## **SIEMENS**

## **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	
<ul> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 250 $\mu s$ (distributed) and 1 ms (central)
Engineering with	
<ul> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	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	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	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 <sup>2</sup> ·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 (for data)	8 Mbyte
Load memory	
<ul> <li>Plug-in (SIMATIC Memory Card), max.</li> </ul>	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	
<ul><li>Number range</li></ul>	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 puels OBs	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 and OBs	3
Number of technology synchronous plarm ORs	3 2
Number of technology synchronous alarm OBs     Number of stortup OBs	100
<ul><li>Number of startup OBs</li><li>Number of asynchronous error OBs</li></ul>	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 tony minico 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	
Data blocks  • Potentivity adjustable	Yes
<ul><li>Retentivity adjustable</li><li>Retentivity preset</li></ul>	No
Local data	INO
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	or hayte, make to the per block
Number of IO modules	16 204; may number of modules / submodules
I/O address area	16 384; max. number of modules / submodules
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	oz kayte, 7 ili outpute are ili the process illiage
— 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	,
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
Number of allowables to eyeleme	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	
<ul><li>integrated</li></ul>	2
<ul><li>Via CM</li></ul>	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can
	be inserted in total
Rack	00 000 04
Modules per rack, max.  Number of lines, max.	32; CPU + 31 modules
Number of lines, max.  PtP CM	1
Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	available slots
Clock	Handware alcal.
• Type	Hardware clock
<ul><li>Backup time</li><li>Deviation per day, max.</li></ul>	6 wk; At 40 °C ambient temperature, typically
Operating hours counter	10 s; Typ.: 2 s
Number	16
Clock synchronization	10
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
Number of PROFIBUS interfaces	1
1. Interface	
Interface types	Vac. V4
RJ 45 (Ethernet)      Number of parts	Yes; X1
Number of ports     integrated switch	2 Vos
• integrated switch	Yes
Protocols  • IP protocol	Voe: IDv/
<ul><li>IP protocol</li><li>PROFINET IO Controller</li></ul>	Yes; IPv4 Yes
PROFINET TO Controller      PROFINET TO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
- Open in communication	100, Optionally also still ypica

Web server	Yes
Web server     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
<ul> <li>Prioritized startup</li> </ul>	Yes; Max. 32 PROFINET devices
<ul> <li>Number of connectable IO Devices, max.</li> </ul>	512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<ul> <li>Of which IO devices with IRT, max.</li> </ul>	64
<ul> <li>Number of connectable IO Devices for RT,</li> </ul>	512
max.	F40
of which in line, max.      Number of IO Devices that can be	512 8: in total across all interfaces
simultaneously activated/deactivated, max.	o, ili 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
Spearing miles	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  avalog.	Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625
cycles	μs 3 875 μs)
Update time for RT	250 up to 129 mg
— for send cycle of 250 μs — for send cycle of 500 μs	250 μs to 128 ms 500 μs to 256 ms
— for send cycle of 3 ms	1 ms to 512 ms
— for send cycle of 1 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	- ma to 6 12 ma
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
<ul> <li>Number of IO Controllers with shared device,</li> </ul>	4
max.	
