## **SIEMENS**

## **Data sheet**

## 6ES7615-7DF10-0AB0



SIMATIC S7-1500, Drive Controller CPU 1507D TF With SINAMICS S120 Integrated; Interfaces: 12 DI, 16 DI/DQ, 4 DRIVE-CLiQ, 3 PROFINET: 3+1+1 ports, 1 PROFIBUS, SIMATIC memory card required

General information	
Product type designation	CPU 1507D TF
HW functional status	FS11
Firmware version	PLC: V3.0 / SINAMICS Integrated: V5.2 SP3
Product function	
● I&M data	Yes; I&M0 to I&M3
Isochronous mode	Yes; with minimum OB 6x cycle of 250 μs
Engineering with	
<ul> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V18 (FW V3.0) / V16 (FW V2.8) or higher
Integrated drive control	
<ul> <li>Number of axes for servo control, max.</li> </ul>	6
<ul> <li>Number of axes for vector control, max.</li> </ul>	6
<ul> <li>Number of axes for V/f control, max.</li> </ul>	12
Remark	alternative control modes; drive control based on SINAMICS S120 CU320-2 (firmware version V5.x); functional subset compared to CU320-2: no free function blocks,; for details, see the manual
Configuration control	
via dataset	Yes
Control elements	
Number of keys	1; FUNCT button
Mode selector switch	1
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
power supply according to NEC Class 2 required	No
Mains buffering	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	3 ms; Refers to the power supply on the CPU section
Repeat rate, min.	1 event every 10 s
Input current	
Current consumption (rated value)	0.65 A; Without load on inputs/outputs, without supply via DRIVE- CLiQ/USB interface
Current consumption, max.	13.1 A; With load
Inrush current, max.	6 A; Rated value
l²t	0.62 A²-s
Power loss	
Power loss, typ.	17 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes

Mode vegeen	
Work memory	15 Mhyte
<ul><li>integrated (for program)</li><li>integrated (for data)</li></ul>	15 Mbyte 40 Mbyte
	40 Mbyte
Load memory	40 Mb to December ded at least when intermeted drive is used
Plug-in (SIMATIC Memory Card), required     Plug-in (SIMATIC Memory Card), required	12 Mbyte; Recommended at least when integrated drive is used
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	V.
maintenance-free	Yes
CPU-blocks	
Number of elements (total)	20 000; 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
e Sizo may	The state of the s
• Size, max.	16 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB . Number range	0 05 525
Number range	0 65 535
• Size, max.	1 Mbyte
FC Niverbanana	0.05.505
Number range	0 65 535
• Size, max.	1 Mbyte
OB	
• Size, max.	1 Mbyte
<ul> <li>Number of free cycle OBs</li> </ul>	100
<ul> <li>Number of time alarm OBs</li> </ul>	20
<ul> <li>Number of delay alarm OBs</li> </ul>	20
<ul> <li>Number of cyclic interrupt OBs</li> </ul>	20; with minimum OB 3x cycle of 100 μs
<ul> <li>Number of process alarm OBs</li> </ul>	50
<ul> <li>Number of DPV1 alarm OBs</li> </ul>	3
<ul> <li>Number of isochronous mode OBs</li> </ul>	3
<ul> <li>Number of technology synchronous alarm OBs</li> </ul>	2
<ul> <li>Number of startup OBs</li> </ul>	100
<ul> <li>Number of asynchronous error OBs</li> </ul>	4
<ul> <li>Number of synchronous error OBs</li> </ul>	2
<ul> <li>Number of diagnostic alarm OBs</li> </ul>	1
Nesting depth	
per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	, (only minion by the monthly)
— adjustable	Yes
— aujustable S7 times	160
Number	2 048
	2 0 <del>1</del> 0
Retentivity	Voc
— adjustable	Yes
IEC timer	Ann forth the that he that we have
• 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,
Flor	counters, DBs, and technology data (axes): 700 KB
Flag	40 lb. 4-
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
Retentivity adjustable	Yes

Local data  • per priority class, max.  64 kbyte; max. 16 KB per block  Address area  Number of IO modules  I/O address area  • Inputs  • Outputs  • Outputs  per integrated IO subsystem  — Inputs (volume)  — Outputs (volume)  — Outputs (volume)  Subprocess images  • Number of subprocess images, max.  16 384; max. number of modules / submodules  16 384; max. number of modules / submodules  18 32 kbyte; All inputs are in the process image  32 kbyte; All outputs are in the process image  32 kbyte; Max. 32 KB via X150; max. 8 KB via X160 or X126  32 kbyte; Max. 32 KB via X150; max. 8 KB via X160 or X126  Subprocess images  • Number of subprocess images, max.  19 32  Hardware configuration  Number of distributed IO systems	Retentivity preset	No
## Per priority class, max.  ## Address area    Number of Direction   Number of Directio		
Number of IO modules  Number of IO masters  Number of IO Controllers  Number of IO		64 kbyte; max. 16 KB per block
Number of IO modules  NO address area  * Inputs  * Uptysts  * Upty		, , , , , , , , , , , , , , , , , , ,
Figure   State   Sta		16 384: max_number of modules / submodules
Pipuls Outputs Portupits		10 00 1, 11000 10 11000 10 11000 100 100
Outputs are in the process image per intergrated (10 subsystem — inputs (volume) 32 ktyte: Max. 32 KB via X150, max. 8 KB via X160 or X126 32 ktyte: Max. 8 ktyte: qai. 4 kB via X160 or X126 32 ktyte: Max. 8 ktyte: qai. 4 kB via X160 or X126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or X126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or X126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or X126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or X126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or x126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or x126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or x126 32 ktyte: Max. 8 ktyte; qai. 4 kB via X160 or x126 33 ktyte: Max. 8 ktyte; qai. 4 kB via X160 33 ktyte: Max. 8 kt		32 kbyte: All inputs are in the process image
per integrated (i) subsystem		
- Inputs (volume) - Outputs (volume) - Outputs (volume) - Outputs (volume) - Subprocess images - Number of subprocess images, max.  32 kByte; Max. 32 kB via X150; max. 8 kB via X160 or X126  Subprocess images - Number of subprocess images, max.  Number of distributed IO systems - Subprocess images - Via CM	'	02 hb/to, / iii outpute a.e iii the processe iiiuge
- Outputs (volume)  Subprocess images  Number of subprocess images, max.  12  Hardware configuration  Number of distributed I/O systems  44, A distributed I/O system is characterized not only by the integration of distributed I/O systems of distributed I/O systems is characterized not only by the integration of distributed I/O systems is characterized not only by the integration of I/O via RSA imaster modules of links (e.g. IE/PB-Link).  Number of IOP masters  1	· · · · · ·	32 kbyte: Max. 32 KB via X150: max. 8 KB via X160 or X126
Subprocess images  Number of subprocess images, max.  Number of distributed IO systems  64; A distributed IO system is characterized not only by the integration of distributed IO systems  64; A distributed IO systems is characterized not only by the integration of distributed IO wa PROFINET or PROFIBUS, but also by the connection of IV via AS-I master modules or links (e.g., IE/PB-Link)  Number of DP masters  • Integrated • Via CM  **Number of IC Controllers • Integrated • Via CM  **Number of IC Controllers • Integrated • Via CM  **Number of PIP CMs  **On these CMs / CPs can only be operated in a central rack  **PP-CM  **Number of PIP CMs  **The number of connectable PIP CMs (distributed) is only limited by the number of available siots  **Time of day  **Clock • Type • Backup time • Deviation per day, max.  **Operating hours counter  • Number • Number  • Number • On Present van TP • Number • In AS, shave • on Ethernet via NTP • Yes • on Ethernet via NTP • Yes • on Ethernet via NTP • Yes • Optate Inputs, parameterizable • Freely usable digital input • Probe • Digital inputs • Integrated channels (DI) • Digital inputs • Integrated channels (DI) • Optate Inputs, parameterizable • Freely usable digital input • Probe • Optate Inputs • Probe • Optate Inputs • Probe • Optate Input ovitage • Freely usable digital input • Probe • Optate Input ovitage • Freely usable digital input • Preside of the second of the secon		
