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	
STEP 7 TIA Portal configurable/integrated from version	V18 (FW V3.0) / V16 (FW V2.8) or higher
Integrated drive control	
 Number of axes for servo control, max. 	6
 Number of axes for vector control, max. 	6
 Number of axes for V/f control, max. 	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	
 Mains/voltage failure stored energy time 	3 ms; Refers to the power supply on the CPU section
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 A ² ·s
Power loss	
Power loss, typ.	17 W
Memory	
Number of slots for SIMATIC memory card	
	1
SIMATIC memory card required	1 Yes

	45.84
integrated (for program)	15 Mbyte
integrated (for data)	40 Mbyte
Load memory	
 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	
 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
• Size, max.	16 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	1 Mbyte
FC	i insylo
	0 65 535
Number range Size may	
• Size, max.	1 Mbyte
OB O:	430
• Size, max.	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 	50
 Number of DPV1 alarm OBs 	3
 Number of isochronous mode OBs 	3
 Number of technology synchronous alarm OBs 	2
Number of startup OBs	100
Number of asynchronous error OBs	4
Number of synchronous error OBs	2
•	
Number of diagnostic alarm OBs	1
Nesting depth	
per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
	2 048
Number	2 048 Yes
Number Retentivity	
NumberRetentivity— adjustable	
Number Retentivity — adjustable IEC counter	Yes
 Number Retentivity — adjustable IEC counter Number 	Yes
Number Retentivity — adjustable IEC counter Number Retentivity	Yes Any (only limited by the main memory)
 Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times 	Yes Any (only limited by the main memory)
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Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable adjustable	Yes Any (only limited by the main memory) Yes
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Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable	Yes Any (only limited by the main memory) Yes 2 048 Yes
Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable Data areas and their retentivity	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory)
Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 768 kbyte; In total; available retentive memory for bit memories, timers,
Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes
Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
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Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB 16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte

Local data	
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	16 384; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	,,
— Inputs (volume)	32 kbyte; Max. 32 KB via X150; max. 8 KB via X160 or X126
— Outputs (volume)	32 kbyte; Max. 32 KB via X150; max. 8 KB via X160 or X126
Subprocess images	, , , , , , , , , , , , , , , , , , , ,
Number of subprocess images, max.	32
Hardware configuration	-
Number of distributed IO systems	64; A distributed I/O system is characterized not only by the integration of
	distributed I/O via PROFINET or PROFIBUS, 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	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	2
• Via CM	Expansion via CMs / CPs (PROFIBUS, PROFINET, Ethernet) not possible;
	these CMs / CPs can only be operated in a central rack
PtP CM	
Number of PtP CMs	The number of connectable PtP CMs (distributed) is only limited by the number of available slots
Time of day	
Clock	
• Type	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
 Deviation per day, max. 	10 s; Typ.: 2.4 s
Operating hours counter	
Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
on Ethernet via NTP	Yes
Digital inputs	
integrated channels (DI)	28; max. depending on parameterization
Digital inputs, parameterizable	Yes; 12 DI, 8 DI/DQ (X122/X132, SINAMICS Integrated) + 8 DI/DQ (X142, PLC)
Source/sink input	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	
Freely usable digital input	Yes; Max. 20 (X122/X132) + max. 8 (X142)
• Probe	Yes; Max. 8 (X122/X132) + max. 8 (X142)
Digital input with time stamp	Yes; Max. 8 (X142); e.g. for probes
• Counter	Yes; Max. 8 (X142); event/cycle duration measurement
Digital input with oversampling	Yes; Max. 8 (X142); 32-fold oversampling
Input voltage	
Type of input voltage	DC
Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+15 to +30 V
permissible voltage at input, min.	-30 V
- permissible voltage at imput, mim.	-30 V
 nermissible voltage at input, may 	
permissible voltage at input, max. Input current	
 permissible voltage at input, max. Input current for signal "1", typ. 	4 mA

- Minimum pulse width for program reactions	Fig. for V122/V122/V122/V122 (DI/DO on DI) for V142 with filter parting 1 up
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	No. For V122/V122
— 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	Voc: identical to those for technological functions
— parameterizable	Yes; identical to those for technological functions
for technological functions	Voc. For V142, additionally adjustable input filter: 1 us / 125 us