<ul> <li>activation/deactivation of I-devices</li> </ul>	Yes; per user program
Asset management record	Yes; per user program
2. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X2
<ul> <li>Number of ports</li> </ul>	1
integrated switch	No
Protocols	
• IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
<ul> <li>SIMATIC communication</li> </ul>	Yes
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 - PROFelenergy - Prioritzed startup - Number of connectable to Devices, max Number of connectable to Devices for RT Number of IO Devices that can be simulfameously advisted/deactivated. max Number of IO Devices per tool, max Updating times - For send cycle of 1 ms - POSICP communication - Isochronous mode - PROFilenergy - Prioritzed startup - PROFilenergy - Prioritzed startup - Number of IO Controllers with shared device, - Number of Octoritollers with shared device, - Number of Ports - PROFIBUS DP master - PROFIBU		
- Prioritized startup No	— IRT	
Number of connectable IO Devices, max.  Number of connectable IO Devices for RT, max.  of which in line, max.  of which in line, max.  Number of IO Devices that can be simultaneously activate/deactiveted, max.  Number of IO Devices that can be simultaneously activate/deactiveted, max.  Number of IO Devices that can be simultaneously activate/deactiveted, max.  Updating times  Updating times  For send cycle of 1 ms  F	5,	
AS-I_PROFIBUS or PROFINET  AS-I_Number of IO Devices that can be simultaneously activately deactivated, max.  - Number of IO Devices per tool, max.  - Updating times  Update time for RT  - for send cycle of 1 ms  PROFINET IO Device  Services  - PG/OP communication  - Isochronous mode  - Isochronous mode  - Number of IO Controllers with shared device, max.  - Number of IO Controllers with shared device, max.  - Number of IO Controllers with shared device, max.  - Asset management record  - Interface State  - PROFIBUS DP master  - PROFIBUS DP mas	•	
Number of nonectable IQ Devices for RT, max of which in line, max of which in line, max Number of IQ Devices that can be simultaneously activated/deactivated, max Number of IQ Devices per tool. max Number of IQ Devices per tool. max Updating times  Updating times  for send cycle of 1 ms for for send cycle of 1 ms for for for send cycle of 1 ms for for for for for send cycle of 1 ms for for for for for for for fo	<ul> <li>Number of connectable IO Devices, max.</li> </ul>	
max. — Number of ID Devices per tool, max. — Number of ID Devices per tool, max. — Number of ID Devices per tool, max. — Updating times  Update time for RT — to read cycle of 1 ms PROFINET ID Device Services — PGIOP communication — Isor Incommond — IRT — to read cycle of 1 ms PROFINET IO Device Services — PGIOP communication — Isor Incommond — IRT — No — PROFINET IO Device Services — PROFIDE attrip — No — PROFINET IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record — Asset management record — Asset management record — Responsible to the protections of the protection of the protectio	Number of connectable IO Devices for RT	
- Number of I/O Devices that can be simultaneously achievated describated, max Number of I/O Devices per tool, max Updating times  - Updating times  - Update time for RT  - For send cycle of 1 ms - FROFINET I/O Devices - Services  - PG/OP communication - Isochronous mode - Isochronous mode - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - Number of I/O Controllers with shared device, max a citivation/ideactivation of I-devices - PROFIBUS DP master - PROFIBUS DP share - PROFIBUS DP share - PROFIBUS DP share - Number of connections, max Number of DP slaves, max PROFIBUS DP master - PG/OP communication - Equidistance - Isochronous mode - Services - PG/OP communication - Yes - Autocrossing - Ves - Number of connections, max Number of connections, wax Number of connections vaintegrated interfaces of the CPU and connected CPs / CMs - Number of connections vaintegrated interfaces -	•	
simultaneously adviated/deachivated, 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  PROFINET ID Device  Services  - PGIOP communication - Isoachivorious mode - No - PROFIenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deachivation of I-devices - Asset management record - Yes; per user program - Ves; per user program - Number of ports - Number of ports - Yes - PROFIBUS DP master - PROFIBUS DP master - Number of connections, max Number of DP slaves, max Number of DP slaves, max Number of prometions, max Number of connections, max Number of connections with interface by Yes - Isoachivorious mode - Yes - Activation/deactivation of DP slaves - Yes - Activation/deactivation of DP slaves - Ves - Activation/deactivation of DP slaves - Yes - Interface by Yes - Number of connections, max Number of connections with integrated interfaces of the CPU and connected CPs / CMs - Number of connections with integrated interfaces - Number of connections wit	— of which in line, max.	128
Number of IO Devices per tool, max.  Updating times	<ul> <li>Number of IO Devices that can be</li> </ul>	8; in total across all interfaces
The minimum value of the update time also depends on communication share set for PROFINET IQ. on the number of IQ devices, and on the quantity of configured user data  Update time for RT  — for send cycle of 1 ms  PROFINET ID Device  Services  — PGOP communication — Iscortinonus mode — PROFIenergy — Prioritized startup — Prioritized startup — Shared device — Number of IQ Controllers with shared device, max. — activation/descrivation of I-devices — Asset management record — Asset management record — Yes; per user program — Yes; Per user	simultaneously activated/deactivated, max.	