Number of subprocess images, max.  Hardware configuration  Number of distributed IO systems  64; A distributed IVO system is characterized not only by the integration of distributed IVO via PROFINET or PROFIBUS. but also by the connection of I/O via ASI master modules or links (e.g., IE/FPL-III.s)  Number of DP masters  1		
Number of distributed IO systems  84'. A distributed IO systems is characterized not only by the integration of distributed IO systems is characterized not only by the integration of distributed IO systems is characterized not only by the integration of IC via AS+ master mediutes of Infos (e.g., IE/PB-LIN.)  Number of DP masters  • integrated • Via CM  **Number of IO Controllers  • integrated • Via CM  **Number of IO Controllers  • integrated • Via CM  **Number of IO Controllers  • integrated • Via CM  **Number of PIP CMs  • Number of PIP CMs  • Number of PIP CMs  **Number of PIP CMs  **The number of connectable PIP CMs (distributed) is only limited by the number of available slots  **Timo of day  **Glock  • Type • Backup time • Deviation per day, max.  **Operating hours counter  • Number • Number • Number • ODP, master • In AS, master • In AS, slave • On Ethernet via NTP • Yes • Max. 20 (X122X132; SINAMICS integrated) + 8 DI/DQ (X142, PLC) • Froely usable digital input • Yes, Max. 8 (X142); end for probes • Yes, Max. 8 (X1	· · · · · · · · · · · · · · · · · · ·	32
Number of distributed IO systems  64. A distributed IO system is characterized not only by the integration of distributed IO systems is characterized not only by the integration of distributed IO will pROPINITE or PROPIBLIS, but also by the connection of I/C via AS-I master modules or links (e.g. IE/PB-Link).  Number of IO Controllers  • Integrated  • Via CM  **Number of IO Controllers  • Integrated  • Via CM  **Number of IO Controllers  • Integrated  • Via CM  **Number of PP CMs  **Number of PP CMs  **Number of PP CMs  **The number of connectable PIP CMs (distributed) is only limited by the number of available soits  **Time of day**  Clock  • Type  • Backup time  • Deviation per day, max.  **Operating hours counter  • Number  • Number  • To PP, master  • In AS, master  • In AS, save  • on Ethernet via NTP  **Opigital inputs  **Integrated Assert Curve in accordance with IEC 61131, type 3  **Opigital input functions, parameterizable  • Preedy usable digital input  • Preed input viating as input input viating input voltage  • Type of input voltage at input, min.  • permissible voltage at input, min.		
Integrated Via CM Via CM Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible; these CMs / CPs can only be operated in a central rack  Integrated Via CM Via CM Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible; these CMs / CPs can only be operated in a central rack  PIP CM Number of PtP CMs The number of connectable PtP CMs (distributed) is only limited by the number of available silots  Time of day  Clock  Time of day  Clock  Specially time Specia		distributed I/O via PROFINET or PROFIBUS, but also by the connection of I/O
Via CM  Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible; these CMs / CPs can only be operated in a central rack  Number of IO Controllers  integrated  Via CM  Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible; these CMs / CPs can only be operated in a central rack  PP CM  Number of PIP CMs  The number of connectable PIP CMs (distributed) is only limited by the number of available slots  Time of day  Clock  Type  Backup time  Deviation per day, max.  Operating hours counter  Number  Number  Number  Number  16  Clock synchronization  Yes  In AS, master  Yes  In AS, master  Yes  On Ethernet via NTP  Yes  Digital inputs  Integrated channels (D1)  Digital inputs, parameterizable  Proba  Digital input muthons, parameterizable  Press  Pr	Number of DP masters	
these CMs / CPs can only be operated in a central rack  Number of IO Controllers  integrated  Via CM  Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible; these CMs / CPs can only be operated in a central rack  PPP CM  Number of PIP CMs  The number of connectable PIP CMs (distributed) is only limited by the number of available slots  Time of dsy  Clock  A Type  Backup time  Deviation per day, max.  Operating hours counter  Number  Number  Number  Number  Number  16  Clock synchronization  supported  To DP, master  In AS, save  On Ethernet via NTP  Digital inputs.  Integrated channels (DI)  Digital inputs, parameterizable  Freq vasible digital input  Probe  Probe  Probe  Probe  Digital input with time stamp  Counter  Digital input with oversampling  Ness Max. 20 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X142); exp for probes  Yes; Max. 8 (X142); a2-fold oversampling  Input voltage  Rated value (DC)  For signal "1"  Permissible voltage at input, min.	• integrated	1
Number of IO Controllers   2	• Via CM	
integrated  integ		these CMs / CPs can only be operated in a central rack
Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible; these CMs / CPs can only be operated in a central rack  PIP CM  Number of PIP CMs  The number of connectable PIP CMs (distributed) is only limited by the number of available slots  Time of day  Clock  Type  Backup time  Deviation per day, max.  Operating hours counter  Number  Number  16  Clock synchronization  supported  Number  In AS, master  In AS, slave  On Ethernet via NTP  Pes  Digital inputs  Integrated channels (DI)  Digital inputs  Integrated channels (DI)  Digital inputs  Digital input sparameterizable  Precipila input with time stamp  Probe  Probe  Poligital input with time stamp  Counter  Digital input with time stamp  Counter  Digital input with oversampling  Input variance (DC)  Pes; Max. 8 (X122/X132) + max. 8 (X142)  Pes; Max. 8 (X142); 32-fold oversampling  Input variance (DC)  Per siden (PROFIBUS, PROFINET, Ethernet) not possible; these CMs CPs can only be operated in a central rack  Expansion via CMs / CPs can only be operated in a central rack  Number  Backup the number of connectable PIP CMs (distributed) is only limited by the number of available slots  Wex; At 40 "C ambient temperature, typically  10 s; Typ.: 2.4 s  Pres  Pres  In AS, alave  Pres  In AS, slave  Pres  Pigital inputs  Integrated channels (DI)  Digital inputs, parameterizable  President  President  President  Pres  Preading  Prea		
these CMs / CPs can only be operated in a central rack  Number of PIP CMs  Number of PIP CMs  The number of connectable PIP CMs (distributed) is only limited by the number of available slots  Time of day  Clock  Type Backup time Deviation per day, max. Operating hours counter  Number Numb	• integrated	
PIP CM  Number of PIP CMs  The number of connectable PIP CMs (distributed) is only limited by the number of available slots  Time of day  Clock  Type Backup time Deviation per day, max.  10 s; Typ: 2.4 s  Operating hours counter Number  Number  Number  Number  16  Clock synchronization  supported Yes In AS, master In AS, slave In AS, slave In AS, slave Yes In AS, slave Yes In AS, slave Personated thannels (DI) Digital inputs Integrated channels (CII) Digital inputs, parameterizable  Preciping parameterizable  Freely usable digital input Precipital input tunctions, parameterizable  Freely usable digital input Preciping AB, XI AS, XI	• Via CM	
