy Yes Yes Yes Yes No No No Redundancy mode • H-Sync forwarding Yes Media redundancy	RJ 45 (Ethernet)	
 Autonegotiation Autocrossing Industrial Ethernet status LED Yes RS 485 Transmission rate, max. PROFIsafe Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths H-Sync forwarding Media redundancy Yes 		Yes
 Autocrossing Industrial Ethernet status LED Yes RS 485 Transmission rate, max. Mbit/s Protocols PROFIsafe No Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Author of S7 routing paths Yes Redundancy mode H-Sync forwarding Media redundancy 	•	Yes
 Industrial Ethernet status LED RS 485 Transmission rate, max. Mbit/s Protocols PROFIsafe No Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy 		Yes
 ◆ Transmission rate, max. Protocols PROFIsafe Number of connections ◆ Number of connections, max. ◆ Number of connections reserved for ES/HMI/web ◆ Number of connections via integrated interfaces ◆ Number of S7 routing paths Redundancy mode ◆ H-Sync forwarding Media redundancy 	_	Yes
PROFIsafe 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 Redundancy mode H-Sync forwarding Media redundancy No No No 320; via integrated interfaces of the CPU and connected CPs / CMs 10 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes	RS 485	
PROFIsafe Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of s7 routing paths Redundancy mode H-Sync forwarding Media redundancy No No 320; via integrated interfaces of the CPU and connected CPs / CMs 10 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes Media redundancy	Transmission rate, max.	12 Mbit/s
Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Mumber of connections, max. 320; via integrated interfaces of the CPU and connected CPs / CMs 10 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes Media redundancy	Protocols	
 Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy 320; via integrated interfaces of the CPU and connected CPs / CMs 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes 	PROFIsafe	No
 Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy 10 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes Media redundancy	Number of connections	
 Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy 10 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes Media redundancy	Number of connections, max.	320; via integrated interfaces of the CPU and connected CPs / CMs
 Number of S7 routing paths 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Redundancy mode H-Sync forwarding Media redundancy Yes	 Number of connections reserved for ES/HMI/web 	
 Number of S7 routing paths 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Redundancy mode H-Sync forwarding Media redundancy Yes	 Number of connections via integrated interfaces 	288
PROFIBUS Redundancy mode • H-Sync forwarding Media redundancy Yes		64; in total, only 16 S7-Routing connections are supported via
◆ H-Sync forwarding Yes Media redundancy		
Media redundancy		
		Yes
— Media redundancy only via 1st interface (X1)		
media redundancy	— 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 • PG/OP communication	Voc: openintian with TLC V/1.2 pro-coloated
S7 routing	Yes; encryption with TLS V1.3 pre-selected Yes
Data 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	, , , , , , , , , , , , , , , , , , , ,
• TCP/IP	Yes
— Data length, max.	64 kbyte
 several passive connections per port, supported 	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; 128 multicast circuits (of which max. 5 via X1)
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Encryption Web server	Yes; Optional
HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	res, otanidard and user pages
Runtime license required	Yes; "Large" 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. 	40
 Number of nodes of the client interfaces, recommended max. 	5 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/O 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	100
OPC_UA_MethodCall, max. — Number of inputs/outputs when calling	20
OPC_UA_MethodCall, max. • OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address
Application anthornication	space
— Application authentication— Security policies	Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15,
Security policies - User authentication	Basic256Sha256
GDS support (certificate management)	"anonymous" or by user name & password Yes
obo support (our mode management)	
 Number of sessions, max. 	64

 Number of accessible variables, max. 	200 000
 Number of registerable nodes, max. 	50 000
 Number of subscriptions per session, max. 	20
— Sampling interval, min.	10 ms
— Publishing interval, min.	10 ms
Number of server methods, max.	100
Number of inputs/outputs per server method,	20
max.	20
Number of monitored items, recommended	10 000; for 1 s sampling interval and 1 s send interval
max.	,
 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 	30 000
interfaces, max.	
 Alarms and Conditions 	Yes
 Number of program alarms 	400
 Number of alarms for system diagnostics 	200
Further protocols	
MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
•	100
S7 message functions	
Number of login stations for message functions, max.	64
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	2 000
Number of alarms for system diagnostics	1 000
Number of alarms for motion technology objects	480
	100
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 10 engineering systems
Status block	Yes; Up to 16 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	20
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
	200, poi jou
Forcing variables	Peripheral inpute/outpute
Forcing, variables Number of variables, many	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
 Number of entries, max. 	3 200
— of which powerfail-proof	1 000
Traces	
 Number of configurable Traces 	8; 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	
• IVIAIN I I CI	
	Yes
Connection display LINK TX/RX	Yes Yes
Connection display LINK TX/RX	Yes Yes; Note: The number of technology objects affects the cycle time of
Connection display LINK TX/RX Supported technology objects	Yes
Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for	Yes Yes; Note: The number of technology objects affects the cycle time of
Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool

— 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	.0
Number of positioning axes at motion control	70
cycle of 4 ms (typical value)	
 Number of positioning axes at motion control 	128
cycle of 8 ms (typical value)	
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
Ambient conditions	
Ambient temperature during operation	
 horizontal installation, min. 	0 °C
 horizontal installation, max. 	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the
	display is switched off
 vertical installation, min. 	0 °C
 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	10.00
• 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	
configuration / programming / header Programming language	
	Yes
Programming language	Yes Yes
Programming language — LAD	
Programming language — LAD — FBD	Yes
Programming language — LAD — FBD — STL	Yes Yes
Programming language — LAD — FBD — STL — SCL	Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH	Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection	Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection	Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection	Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection	Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection	Yes Yes Yes Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data	Yes Yes Yes Yes Yes Yes Yes Yes Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width Height Depth	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • Block protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width Height Depth Weights	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width Height Depth	Yes
Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection • Block protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Dimensions Width Height Depth Weights	Yes