share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data  PROFINET IO Device  Services  - PGIOP communication - Isochronous mode - Isochronou	<ul> <li>Number of IO Devices per tool, max.</li> </ul>	8
Quantity of configured user data	<ul> <li>Updating times</li> </ul>	
Update time for RT — for send cycle of 1 ms PROFINET IO Device  Services  — PGVOP communication — isochronous mode — No — IRT — No — PROFlenergy — Prioritized startup — No — Shared device — Number of Controllers with shared device, — max. — activation/deactivation of I devices — Asset management record  3. Interface  Interface types — RS 485 — Number of ports — 1 Protocols — PROFIBUS DP master — Number of connections, max. — 125, in total, up to 1 000 distributed I/O devices can be connected via ASI, PROFIBUS or PROFINET  Services — PGO'De communication — Equidistance — PGO'De communication — Equidistance — PGO'De communication — PGO'De commun		
- for send cycle of 1 ms	Undate time for RT	quantity of configured user data
PROFINET IO Device Services  - PG/OP communication	·	1 ms to 512 ms
Services  - PG/OP communication - Isochronous mode - IRT - Isochronous mode - IRT - PROFilenergy - Prioritized startup - No - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - RS 486 - RS 486 - RS 486 - RS 486 - PROFIBUS DP master - PROFIBUS DP master - PROFIBUS DP palsive - Number of ports - PROFIBUS DP master - Number of connections, max Number of DP slaves, max.  - Startice - Services - PO(OP communication - Equidistance - Lactivation/deactivation of DP slaves - Activation/deactivation of DP slaves - Activation of DP sla	·	1 to 0 . <u>2</u>
- PG/OP communication		
- Isochronous mode - IRT		Yes
- IRT - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Yes, Satta Management record - Asset management record - Yes - PROFIBUS DP master - Number of connections, max Number of connection of DP slaves - Autocrossing - Autocrossing - Autocrossing - Autocrossing - Industrial Ethernet status LED - Yes - Autocrossing - Industrial Ethernet status LED - Yes - Autocrossing - Industrial Ethernet status LED - Yes - Autocrossing - Industrial Ethernet status LED - Yes - Transmission rate, max - Number of connections, max Number of connections, max Number of connections reserved for ES/HMI/web - Number of connections via integrated interfaces - Number of connections via integrated interfac		
- PROFlenergy - Prioritized startup - Shared device and the startup and the st		
- Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Si. Interface    Interface types   RS 485   Number of ports   PROFIBUS DP master   PROFIBUS DP master   PROFIBUS DP slave   No   SIMATIC communication   Yes   PROFIBUS DP slave   Number of connections, max.   Number of connections, max.   Number of DP slaves, max.   Asset profits are asset profits are asset program   PROFIBUS DP master   Number of connections max.   Number of connections max.   Number of connections max.   PG/OP communication   Equidistance   PG/OP communication   Pes   PROFIBUS DP interface   125; In total, up to 1 000 distributed I/O devices can be connected via Assi, PROFIBUS or PROFINET    Services   PROFIBUS DP interface   PROFIBUS DP interface   125; In total, up to 1 000 distributed I/O devices can be connected via Assi, PROFIBUS or PROFINET    Services   PROFIBUS DP interface   PROFIBUS DP interface   Yes   PROFIBUS DP interface   Yes   PROFIBUS DP interface   PROFIBUS DP interfa		
Shared device Number of IO Controllers with shared device, max activation/deactivation of I-devices Yes; per user program Asset management record Yes; per user program	=-	
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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 • SIMATTIC communication  PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max.  Services  - PG/OP communication - Equidistance - Activation/deactivation of DP slaves  Interface types • Autonegotiation • Autocrossing • Industrial Ethernet status LED  RS 485 • Transmission rate, max. • Number of connections, max. • Number of connections • Number of Connections • Author of DP slaves  - Author of DP slaves • Interface types • Interface types • Number of DP slaves • Interface types • Number of DP slaves • Number of DP slaves • Number of DP slaves • Number of Connections • Number of Connections • No Number of Connections reserved for ES/HMI/web • Number of connections reserved for ES/HMI/web	0.100.000	