Time of day  Clock  Type Backup time Deviation per day, max.  Operating hours counter Number	PtP CM	and of the stant only be operated in a central rack
Time of day  Clock  Type Backup time Special pour day, max.  Operating hours counter  Number Number Clock synchronization Supported To DP, master In AS, slave On Ethernet via NTP Digital inputs, parameterizable  PLC Source/sink input Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Probe Digital input with time stamp Counter Digital input with oversampling Input voltage Digital input with oversampling Digital input with oversampling Digital input with oversampling Input voltage Type of input voltage Digital input with oversampling Digital input voltage Type of input voltage Type of input voltage Type of input, max. Digital input with oversampling Digital input with oversampling Digital input voltage Type of input voltage at input, min. Demissible voltage at input,		The number of connectable PtP CMs (distributed) is only limited by the number
Type	- Nambor of Fit Civio	
Type Backup time Deviation per day, max.  Operating hours counter  Number  Number  16  Clock synchronization  supported De naster In AS, master In AS, slave On Ethernet via NTP  Digital inputs  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Probe Digital input with time stamp Counter  Freely usable digital input Digital input with oversampling  Pres; Max. 8 (X1422): 82-fold oversampling  Input voltage Type of input voltage Freel permissible voltage at input, max.  Permissible voltage at input, max.  Ray and the support temperature, typically 10 s; Typ. 2.4 s  We, 10 s; Typ. 2.4 s  Wes  Ves  Yes  Yes  Yes  Yes  Yes  Yes  Digital inputs  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Yes; Max. 20 (X122/X132) + max. 8 (X142) Yes; Max. 8 (X122/X132) + max. 8 (X142) Yes; Max. 8 (X1422): e.g. for probes  Counter  Digital input with oversampling  Press  Press  OD  AND  Press  Input voltage  Freely usable digital input, min.  Permissible voltage at input, min.  Permissible voltage at input, max.  Input current	Time of day	
Backup time Deviation per day, max.  Operating hours counter  Number  Number  Clock synchronization supported to DP, master in AS, master in AS, slave on Ethernet via NTP  Digital inputs  Integrated channels (DI)  Digital inputs, parameterizable  Preading Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Probe Probe Spital input with time stamp Counter Digital input with time stamp Counter Digital input with oversampling Type of input voltage Prof of signal "0" For signal "1" For permissible voltage at input, max.  Nave on St. 44.40 "C ambient temperature, typically 10 s; Typ.: 2.4 s 10 s; Typ.: 2.4 s 16  Carbotrateristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Pes; Max. 20 (X122/X132) + max. 8 (X142) Pes; Max. 8 (X122/X132) + max. 8 (X142) Pes; Max. 8 (X142); e.g. for probes  Counter Pes; Max. 8 (X142); e.g. for probes  Digital input with oversampling  Prove of input voltage Fixed value (DC) For signal "1" For emissible voltage at input, min. Permissible voltage at input, max.  Source of the counter	Clock	
Deviation per day, max.  Operating hours counter  Number  Number  Solve synchronization  Supported  Solve Synchronization  Supported  Solve Synchronization  Supported  Solve Synchronization  Digital inputs  Integrated channels (DI)  Digital inputs, parameterizable  Source/sink input  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input  Freely usable digital input  Freely usable digital input  Frobe  Solve Max. 8 (X122/X132) + max. 8 (X142)  Frobe  Digital input with time stamp  Solve Max. 8 (X142); e.g. for probes  Counter  Solve Max. 8 (X142); e.g. for probes  Freely usualled duration measurement  Solve Max. 8 (X142); e.g. for probes  Counter  Solve Max. 8 (X142); e.g. for probes  Counter  Solve Max. 8 (X142); e.g. for probes  Solve Max. 8 (X142); e.g. for probes  Counter  Solve	• Type	Hardware clock
Operating hours counter  Number  Number  Clock synchronization  supported  o to DP, master  in AS, master  on Ethernet via NTP  Digital inputs  integrated channels (DI)  Digital inputs, parameterizable  P-reading  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input  Freely usable digital input  Probe  Objital input with time stamp  Counter  Objital input with oversampling  Fresh Max. 8 (X142); e.g. for probes  Counter  Pes; Max. 8 (X142); e.g. for probes  Rated value (DC)  Rated value (DC)  For signal "0"  Rate value on the stamp  Occupance of input voltage  Rated value (DC)  For signal "1"  Permissible voltage at input, min.  Permissible voltage at input, max.  Input current	Backup time	6 wk; At 40 °C ambient temperature, typically
Number Clock synchronization  supported to DP, master to DP, master in AS, master in AS, slave on Ethernet via NTP  Pigital inputs  Integrated channels (DI) Digital inputs, parameterizable  Source/sink input Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Probe Freely usable digital input Probe Sourcely input input with time stamp Freely input input with time stamp Digital input with oversampling Freely usable digital input voltage Tourier Digital input with oversampling  DC Rated value (DC) For signal "0" For signal "0" Fermissible voltage at input, max. Person Forely usable diaput, min. Foreity input control input voltage at input, min. For signal "1" For emissible voltage at input, max. Foreity input courtent Foreity input courtent Foreity input voltage at input, min. Foreity input courtent Foreity input courtent Foreity input courtent Foreity input voltage at input, min. Foreity input courtent Foreity input courtend Foreity inpu	<ul> <li>Deviation per day, max.</li> </ul>	10 s; Typ.: 2.4 s
Clock synchronization  supported  to DP, master  in AS, slave  on Ethernet via NTP  Digital inputs  integrated channels (DI)  Digital inputs, parameterizable  P-reading  Input characteristic curve in accordance with IEC 61131, type 3  Digital input dharacteristic curve in accordance with IEC 61131, type 3  Digital input theracteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input  Probe  Freely usable digital input  Probe  Souncer  Freely usable digital input  Probe  Freely usable value (DC)  Freely usable voltage  Freely usable voltage at input, min.  Permissible voltage at input, min.  Permissible voltage at input, max.  Input current	Operating hours counter	
supported     to DP, master     in AS, master     in AS, slave     on Ethernet via NTP  Polipital inputs  integrated channels (DI)  Digital inputs, parameterizable  Source/sink input  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input  Freely usable digital input  Probe  Digital input with time stamp Counter  Digital input with oversampling  Founter  Digital input with oversampling  Input voltage  Type of input voltage  Rated value (DC)  For signal "0" For signal "0" For permissible voltage at input, min. Forely ves, max. Forely usable digital input Foreignal "1" Forely usable voltage at input, min. Forely usable voltage at input, max. Forely usable voltage at input, min. Forely usable voltage at input voltage at input, max. Forely usable voltage at input at vest and at vest	Number	16