— parameterizable— with "0" to "1", typ.	Yes; For X142, additionally adjustable input filter: 1 μs / 125 μs
— with "1" to "0", typ.	5 μs; For X142; HW delay 5 μs; For X142; HW delay
Cable length	5 μs, 1 οι χ142, 1100 uciay
• shielded, max.	30 m; For technological functions: Shielding of the DI recommended depending on the requirements
unshielded, max.	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 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
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 ratio over 32-bit pattern
— ON period, min.	0 %
— ON period, max.	100 %
 Resolution of the duty cycle 	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	
• "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	
— "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	
• for logic links	Yes; For technological functions and high-speed outputs: No
for uprating	No
for redundant control of a load	Yes; For technological functions and high-speed outputs: No
Switching frequency	
with resistive load, max.	35 kHz; With High Speed output, 1 kHz with standard output

• on lamp load, max • Current of the outputs • Current per module, max. • Carbiel length • shelded, max, • unshelded, ma	a with industria load many	2 Hz: May 1 I nor channel
Current per module, max. 8 A	with inductive load, max.	2 Hz; Max. 1 J per channel
Carbon C		IIΠZ
Cable length • shielded, max. • shielded, max. 30 m • unshalled, max. 30 m * unshalled, max. 30 m * where of PROFINET interfaces 1 Number of PROFINET interfaces 2 LUSB 3 (without function, no connection permissible) Number of DRIVE-CUQ interfaces 2 LUSB 3 (without function, no connection permissible) Number of DRIVE-CUQ interfaces 2 LINEARCE Interface Interfac	·	0.4
• shelded, max. • unahielded, max. Number of PROFINET interfaces 1 Number of PROFINET interfaces 2		8 A
• unshelded, max Interfaces Number of PROFINET interfaces Number of PROFINES interfaces Number of DRIVE-CLIQ interfaces **Post		00
Number of PROFINET interfaces Number of PROFINET interfaces 1. Number of USB interfaces 2. USB 3.0 (without function, no connection permissible) Number of USB interfaces 2. USB 3.0 (without function, no connection permissible) Number of USB interfaces 1. PRIVE-CLIQ interfaces (24 V; 450 mA per interface for connecting encoders/measuring systems) Interface Interface types R. 4.5 (Ethernet) R. 5 (Ethernet)		
Number of PROFINET interfaces Number of DRIVE-CLIQ interfaces Number of DRIVE-CLIQ interfaces Number of DRIVE-CLIQ interfaces Very Concept of PROFINET interfaces Number of DRIVE-CLIQ interfaces **PORTION OF TRANSPORT OF	·	30 m
Number of PROFIBUS interfaces 1 VSB 3.0 (without function, no connection permissible) Number of DRNE-CUD interfaces 2 VSB 3.0 (without function, no connection permissible) Number of DRNE-CUD interfaces 1 Number of DRNE-CUD interfaces 1 Number of ports 2 R.1 45 (Ethernet) 2 R.1 45 (Ethernet) 3 Yes; X150 3 Number of ports 3 Yes; YSS 0 4 PROFINET IO Controller 5 PROFINET IO Controller 6 PROFINET IO Controller 7 Yes 7 PROFINET IO Controller 7 Yes 8 PROFINET IO Controller 8 PROFINET IO Controller 9 PROFINET IO Controller 1 PROFINET I Controller 1 PROFINET IO Controller 1 PROFINET IO Controller 1 PROFINET I Controller 1 PROFINET IO Controller 1 PROFINET I Cont		
Number of USB interfaces Number of DRNE-CLQ interfaces 4 DRIVE-CLQ interfaces (24 V 450 mA per interface for connecting enterface (24 V 450 mA per interface for connecting enterface (24 V 450 mA per interface for connecting enterface (24 V 450 mA per interface for connecting enterface (24 V 450 mA per interface for connecting enterface (24 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface for connecting enterface) Interface (25 V 450 mA per interface)		
Mumber of DRIVE-CLIQ interfaces (24 V / 450 mA per interface for connecting encoders/measuring systems) Interface		
Interface types Interf		
Interface yipss R.1 45 (Ehemet) Number of ports Interface yies R.2 45 (Ehemet) Number of ports Interface yies Protocols IP protocol IP prot	Number of DRIVE-CLiQ interfaces	
• RJ 45 (Elhemet) • Number of ports • Number of ports • Integrated which • Yes Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Device • Yes • SIMATIC communication • Open IE communication • Web server • Media redundancy • Yes • Media redundancy • Yes PROFIDET IO Controller Services	. Interface	Should be made and a special s
• RJ 45 (Elhemet) • Number of ports • Number of ports • Integrated which • Yes Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Device • Yes • SIMATIC communication • Open IE communication • Web server • Media redundancy • Yes • Media redundancy • Yes PROFIDET IO Controller Services		
• integrated switch Protocols - IP protocol - PROFINET IO Controller - PROFINET IO Device - PROFINET IO Device - PROFINET IO Communication - Open IE communication - Web server - Media redundancy - Wes server - Media redundancy - Yes - PROFINET IO Controller - PGOP communication - Yes - PROFINET devices	* *	Yes; X150
PROFINET IO Controller PROFINET IO Device PROFINET IO Communication Pes Nedia redundancy PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller P	Number of ports	3
PROFINET IO Controller PROFINET IO Device PROFINET IO Communication Pes Nedia redundancy PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller P	integrated switch	Yes
■ IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Ves SIMATIC communication Ves Open IE communication Ves Web server Media redundancy Ves PROFINET IO Controller Services — PG(OP communication Ves Services — PG(OP communication Ves Services — PG(OP communication Ves Services — PG(OP communication Ves Services — PROFIner Io Controller Services — PROFIner Io Controller Ves — Direct data exchange Ves — Services — PROFIner Io Advices — Services — PROFIner Io Communication Ves — Services — PROFIner Idea (MRPD optional) Ves — Services — PROFIner Idea (MRPD optional) Ves — PROFINET Gevices — PROFINET Gevices — PROFINET Gevices — Number of connectable Io Devices, max. — Of which In O devices with IRT, max. — Of which In O devices with IRT, max. — Of which In Ine, max. — Number of Connectable Io Devices for RT, max. — Of which In Ine, max. — Number of Connectable Io Devices for RT, max. — Services — Number of Connectable Io Devices for RT, max. — Videa In Iner Iner Iner Iner Iner Iner Iner I	•	
■ PROFINET IO Device PROFINET IO Device PROFINET IO Device Profine to Controller ■ Media redundancy Profine to Controller ■ Media redundancy Profine to Controller ■ Profice Controller ■ Direct data exchange Profine to Lock pulse Direct data exchange Profine to Lock pulse Profine to		Yes; IPv4
• SIMATIC communication • Open IE communication • Web server • Media redundancy • Media redundancy • PROFINET IO Controller Services - PG/OP communication - Isochronous mode - Isochronous mode - Isochronous mode - Isochronous mode - IRT - Direct data exchange - shortest clock pulse - Shortest clock pulse - IRT - PROFIenergy - Prioritized startup - Prioritized startup - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which in line, max Of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - For send cycle of 500 µs - for send cycle of 20 ns - for send cycle of 4 ms - With IRT and parameterization of *odd* send cycles - For send cycle of 500 µs - for send cycle of 4 ms - for send		
● SIMATIC communication ● Vets communication For Per Server ● Media redundancy Per Services Services PERCIFIET 10 Controller Services PERCIFIET 10 Controller Services PERCIPIET 10 Controller Services Sevices Services Se	PROFINET IO Device	Yes
■ Open IE communication ■ Ves Server ■ Media redundancy ■ PROFINET IO Controller Services ■ PG/OP communication ■ Isochronous mode ■ Direct data exchange ■ Shortest dock pulse ■ Shortest dock pulse ■ IRT ■ PROFlenergy ■ Prioritized startup ■ Prioritized startup ■ Number of connectable IO Devices, max. ■ Of which IO devices with IRT, max. ■ Of which IO devices with IRT, max. ■ Number of Connectable IO Devices for RT, max. ■ Number of Devices bat can be simultaneously activated/deactivated, max. ■ Number of IO Devices per tool, max. ■ Number of IO Devices per tool, max. ■ Updating times ■ For send cycle of 250 µs ■ for send cycle of 4 ms ■ With IRT and parameterization of "odd" send cycles ■ For send cycle of 550 µs ■ for send cycle of 1 ms ■ for send cycle of 550 µs ■ for send cycle of 550 µs ■ for send cycle of 1 ms ■ for send cycle of 550 µs		Yes
• Web server • Nedia redundancy Pres PROFINET IO Controller Services - PG/OP communication - Isochronous mode - Direct data exchange - shortest clock pulse - shortest clock pulse - shortest clock pulse - IRT - PROFIlenergy - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which in line, max Of which in Ilne, max Of which in ID Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - For send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - for send cycle of 500 µs - for send cycle of 100 µs - for send cycle of 100 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 100 µs - for send cycle of		
PROFINET IO Controller Services - PG/OP communication - Isochronous mode - Direct data exchange - shortest clock pulse - shortest clock pulse - shortest clock pulse - shortest data exchange - PROFIenergy - PROFIenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max Of which IO devices with IRT, max Of which In line, max Number of Devices for RT, max Of which in line, max Of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices that can be simultaneously activated/deactivated, max Updating times - For send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 2 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 550 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 550 µs - for send cycle of 550 µs - for send cycle of 1 ms - for send cycle of 150 µs - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 250 µs - for se	•	
Services - PC/OP communication Yes Yes Securify	Media redundancy	Yes
- PG/OP communication - Isochronous mode - Direct data exchange - Shortest clock pulse - Shortest clock pulse - IRT - PROFInergy - Prioritized startup - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which Io devices with IRT, max Of which in line, max Of which in line, max Of which in line, max Of which of IO Devices for RT, max Of which of IO Devices per tool, max Number of 1O Devices per tool, max Updating times - For send cycle of 250 μs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 μs - For send cycle of 250 μs - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 4 ms - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 4 ms - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 250 μs - For send cycle of 4 ms - For send cycle of 250 μs - For send cycle of	•	