	•	7
- Asset management record Yes; per user program  3. Interface types  • 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. • Number of DP slaves  - PGOP communication - Equidistance - Equidistance - Activation/deactivation of DP slaves  - Loochronous mode - Activation/deactivation of DP slaves  - Autonegotiation • Autocrossing • Industrial Ethernet status LED  * PS  * R 485  • Transmission rate, max.  • Number of connections • Number of connections • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of connec		Yes; per user program
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Interface types  • RS 485  • Number of ports  1  Protocols  • PROFIBUS DP master  • PROFIBUS DP slave  • SIMATIC communication  PROFIBUS DP master  • Number of connections, max.  • Number of DP slaves, max.  • Number of Connections, max.  • Number of connections reserved for ES/HMI/web  • Number of connections was integrated interfaces  • Number of connections was integrated interfaces  • Number of Sor routing paths  Redundancy mode  • H-Sync forwarding  Media redundancy	_	,, ,
■ 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.  ■ PG/IDP communication  — Equidistance — PG/OP communication — Equidistance — Isochronous mode — Activation/deactivation of DP slaves  Pes  ■ Interface types  RJ 45 (Eithernet)  ■ 100 Mbps ■ Autocrossing ■ Industrial Ethernet status LED ■ Yes  ■ Autocrossing ■ Industrial Ethernet status LED ■ Yes  RS 485 ■ Transmission rate, max.  ■ Number of connections, max. ■ Number of connections reserved for ES/HMI/web ■ Number of connections ■ Redundancy mode ■ H-Sync forwarding Media redundancy	·	
Protocols  Protocols  PROFIBUS DP master PROFIBUS DP slave PROFIBUS DP master PROFIBUS DP master No SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. PROFIBUS DP master PROFIBUS DP master Number of DP slaves, max. PROFIBUS DP master Number of DP slaves, max. PROFIBUS OP ProFIBUS OP PROFINET  Services PPG/OP communication Peg-Gludistance Peg-Gludistan	• •	Vac. X3
Protocols  PROFIBUS DP master PROFIBUS DP slave SIMATIC communication PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Services PROFIBUS or PROFIBUS o		
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PROFIBUS DP master  Number of connections, max. Number of DP slaves, max.  PG/OP communication Equidistance Services PG/Services PG/OP communication Equidistance Services PG/Services PG/		
Number of connections, max. Number of DP slaves, max. Services  - PG/OP communication - Equidistance - Isochronous mode - Activation/deactivation of DP slaves  - Ves - Activation/deactivation of DP slaves    Number of connections   Yes   Number of connections, max.   Number of connections, max.   Number of sonnections reserved for ES/HMI/web   Number of sonnections reserved interfaces   No   Number of SP routing paths   Number of SP routing paths   Nedia redundancy   Nes   Nes   Nes   Nes   Nes   Number of connections reserved for ES/HMI/web   Number of SP routing paths   Nes   Nes   Nes   Nes   Nes   Nes   Nes   Number of connections reserved for ES/HMI/web   Number of SP routing paths   Nes   Nes		100
Number of DP slaves, max.  Services  - PG/OP communication - Equidistance - Isochronous mode - Activation/deactivation of DP slaves  Interface types  RJ 45 (Ethernet) - 100 Mbps - Autocrossing - Industrial Ethernet status LED - Yes - Industrial Ethernet status LED - Transmission rate, max.  Protocols  PROFIsafe No  Number of connections - Number of connections erserved for ES/HMI/web - Number of connections reserved for ES/HMI/web - Number of S7 routing paths  Redundancy mode - H-Sync forwarding - Media redundancy  125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS  125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS  126; In total, up to 1 000 distributed I/O devices can be connected via PROFIBUS  127; In total, up to 1 000 distributed I/O devices can be connected via PROFIBUS		48: for the integrated PROFIBILS DD interface
Services		
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 • Autorossing Yes • Industrial Ethernet status LED Yes  RS 485 • Transmission rate, max. 12 Mbit/s  Protocols  PROFIsafe No Number of connections, max. • Number of connections reserved for ES/HMI/web 10 • Number of connections via integrated interfaces 288 • Number of S7 routing paths Action of DP slaves Yes  Redundancy mode • H-Sync forwarding Yes Media redundancy  Yes	■ INUITING! OF DIC SIDVES, ITIDX.	AS-i, PROFIBUS or PROFINET