• to DP, master • in AS, master • in AS, slave • on Ethernet via NTP  Digital Inputs  integrated channels (DI)  Digital inputs, parameterizable  P-reading  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  • Freely usable digital input • Probe • Digital input with time stamp • Counter • Digital input with oversampling  Input voltage  • Type of input voltage • Type of risgnal "1" • permissible voltage at input, max.  Input current  Yes  Yes  Yes  Yes  Yes  Yes  Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); a.g. fold oversampling  P-reading  P-reading  Yes  Yes  Nax. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); a.g. fold oversampling  Input voltage  • Type of input voltage  P-reading  P-reading  Yes  Nax. 8 (X122/X132) + max. 8 (X142)  Yes  Nax. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); a.g. fold oversampling  Input voltage  • Type of input voltage  • Type of input voltage  P-reading  P-reading  P-reading  Yes  Nax. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); a.g. for probes  Yes  Yes  Yes  Yes  Yes  Yes  Yes	Clock synchronization	
in AS, master     in AS, slave     ves     on Ethernet via NTP      Digital inputs  integrated channels (DI)  Digital inputs, parameterizable  P-reading  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input  Probe     input with time stamp     Counter     Digital input with oversampling  Counter  Digital input with oversampling  Persignal "0"  Rated Value (DC)  Rated Value (DC)  For signal "1"  Permissible voltage at input, max.  Pyes  Yes  Yes  Yes  Nax. 8 (X142)  Yes; Max. 8 (X142); 32-fold oversampling  DC  Rated Value (DC)  For signal "1"  Permissible voltage at input, min.  Pyes max. 8 (Value)  Popul voltage  Permissible voltage at input, min.  Permissible voltage at input, max.  Pyes  Prob  Yes  Yes  Yes  Yes  Nax. 8 (X142); 32-fold oversampling  Poc  Pat overmissible voltage at input, min.  Permissible voltage at input, max.  Pyes  Prob  Yes  Yes  Yes  Nax. 8 (X142); 32-fold oversampling  Poc  Pat overmissible voltage at input, min.  Permissible voltage at input, max.  Pyes  Prob  Prob  Preading  Preading  Preading  Yes  Yes  Nax. 8 (X122/X132) + max. 8 (X142)  Yes  Nax. 8 (X142)  Permissible voltage at input, min.  Permissible voltage at input, max.  Pyes  Prob  Prob  Preading  Preading  Preading  Preading  Preading  Yes  Yes  Nax. 8 (X122/X132) + max. 8 (X142)  Yes  Nax. 8 (X142)  Permissible voltage at input, max.  Prob  Permissible voltage at input, max.  Pyes  Prob  Preading  Presading  Preading  Preadi	• supported	Yes
in AS, slave     on Ethernet via NTP     Yes      Digital inputs  integrated channels (DI)     Digital inputs, parameterizable     PLC)  Source/sink input Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Probe Frobe Digital input with time stamp Counter Digital input with oversampling Fyes, Max. 8 (X142); e.g. for probes Counter Digital input with oversampling Fyes, Max. 8 (X142); 32-fold oversampling Fyes of ripput voltage Rated value (DC) For signal "0" For signal "0" For signal "1" Fyes max. 8 (X142) Fyes Fyes Fyes Fyes Fyes Fyes Fyes Fyes	• to DP, master	Yes
on Ethernet via NTP      Digital inputs     integrated channels (DI)     Digital inputs, parameterizable     Source/sink input     Input characteristic curve in accordance with IEC 61131, type 3     Digital input functions, parameterizable     Freely usable digital input     Probe     Freely usable digital input     Probe     Poigital input with time stamp     Counter     Digital input with oversampling     Positial input with oversampling     Prope input voltage     Rated value (DC)     Fated value (DC)     For signal "1"     Permissible voltage at input, max.  Input current      Permissible voltage at input, max.  Input current  Yes, max. depending on parameterization  Yes; 12 DI, 8 DI/DQ (X122/X132, SINAMICS Integrated) + 8 DI/DQ (X142, PLC)  Preading  Yes; Max. 20 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); 32-fold oversampling  Probe  Probe  Probe  Probe  Probe  Probe  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); event	• in AS, master	Yes
integrated channels (DI)  Digital inputs, parameterizable  Source/sink input Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  • Freely usable digital input • Probe • Probe • Digital input with time stamp • Counter • Digital input with oversampling  Input voltage  • Type of input voltage • Type of signal "0" • for signal "0" • permissible voltage at input, min. • permissible voltage at input, max.  Input current  28; max. depending on parameterization  Yes; 12 DI, 8 DI/DQ (X122/X132, SINAMICS Integrated) + 8 DI/DQ (X142, PLC)  Yes, 12 DI, 8 DI/DQ (X122/X132, SINAMICS Integrated) + 8 DI/DQ (X142, PLC)  Yes (Max. 20 (X122/X132) + max. 8 (X142)  Yes (Max. 20 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); 32-fold oversampling  Input voltage  • Type of input voltage	• in AS, slave	Yes
integrated channels (DI)  Digital inputs, parameterizable  Source/sink input  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  • Freely usable digital input • Probe • Digital input with time stamp • Counter • Digital input with oversampling  Input voltage  • Type of input voltage • Rated value (DC) • for signal "0" • permissible voltage at input, min. • permissible voltage at input, max.  Input current  28; max. depending on parameterization  Yes; 12 DI, 8 DI//DQ (X122/X132, SINAMICS Integrated) + 8 DI//DQ (X142, PLC)  Yes and depending on parameterization  Yes; 12 DI, 8 DI//DQ (X122/X132, SINAMICS Integrated) + 8 DI//DQ (X142, PLC)  Yes  Yes  Yes  Yes  Max. 20 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); 32-fold oversampling  DC  24 V  -3 to +5V  +15 to +30 V  9 permissible voltage at input, min30 V  Input current	• on Ethernet via NTP	Yes
Digital inputs, parameterizable  Yes; 12 DI, 8 DI/DQ (X122/X132, SINAMICS Integrated) + 8 DI/DQ (X142, PLC)  Source/sink input  Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  Freely usable digital input Probe Frobe Digital input with time stamp Source/sink input with time stamp Source/sink input Freely usable digital input Freely usable digital input Freely usable digital input Frobe Source/sink input Freely usable digital input Freely usable	Digital inputs	
Source/sink input Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  • Freely usable digital input • Probe • Digital input with time stamp • Counter • Digital input with oversampling Input voltage • Type of input voltage • Rated value (DC) • for signal "0" • permissible voltage at input, min. • permissible voltage at input, max.  PLC)  P-reading  Yes  Yes  Max. 20 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); 32-fold oversampling  DC  4 V  5 to +5V  15 to +30 V  9 permissible voltage at input, min.  9 permissible voltage at input, max.  Input current	integrated channels (DI)	28; max. depending on parameterization
Input characteristic curve in accordance with IEC 61131, type 3  Digital input functions, parameterizable  • Freely usable digital input  • Probe  • Probe  • Digital input with time stamp  • Counter  • Digital input with oversampling  Input voltage  • Type of input voltage  • Rated value (DC)  • for signal "1"  • permissible voltage at input, min.  • permissible voltage at input, max.  Input current  Yes; Max. 20 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X122/X132) + max. 8 (X142)  Yes; Max. 8 (X142); e.g. for probes  Yes; Max. 8 (X142); event/cycle duration measurement  Yes; Max. 8 (X142); 32-fold oversampling  DC  24 V  • for signal "0"  • a to +5V  • for signal "1"  • permissible voltage at input, min.  • 30 V  Input current	Digital inputs, parameterizable	