PG/OP communication Yes Equidistance Yes Isochronous mode Yes Activation/deactivation of DP slaves Yes  Interface types  RJ 45 (Ethernet)  100 Mbps Autoregotiation 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 via integrated interfaces Number of S7 routing paths  Redundancy mode H-Sync forwarding Media redundancy Media redundancy  Yes Activation/deactivation of DP slaves Yes Activation/deactivation of DP slaves Yes Number of S7 routing paths Activation/deactivation of DP slaves Yes Number of S7 routing paths Yes Routing connections are supported via PROFIBUS Routing connections are supported via PROFIBUS Routing connections are supported via PROFIBUS	Services	, , , , , , , , , , , , , , , , , , , ,
- Equidistance - Isochronous mode - Activation/deactivation of DP slaves    Nes		Yes
Isochronous mode Activation/deactivation of DP slaves  Interface types  RJ 45 (Ethernet)  100 Mbps Autorogotiation Autocrossing 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		
	•	
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		
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<ul> <li>Autorogotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> <li>RS 485</li> <li>Transmission rate, max.</li> <li>Protocols</li> <li>PROFIsafe</li> <li>Number of connections</li> <li>Number of connections, max.</li> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> <li>Redundancy mode</li> <li>H-Sync forwarding</li> <li>Media redundancy</li> </ul>	,	Voc
<ul> <li>Autocrossing         <ul> <li>Industrial Ethernet status LED</li> <li>Yes</li> </ul> </li> <li>RS 485         <ul> <li>Transmission rate, max.</li> </ul> </li> <li>Protocols         <ul> <li>PROFIsafe</li> <li>No</li> </ul> </li> <li>Number of connections         <ul> <li>Number of connections, max.</li> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> </ul> </li> <li>Redundancy mode         <ul> <li>H-Sync forwarding</li> <li>Media redundancy</li> </ul> </li> <li>Yes</li> <li>Media redundancy</li> </ul>		
● Industrial Ethernet status LED  RS 485  ● Transmission rate, max.  Protocols  PROFIsafe  No  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  12 Mbit/s  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  Redundancy mode  ● H-Sync forwarding  Media redundancy		
Protocols  PROFIsafe  No  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  12 Mbit/s  No  12 Mbit/s  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		
<ul> <li>◆ Transmission rate, max.</li> <li>Protocols</li> <li>PROFIsafe</li> <li>Number of connections</li> <li>♦ Number of connections, max.</li> <li>♦ Number of connections reserved for ES/HMI/web</li> <li>♦ Number of connections via integrated interfaces</li> <li>♦ Number of s7 routing paths</li> <li>10</li> <li>288</li> <li>♦ Number of S7 routing paths</li> <li>64; in total, only 16 S7-Routing connections are supported via PROFIBUS</li> <li>Redundancy mode</li> <li>♦ H-Sync forwarding</li> <li>Media redundancy</li> </ul>		res
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 connections via integrated interfaces  Number of S7 routing paths  Redundancy mode  H-Sync forwarding  Media redundancy  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		10 Mbit/o
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		12 IVIDIUS
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		
<ul> <li>Number of connections, max.</li> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> <li>Redundancy mode</li> <li>H-Sync forwarding</li> <li>Media redundancy</li> <li>320; via integrated interfaces of the CPU and connected CPs / CMs</li> <li>288</li> <li>64; in total, only 16 S7-Routing connections are supported via PROFIBUS</li> <li>Yes</li> </ul>	1 11 1	No
<ul> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> <li>Redundancy mode</li> <li>H-Sync forwarding</li> <li>Media redundancy</li> </ul> 10 288 64; in total, only 16 S7-Routing connections are supported via PROFIBUS Yes		
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<ul> <li>Number of S7 routing paths</li> <li>Redundancy mode</li> <li>H-Sync forwarding</li> <li>Media redundancy</li> </ul> Yes Media redundancy		10
PROFIBUS  Redundancy mode  • H-Sync forwarding  Media redundancy  Yes	<ul> <li>Number of connections via integrated interfaces</li> </ul>	288
Redundancy mode  ◆ H-Sync forwarding  Media redundancy  Yes	<ul> <li>Number of S7 routing paths</li> </ul>	
H-Sync forwarding     Yes  Media redundancy		PROFIBUS
Media redundancy	-	
•		Yes
Media redundancy only via 1st interface (X1)		
	— Media redundancy	only via 1st interface (X1)

— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
<ul> <li>MRP interconnection, supported</li> </ul>	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	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
Data record routing	Yes
S7 communication, as server	Yes
S7 communication, as client	Yes
<ul> <li>User data per job, max.</li> </ul>	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
<ul> <li>several passive connections per port, supported</li> </ul>	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max. — UDP multicast	2 kbyte; 1 472 bytes for UDP broadcast
DHCP	Yes; 128 multicast circuits (of which max. 5 via X1) Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
<ul><li>Encryption</li></ul>	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
000114	
OPC UA	Voc. "Lorgo" license required
Runtime license required	Yes; "Large" license required
<ul><li>Runtime license required</li><li>OPC UA Client</li></ul>	Yes
Runtime license required	Yes Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15,
<ul><li>Runtime license required</li><li>OPC UA Client</li><li>Application authentication</li></ul>	Yes Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
<ul> <li>Runtime license required</li> <li>OPC UA Client <ul> <li>Application authentication</li> <li>Security policies</li> </ul> </li> </ul>	Yes Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15,
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<ul> <li>Runtime license required</li> <li>OPC UA Client         <ul> <li>Application authentication</li> <li>Security policies</li> </ul> </li> <li>User authentication         <ul> <li>Number of connections, max.</li> <li>Number of nodes of the client interfaces, recommended max.</li> <li>Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/Omax.</li> <li>Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.</li> <li>Number of elements for one call of OPC_UA_MethodGetHandleList, max.</li> <li>Number of simultaneous calls of the client instructions for session management, per connection, max.</li> <li>Number of simultaneous calls of the client instructions for data access, per connection, max.</li> <li>Number of registerable nodes, max.</li> <li>Number of registerable method calls of OPC_UA_MethodCall, max.</li> <li>Number of inputs/outputs when calling OPC_UA_MethodCall, max.</li> </ul> </li> <li>OPC UA Server          <ul> <li>Application authentication</li> </ul> </li> </ul>	Yes Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 "anonymous" or by user name & password 40 5 000 300 20 100 1 5 000 100 20 Yes; Data access (read, write, subscribe), method call, custom address space Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15,
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<ul> <li>Number of accessible variables, max.</li> </ul>	200 000
<ul> <li>Number of registerable nodes, max.</li> </ul>	50 000
<ul> <li>Number of subscriptions per session, max.</li> </ul>	20
— Sampling interval, min.	10 ms
— Publishing interval, min.	10 ms
Number of server methods, max.	100
<ul> <li>Number of inputs/outputs per server method, max.</li> </ul>	20
	40,000 for 4
<ul> <li>Number of monitored items, recommended max.</li> </ul>	10 000; for 1 s sampling interval and 1 s send interval
	10 of each "Conver interferees" / "Companies appointed type and 20
<ul> <li>Number of server interfaces, max.</li> </ul>	10 of each "Server interfaces" / "Companion specification" type and 20
Number of pades for upon defined conver	of the type "Reference namespace"
<ul> <li>Number of nodes for user-defined server interfaces, max.</li> </ul>	30 000
	Vee
Alarms and Conditions	Yes
Number of program alarms	400
Number of alarms for system diagnostics	200
Further protocols	
<ul><li>MODBUS</li></ul>	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
·	103
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"
5 11 1 11 J 11 1 J 1 1 1 1 1 1 1 1 1 1 1	block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
	2 000
Number of program alarms     Number of playing for protein diagnostics.	