Digital input functions, parameterizable  Freely usable digital input Probe Probe Yes; Max. 20 (X122/X132) + max. 8 (X142)  Digital input with time stamp Yes; Max. 8 (X122)x132) + max. 8 (X142)  Digital input with time stamp Yes; Max. 8 (X142); e.g. for probes  Counter Digital input with oversampling Yes; Max. 8 (X142); event/cycle duration measurement Yes; Max. 8 (X142); 32-fold oversampling  Input voltage  Type of input voltage Rated value (DC) At the for signal "0" For signal "0" For signal "1" For signal "1	·	P-reading
<ul> <li>Freely usable digital input</li> <li>Probe</li> <li>Probe</li> <li>Persi Max. 8 (X122/X132) + max. 8 (X142)</li> <li>Pigital input with time stamp</li> <li>Counter</li> <li>Digital input with oversampling</li> <li>Prose</li> <li>Persi Max. 8 (X142); e.g. for probes</li> <li>Counter</li> <li>Pigital input with oversampling</li> <li>Persi Max. 8 (X142); event/cycle duration measurement</li> <li>Persi Max. 8 (X142); 32-fold oversampling</li> <li>Input voltage</li> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>For signal "0"</li> <li>For signal "1"</li> <li>Permissible voltage at input, min.</li> <li>Permissible voltage at input, max.</li> <li>Input current</li> </ul>		Yes
<ul> <li>Probe</li> <li>Yes; Max. 8 (X122/X132) + max. 8 (X142)</li> <li>Digital input with time stamp</li> <li>Counter</li> <li>Digital input with oversampling</li> <li>Yes; Max. 8 (X142); e.g. for probes</li> <li>Probe</li> <li>Yes; Max. 8 (X142); event/cycle duration measurement</li> <li>Yes; Max. 8 (X142); 32-fold oversampling</li> <li>Input voltage</li> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>For signal "0"</li> <li>3 to +5V</li> <li>for signal "1"</li> <li>+15 to +30 V</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> <li>Input current</li> </ul>	Digital input functions, parameterizable	
<ul> <li>Digital input with time stamp</li> <li>Counter</li> <li>Yes; Max. 8 (X142); e.g. for probes</li> <li>Yes; Max. 8 (X142); event/cycle duration measurement</li> <li>Digital input with oversampling</li> <li>Yes; Max. 8 (X142); 32-fold oversampling</li> </ul> Input voltage <ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>3 to +5V</li> <li>for signal "1"</li> <li>+15 to +30 V</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> </ul> Input current <ul> <li>Yes; Max. 8 (X142); e.g. for probes</li> <li>Yes; Max. 8 (X142); e.g. for probes</li> </ul> Yes; Max. 8 (X142); e.g. for probes Yes; Max. 8 (X142); event/cycle duration measurement	Freely usable digital input	
<ul> <li>Counter</li> <li>Digital input with oversampling</li> <li>Yes; Max. 8 (X142); event/cycle duration measurement</li> <li>Yes; Max. 8 (X142); 32-fold oversampling</li> </ul> Input voltage <ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>+15 to +30 V</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> </ul> Input current <ul> <li>Yes; Max. 8 (X142); event/cycle duration measurement</li> </ul>		
<ul> <li>Digital input with oversampling</li> <li>Input voltage</li> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> </ul> Input current Yes; Max. 8 (X142); 32-fold oversampling DC 24 V -3 to +5V +15 to +30 V 9 permissible voltage at input, min. 30 V Input current		
Input voltage  Type of input voltage Rated value (DC) for signal "0" for signal "1" for signal "1" for signal at input, min. permissible voltage at input, max.  Input current		
<ul> <li>Type of input voltage</li> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>+15 to +30 V</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> <li>Input current</li> </ul>		Yes; Max. 8 (X142); 32-fold oversampling
<ul> <li>Rated value (DC)</li> <li>for signal "0"</li> <li>for signal "1"</li> <li>+15 to +30 V</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> <li>Input current</li> </ul>	Input voltage	
<ul> <li>for signal "0"</li> <li>for signal "1"</li> <li>for signal "1"</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> </ul> Input current -3 to +5V -30 V 30 V		
<ul> <li>for signal "1"</li> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> </ul> 10 V 30 V Input current	Rated value (DC)	24 V
<ul> <li>permissible voltage at input, min.</li> <li>permissible voltage at input, max.</li> <li>Input current</li> </ul>	•	-3 to +5V
• permissible voltage at input, max. 30 V Input current	• for signal "1"	+15 to +30 V
Input current	<ul> <li>permissible voltage at input, min.</li> </ul>	-30 V
·	permissible voltage at input, max.	30 V
● for signal "1", typ. 4 mA	Input current	
	• for signal "1", typ.	4 mA

Input delay (for rated value of input voltage)	E 110 for V400 (V400 (V440 /DUDO DI) for V440 /U 5U
Minimum pulse width for program reactions  for standard inputs	5 μs for X122/X132/X142 (DI/DQ as DI; for X142 with filter setting 1 μs)
for standard inputs	N F V400 N/400
— parameterizable	No; For X122/X132
— with "0" to "1", typ.	For X122/X132: 10 µs (DI) / 5 µs (DI/DQ as DI)
— with "1" to "0", typ.	For X122/X132: 30 μs (DI) / 5 μs (DI/DQ as DI)
for interrupt inputs	Very intention to the confined and a least from the con-
— parameterizable	Yes; identical to those for technological functions
for technological functions	Van Fan VAAO additionally adjustable insult filters Ave. (405 va
— parameterizable	Yes; For X142, additionally adjustable input filter: 1 μs / 125 μs
— with "0" to "1", typ.	5 µs; For X142; HW delay
— with "1" to "0", typ.	5 μs; For X142; HW delay
Cable length	00 m. Fastacka da sia di fundiana Obieldian et la Disconsora dal describi
shielded, max.	30 m; For technological functions: Shielding of the DI recommended depending on the requirements
<ul> <li>unshielded, max.</li> </ul>	30 m
Digital outputs	
Type of digital output	Transistor
integrated channels (DO)	16; max. depending on parameterization
Current-sinking	Yes; With High Speed output
Current-sourcing	Yes; Optionally as a P-switch or high-speed push-pull switch (high-speed
our one-sourcing	output)
Digital outputs, parameterizable	Yes; 8 DI/DQ (X122/X132, SINAMICS Integrated) + 8 DI/DQ (X142, PLC)
Short-circuit protection	Yes; electronic/thermal
Response threshold, typ.	X122/X132: 1.4 A / X142: 0.9 A (high-speed output: 0.7 A)
Limitation of inductive shutdown voltage to	X122/X132: max60 V / X142: max64.5 V
Controlling a digital input	Yes
minimum pulse duration	2 μs; For high-speed output, single pulse
Digital output functions, parameterizable	
Freely usable digital output	Yes; Max. 8 (X122/X132) + max. 8 (X142)
Digital output with time stamp	Yes; Max. 8 (X142); e.g. for output cams
PWM output	Yes; Max. 8 (X142)
Cycle duration, parameterizable	Yes; Base frequency 1 / 2 / 4 / 8 / 16 kHz; specification of interpulse period rat over 32-bit pattern
— ON period, min.	0 %
— ON period, max.	100 %
<ul> <li>Resolution of the duty cycle</li> </ul>	3.125 %
Digital output with oversampling	Yes; Max. 8 (X142)
Switching capacity of the outputs	
with resistive load, max.	0.5 A; 0.4 A for high-speed output
on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω; with 24 V DC supply
Output voltage	
Type of output voltage	DC
Rated value (DC)	24 V
• for signal "0", max.	28.8 V
• for signal "1", min.	20.4 V
Output current	
• for signal "1" rated value	0.5 A; 0.4 A for high-speed output
• for signal "1" permissible range, min.	2 mA
• for signal "1" permissible range, max.	0.6 A; 0.48 A for high-speed output
Output delay with resistive load	o.o.r., vto retor high opeca output
• "0" to "1", typ.	100 μs; For X122/X132; at 48 ohm load
**	
• "1" to "0", typ.	150 μs; For X122/X132; at 48 ohm load
for technological functions	1 us: For V142
— "0" to "1", typ.	1 µs; For X142
— "1" to "0", typ.	1 μs; For X142 as a high-speed output; 150 μs for standard output
Parallel switching of two outputs	Van Fartabalaria (* 11. 11. 11. 11. 11. 11.
• for logic links	Yes; For technological functions and high-speed outputs: No
<ul> <li>for uprating</li> </ul>	No

Switching frequency	
with resistive load, max.	35 kHz; With High Speed output, 1 kHz with standard output
with resistive load, max.	2 Hz; Max. 1 J per channel
	11 Hz
• on lamp load, max.	I I nz
Total current of the outputs	0.4
Current per module, max.	8 A
Cable length	
• shielded, max.	30 m
unshielded, max.	30 m
nterfaces	
Number of PROFINET interfaces	3
Number of PROFIBUS interfaces	1
Number of USB interfaces	2; USB 3.0 (without function, no connection permissible)
Number of DRIVE-CLiQ interfaces	4; DRIVE-CLiQ interfaces (24 V / 450 mA per interface for connecting encoders/measuring systems)
l. Interface	,
Interface types	
<ul> <li>RJ 45 (Ethernet)</li> </ul>	Yes; X150
<ul> <li>Number of ports</li> </ul>	3
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
	Yes
— Isochronous mode	
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— shortest clock pulse	250 µs
— 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>	256; 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, max.</li> </ul>	256
— of which in line, max.	256
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	8; in total across all interfaces
Number of IO Devices per tool, max.	8
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT	
— for send cycle of 250 μs	250 μs to 4 ms
— 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
Update time for RT	875 μs)
·	250 ue to 128 me
— 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
<ul> <li>for send cycle of 4 ms</li> </ul>	4 ms to 512 ms

PROFINET IO Device	
Services Services	
— PG/OP communication	Yes
Isochronous mode	No
	250 μs
— shortest clock pulse — IRT	Yes
PROFlenergy      Shared device	Yes; per user program
	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 V/00
• RJ 45 (Ethernet)	Yes; X160
Number of ports	1
integrated switch	No
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	No
PROFINET IO Controller	
Services	
<ul><li>— PG/OP communication</li></ul>	Yes
— Isochronous mode	No
Direct data exchange	No
— IRT	No
— PROFlenergy	Yes; per user program
<ul> <li>Prioritized startup</li> </ul>	No
— Number of connectable IO Devices, max.	128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	128
— of which in line, max.	128
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	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 RT	
— for send cycle of 1 ms	1 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	No
— PROFlenergy	Yes; per user program
Prioritized startup	No
— Shared device	Yes
Number of IO Controllers with shared device, max.	4
activation/deactivation of I-devices	Yes; per user program
Asset management record	Yes; per user program
3. Interface	100, por door program
Interface types	Vac: ¥130
RJ 45 (Ethernet)      Number of ports	Yes; X130
Number of ports     integrated quiteb	1 No
• integrated switch	No
Protocols	Veg IDv4
IP protocol	Yes; IPv4

<ul> <li>PROFINET IO Controller</li> </ul>	No
PROFINET IO Device	No
SIMATIC communication	Yes
Open IE communication	Yes
Web server	Yes
4. Interface	
Interface types	
• RS 485	Yes; X126
Number of ports	1
Protocols	
PROFIBUS DP master	Yes
PROFIBUS DP slave	No
SIMATIC communication	Yes
PROFIBUS DP master	40.6 11 14 14 14 15 15 15 15 15 15 15 15 15 15 15 15 15
Number of connections, max.	48; for the integrated PROFIBUS DP interface
<ul> <li>Number of DP slaves, max.</li> </ul>	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Services	
— PG/OP communication	Yes
— Equidistance	Yes
— Isochronous mode	Yes
<ul> <li>Activation/deactivation of DP slaves</li> </ul>	Yes
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• 1000 Mbps	Yes; Only at the X130 interface
Autonegotiation	Yes
Autocrossing	Yes
Industrial Ethernet status LED	Yes; LINK and ACTIVITY
RS 485	
Transmission rate, max.	12 Mbit/s
ee / e	
Protocols	
	Yes; V2.4 / V2.6
Protocols	Yes; V2.4 / V2.6
Protocols PROFIsafe	Yes; V2.4 / V2.6  384; Via integrated interfaces of the CPU
Protocols  PROFIsafe  Number of connections	
Protocols  PROFIsafe  Number of connections  • Number of connections, max.	384; Via integrated interfaces of the CPU
Protocols  PROFIsafe  Number of connections  • Number of connections, max.  • Number of connections reserved for ES/HMI/web	384; Via integrated interfaces of the CPU 10
Protocols  PROFIsafe  Number of connections  • Number of connections, max.  • Number of connections reserved for ES/HMI/web  • Number of connections via integrated interfaces	384; Via integrated interfaces of the CPU 10 320
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	384; Via integrated interfaces of the CPU 10 320
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	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS
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  Media redundancy	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150
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	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes only via interface X150 Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager;
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  Media redundancy  MRP	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes only via interface X150 Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
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  Media redundancy  MRP  MRP interconnection, supported	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes only via interface X150 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
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  Media redundancy  MRP  MRP interconnection, supported  MRPD	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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
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  Media redundancy  MRP  MRP  MRP interconnection, supported  MRPD  Switchover time on line break, typ.	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes only via interface X150 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
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  Media redundancy  MRP  MRP  MRP  Switchover time on line break, typ.  Number of stations in the ring, max.	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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
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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  Media redundancy  MRP  MRP  MRP interconnection, supported  MRPD  Switchover time on line break, typ.  Number of stations in the ring, max.  SIMATIC communication  PG/OP communication	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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
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  Media redundancy  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	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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
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  Media redundancy  MRP  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  Data record routing	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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
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  Media redundancy  MRP  MRP  MRP  Switchover time on line break, typ.  Number of stations in the ring, max.  SIMATIC communication  PG/OP communication  S7 routing  Data record routing  S7 communication, as server	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes only via interface X150 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
Protocols  PROFIsafe  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 — Media redundancy — 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 Data record routing S7 communication, as server S7 communication, as client	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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 Yes