Number of alarms for system diagnostics	1 000
Number of alarms for motion technology objects	480
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
·	20
Status/control	V.
<ul> <li>Status/control variable</li> </ul>	Yes
<ul> <li>Variables</li> </ul>	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
<ul> <li>Number of variables, max.</li> </ul>	
<ul><li>of which status variables, max.</li></ul>	200; per job
<ul> <li>of which control variables, max.</li> </ul>	200; per job
Forcing	
Forcing, variables	Peripheral inputs/outputs
Number of variables, max.	200
	200
Diagnostic buffer	V
• present	Yes
<ul> <li>Number of entries, max.</li> </ul>	3 200
<ul><li>— of which powerfail-proof</li></ul>	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	V.
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
<ul> <li>Connection display LINK TX/RX</li> </ul>	Yes
Supported technology objects	
	Voc. Note: The number of technology chicate effects the guals time of
Motion Control	Yes; Note: The number of technology objects affects the cycle time of
a Number of eveilable Metics Control	the PLC program; selection guide via the TIA Selection Tool
Number of available Motion Control resources for technology objects	10 240
technology objects	
Required Motion Control resources	40
— per speed-controlled axis	40

<ul><li>per positioning axis</li></ul>	80
<ul><li>per synchronous axis</li></ul>	160
<ul> <li>per external encoder</li> </ul>	80
<ul><li>per output cam</li></ul>	20
— per cam track	160
— per probe	40
Positioning axis	
<ul> <li>Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	70
<ul> <li>Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	128
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID_33tep	Yes; PID controller with integrated optimization for temperature
•	res, Fib controller with integrated optimization for temperature
Counting and measuring	Von
High-speed counter	Yes
Ambient conditions	
Ambient temperature during operation	
<ul> <li>horizontal installation, min.</li> </ul>	0 °C
<ul> <li>horizontal installation, max.</li> </ul>	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
<ul> <li>vertical installation, min.</li> </ul>	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	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
<ul> <li>Installation altitude above sea level, max.</li> </ul>	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
configuration / header	
configuration / header	
configuration / programming / header	
configuration / programming / header Programming language	Voc
configuration / programming / header Programming language — LAD	Yes
configuration / programming / header Programming language — LAD — FBD	Yes
configuration / programming / header Programming language — LAD — FBD — STL	Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL	Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH	Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection	Yes Yes Yes Yes
configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection  • User program protection/password protection	Yes Yes Yes Yes Yes
configuration / programming / header  Programming language  — LAD  — FBD  — STL  — SCL  — GRAPH  Know-how protection  • User program protection/password protection • Copy protection	Yes Yes Yes Yes Yes Yes
configuration / programming / header  Programming language  — LAD  — FBD  — STL  — SCL  — GRAPH  Know-how protection  • User program protection/password protection  • Copy protection  • Block protection	Yes Yes Yes Yes Yes
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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	Yes
configuration / programming / header  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	Yes
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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
configuration / programming / header  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	Yes
configuration / programming / header  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
configuration / programming / header  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	Yes
configuration / programming / header  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