Protocols  PROFIsafe  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 — Media redundancy — 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 Data record routing S7 communication, as server S7 communication, as client User data per job, max.	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes only via interface X150 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
Protocols  PROFIsafe  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 — Media redundancy — 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 Data record routing S7 communication, as server S7 communication, as client	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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 Yes
Protocols PROFIsafe 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 — Media redundancy — 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 Data record routing S7 communication, as server S7 communication, as client User data per job, max.  Open IE communication TCP/IP	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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 Yes See online help (S7 communication, user data size)
Protocols  PROFIsafe  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  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 Data record routing S7 communication, as server S7 communication, as client User data per job, max.  Open IE communication TCP/IP  Data length, max.	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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 Yes See online help (S7 communication, user data size)  Yes 64 kbyte
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  Media redundancy  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  Data record 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	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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 Yes See online help (S7 communication, user data size)
Protocols  PROFIsafe  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  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 Data record routing S7 communication, as server S7 communication, as client User data per job, max.  Open IE communication TCP/IP  Data length, max.	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS  Yes  only via interface X150 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 Yes Yes See online help (S7 communication, user data size)  Yes 64 kbyte Yes

LIDD	V
UDP     Data langth max	Yes 2 kbyte; 1 472 bytes for UDP broadcast
<ul><li>— Data length, max.</li><li>— UDP multicast</li></ul>	Yes; 128 multicast circuits (of which max. 5 via X150)
DHCP	Yes
• DNS	Yes
• SNMP	Yes; disconnected by default
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	res, optional
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes; "Large" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
	Basic256Sha256
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password
— Number of connections, max.	40
<ul> <li>Number of nodes of the client interfaces, recommended max.</li> </ul>	5 000
<ul> <li>Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max.</li> </ul>	300
<ul> <li>Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.</li> </ul>	20
<ul> <li>Number of elements for one call of OPC_UA_MethodGetHandleList, max.</li> </ul>	100
<ul> <li>Number of simultaneous calls of the client instructions for session management, per connection, max.</li> </ul>	1
<ul> <li>Number of simultaneous calls of the client instructions for data access, per connection, max.</li> </ul>	5
<ul> <li>Number of registerable nodes, max.</li> </ul>	5 000
<ul> <li>Number of registerable method calls of OPC_UA_MethodCall, max.</li> </ul>	100
<ul> <li>Number of inputs/outputs when calling OPC_UA_MethodCall, max.</li> </ul>	20
OPC UA Server	Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms & Condition (A&C), Custom Address Space
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password
<ul> <li>— GDS support (certificate management)</li> </ul>	Yes
<ul><li>— Number of sessions, max.</li></ul>	64
<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>	50
— Sampling interval, min.	10 ms
— Publishing interval, min.	10 ms
Number of server methods, max.	100
Number of inputs/outputs per server method, max.	20
Number of monitored items, recommended max.	10 000; for 1 s sampling interval and 1 s send interval
— Number of server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"
<ul> <li>Number of nodes for user-defined server interfaces, max.</li> </ul>	30 000
<ul> <li>Alarms and Conditions</li> </ul>	Yes
<ul> <li>Number of program alarms</li> </ul>	400
<ul> <li>Number of alarms for system diagnostics</li> </ul>	200
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	

Equidistance	Yes
Jitter, max.	1 µs
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	4 000
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
Status/control	20
Status/control variable	Yes
Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters
<ul> <li>Number of variables, max.</li> </ul>	
— of which status variables, max.	200; per job
of which control variables, max.	200; per job
Forcing	
• Forcing	Yes
Forcing, variables	peripheral inputs/outputs (without fail-safe)
Number of variables, max.	200
	200
Diagnostic buffer	Yes
• present	
Number of entries, max.	3 200
— of which powerfail-proof	1 000
Traces	
Number of configurable Traces	8
Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
• ACT LED	Yes; For memory card access
• RDY LED	Yes
• COM LED	Yes
<ul> <li>Connection display LINK TX/RX</li> </ul>	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC
Number of available Motion Control resources for	program; selection guide via the TIA Selection Tool 12 800
technology objects	
Required Motion Control resources	
— per speed-controlled axis	40
<ul><li>per positioning axis</li></ul>	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
<ul> <li>Number of available Extended Motion Control resources for technology objects</li> </ul>	420
	420
for technology objects	2

	00
— for each set of kinematics	30
— Per leading axis proxy	3
<ul> <li>kinematics functions</li> </ul>	
<ul> <li>kinematics with up to 4 interpolating axes</li> </ul>	Yes; max. 3D + orientation
<ul> <li>kinematics with 5 or more interpolating axes</li> </ul>	Yes; only with S7-1500T Motion Control KinPlus, as of TIA Portal V18 / FW V3.0
<ul> <li>user-defined kinematics</li> </ul>	Yes
<ul> <li>— SIMATIC Safe Kinematics</li> </ul>	Yes; optional, SIMATIC Safe Kinematics V17 or higher
<ul> <li>Positioning axis</li> </ul>	
<ul> <li>Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	55
<ul> <li>Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	110
Controller	
<ul><li>PID_Compact</li></ul>	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
Integrated Functions	
Counter	
Number of counters	8; Event/cycle duration measurement
Counting frequency, max.	32 kHz
Counting functions	
Continuous counting	Yes
Measuring functions	, 60
Measuring range	
ž ž	10 us: 5 us minimum nulse width
Cycle duration measurement, min.  Cycle duration measurement may	10 µs; 5 µs minimum pulse width 178 s
Cycle duration measurement, max.	1765
Accuracy	Consulting of the time and deviate 44.07 as in second
Cycle duration measurement	Sampling of the time period with 41.67 ns increments
Potential separation	
Potential separation digital inputs	
· · · · · · · · · · · · · · · · · · ·	\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
between the channels	Yes; 12 DI (X122/X132), in 2 groups of 6 DI each
between the channels     Potential separation digital outputs	
<ul> <li>between the channels</li> <li>Potential separation digital outputs</li> <li>between the channels</li> </ul>	Yes; 12 DI (X122/X132), in 2 groups of 6 DI each No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)
between the channels     Potential separation digital outputs	
<ul> <li>between the channels</li> <li>Potential separation digital outputs</li> <li>between the channels</li> </ul>	
between the channels  Potential separation digital outputs      between the channels  Isolation	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  CULus  RCM (formerly C-TICK)	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  CULus  RCM (formerly C-TICK)  KC approval	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  CULus  RCM (formerly C-TICK)  KC approval  EAC (formerly Gost-R)	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  cULus  RCM (formerly C-TICK)  KC approval  EAC (formerly Gost-R)  Highest safety class achievable in safety mode	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  cULus  RCM (formerly C-TICK)  KC approval  EAC (formerly Gost-R)  Highest safety class achievable in safety mode  Performance level according to ISO 13849-1	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  CULus  RCM (formerly C-TICK)  KC approval  EAC (formerly Gost-R)  Highest safety class achievable in safety mode  Performance level according to ISO 13849-1  SIL acc. to IEC 61508	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Solution (PLe if exclusively F-CPU is used) SIL 2 (SIL 3 if exclusively F-CPU is used)
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  cULus  RCM (formerly C-TICK)  KC approval  EAC (formerly Gost-R)  Highest safety class achievable in safety mode  Performance level according to ISO 13849-1	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Solution (PLe if exclusively F-CPU is used) SIL 2 (SIL 3 if exclusively F-CPU is used)
<ul> <li>between the channels</li> <li>Potential separation digital outputs         <ul> <li>between the channels</li> </ul> </li> <li>Isolation         <ul> <li>Isolation tested with</li> </ul> </li> <li>Degree and class of protection</li> <li>IP degree of protection</li> <li>Standards, approvals, certificates</li> <li>CE mark</li> <li>UKCA mark</li> <li>CULus</li> <li>RCM (formerly C-TICK)</li> <li>KC approval</li> </ul> <li>EAC (formerly Gost-R)</li> <li>Highest safety class achievable in safety mode         <ul> <li>Performance level according to ISO 13849-1</li> <li>SIL acc. to IEC 61508</li> </ul> </li> <li>Probability of failure (for service life of 20 years and repair time         <ul> <li>Low demand mode: PFDavg in accordance with</li> <li>SIL2</li> <li>Low demand mode: PFDavg in accordance with</li> </ul> </li>	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
<ul> <li>between the channels</li> <li>Potential separation digital outputs</li> <li>between the channels</li> <li>Isolation</li> <li>Isolation tested with</li> <li>Degree and class of protection</li> <li>IP degree of protection</li> <li>Standards, approvals, certificates</li> <li>CE mark</li> <li>UKCA mark</li> <li>CULus</li> <li>RCM (formerly C-TICK)</li> <li>KC approval</li> <li>EAC (formerly Gost-R)</li> <li>Highest safety class achievable in safety mode</li> <li>Performance level according to ISO 13849-1</li> <li>SIL acc. to IEC 61508</li> <li>Probability of failure (for service life of 20 years and repair time — Low demand mode: PFDavg in accordance with SIL2</li> </ul>	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
<ul> <li>between the channels</li> <li>Potential separation digital outputs</li> <li>between the channels</li> <li>Isolation</li> <li>Isolation tested with</li> <li>Degree and class of protection</li> <li>IP degree of protection</li> <li>Standards, approvals, certificates</li> <li>CE mark</li> <li>UKCA mark</li> <li>cULus</li> <li>RCM (formerly C-TICK)</li> <li>KC approval</li> <li>EAC (formerly Gost-R)</li> <li>Highest safety class achievable in safety mode</li> <li>Performance level according to ISO 13849-1</li> <li>SIL acc. to IEC 61508</li> <li>Probability of failure (for service life of 20 years and repair time</li> <li>Low demand mode: PFDavg in accordance with SIL2</li> <li>Low demand mode: PFDavg in accordance with SIL3</li> <li>High demand/continuous mode: PFH in accordance</li> </ul>	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
<ul> <li>between the channels</li> <li>Potential separation digital outputs         <ul> <li>between the channels</li> </ul> </li> <li>Isolation         <ul> <li>Isolation tested with</li> </ul> </li> <li>Degree and class of protection</li> <li>IP degree of protection</li> <li>Standards, approvals, certificates</li> <li>CE mark</li> <li>UKCA mark</li> <li>CULus</li> <li>RCM (formerly C-TICK)</li> <li>KC approval</li> </ul> <li>EAC (formerly Gost-R)</li> <li>Highest safety class achievable in safety mode         <ul> <li>Performance level according to ISO 13849-1</li> <li>SIL acc. to IEC 61508</li> </ul> </li> <li>Probability of failure (for service life of 20 years and repair time         <ul> <li>Low demand mode: PFDavg in accordance with SIL2</li> <li>Low demand mode: PFDavg in accordance with SIL3</li> <li>High demand/continuous mode: PFH in accordance with SIL2</li> <li>High demand/continuous mode: PFH in accordance</li> </ul> </li>	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
between the channels  Potential separation digital outputs     between the channels  Isolation  Isolation tested with  Degree and class of protection  IP degree of protection  Standards, approvals, certificates  CE mark  UKCA mark  cULus  RCM (formerly C-TICK)  KC approval  EAC (formerly Gost-R)  Highest safety class achievable in safety mode  Performance level according to ISO 13849-1  SIL acc. to IEC 61508  Probability of failure (for service life of 20 years and repair time  Low demand mode: PFDavg in accordance with SIL2  Low demand mode: PFDavg in accordance with SIL3  High demand/continuous mode: PFH in accordance with SIL2  High demand/continuous mode: PFH in accordance with SIL3  Ambient conditions	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
<ul> <li>between the channels</li> <li>Potential separation digital outputs</li> <li>between the channels</li> <li>Isolation</li> <li>Isolation tested with</li> <li>Degree and class of protection</li> <li>IP degree of protection</li> <li>Standards, approvals, certificates</li> <li>CE mark</li> <li>UKCA mark</li> <li>CULus</li> <li>RCM (formerly C-TICK)</li> <li>KC approval</li> <li>EAC (formerly Gost-R)</li> <li>Highest safety class achievable in safety mode</li> <li>Performance level according to ISO 13849-1</li> <li>SIL acc. to IEC 61508</li> <li>Probability of failure (for service life of 20 years and repair time — Low demand mode: PFDavg in accordance with SIL2</li> <li>— Low demand mode: PFDavg in accordance with SIL3</li> <li>— High demand/continuous mode: PFH in accordance with SIL2</li> <li>— High demand/continuous mode: PFH in accordance with SIL3</li> </ul>	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)  707 V DC (type test)  IP20 control cabinet installation / open type  Yes Yes Yes Yes Yes Yes Yes Yes Yes Y

• max.	55 °C
Ambient temperature during storage/transportation	
• min.	-40 °C; Long-term storage: -25 °C
● max.	70 °C; Long-term storage: +55 °C
Altitude during operation relating to sea level	
<ul> <li>Installation altitude above sea level, max.</li> </ul>	4 000 m; as of an altitude of 2000 m, the maximum ambient air temperature is reduced by 7 °C per 1000 m; see SINAMICS documentation for SINAMICS S120 drive components
Ambient air temperature-barometric pressure-altitude	Permissible air pressure: 620 hPa 1 060 hPa
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— CFC	No
— GRAPH	Yes
Know-how protection	
<ul> <li>User program protection/password protection</li> </ul>	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
<ul> <li>protection of confidential configuration data</li> </ul>	Yes
<ul> <li>Protection level: Write protection</li> </ul>	Yes; Specific write protection both for Standard and for Failsafe
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
<ul> <li>Protection level: Write protection for Failsafe</li> </ul>	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	50 mm
Height	300 mm
Depth	226 mm; 270 mm with spacer (included in scope of supply)
Weights	
Weight, approx.	2 400 g
Other	
Note:	The SIMATIC Drive Controller deviates from the usual SIMATIC S7-1500 ambient conditions and specifications as well as the available approvals and certificates because of the drive design. For details, see the SIMATIC Drive Controller device and system manual. Operation is without fan.
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