- Isochronous mode - Direct data exchange - Shortest clock pulse - PROFIBUS or PROFINET devices - Of which In Odevices with IRT, max Of which In Odevices with IRT, max Of which In Ilne, max Of which In Ilne, max Of which In Ilne, max Number of IO Devices that can be simultaneously activate/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - 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 500 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - Yes: Requirement: IRT and isochronous mode (MRPD optional) - Yes: Nax. 32 PROFINET IO obstituted I/O devices and be connected via AS-i, PROFINET IO Device - The send cycle of 4 ms - With IRT and isochronous mode (MRPD optional) - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program - Yes: Nax. 32 PROFINET IO Device - Shortest program -	Services	
- Direct data exchange - shortest clock pulse - shortest clock pulse - IRT - PROFIenergy - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - FROFINET IO, on the number of IO devices, and on the quantity of configured user data - Vupdate time for IRT - For send cycle of 250 μs - For send cycle of 2 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 μs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 μs - For send cycle of 250 μs - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of 4 ms - For send cycle of 4 ms - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of	— PG/OP communication	Yes
— shortest clock pulse — IRT — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — of which in line, max. — of which in line, max. — Sumber of IO Devices that can be simultaneously activated/deactivated, max. — Number of IO Devices per tool, max. — Updating times Update time for IRT — for send cycle of 250 μs — for send cycle of 1 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles — for send cycle of 250 μs — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 200 μs — for send cycle of 4 ms — for send cycle	— Isochronous mode	Yes
— shortest clock pulse — IRT — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — of which in line, max. — of which in line, max. — Sumber of IO Devices that can be simultaneously activated/deactivated, max. — Number of IO Devices per tool, max. — Updating times Update time for IRT — for send cycle of 250 μs — for send cycle of 1 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles — for send cycle of 250 μs — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 200 μs — for send cycle of 4 ms — for send cycle	— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- IRT - PROFlenergy - Prioritized startup - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which in line, max of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - For send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 2 ms - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - for send cycle of 250 μs - for send cycle of 2 ms - for send cycle of 250 μs - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 250 μs - for send cycle of 2 ms - for send cycle of 4 ms - for send	-	
Prioritized startup Number of connectable IO Devices, max. Of which IO devices with IRT, max. Of which IO devices with IRT, max. Number of connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Updating times Profused time for IRT for send cycle of 250 μs for send cycle of 1 ms which IRT and parameterization of "odd" send cycles be a cycle of 250 μs With IRT and parameterization of "odd" send cycles be soon up to send cycle of 500 μs which IRT for send cycle of 250 μs which IRT and parameterization of "odd" send cycles be soon update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 250 μs which IRT and parameterization of "odd" send cycles be soon update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 250 μs for send cycle of 250 μs for send cycle of 1 ms methods Implicate time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 2 ms for send cycle of 1 ms methods Implicate time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 2 ms for send cycle of 1 ms for send cycle of 1 ms for send cycle of 4 ms for send	·	
Prioritized startup Number of connectable IO Devices, max. Of which IO devices with IRT, max. Of which IO devices with IRT, max. Number of connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Updating times Profused time for IRT for send cycle of 250 μs for send cycle of 1 ms which IRT and parameterization of "odd" send cycles be a cycle of 250 μs With IRT and parameterization of "odd" send cycles be soon up to send cycle of 500 μs which IRT for send cycle of 250 μs which IRT and parameterization of "odd" send cycles be soon update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 250 μs which IRT and parameterization of "odd" send cycles be soon update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 250 μs for send cycle of 250 μs for send cycle of 1 ms methods Implicate time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 2 ms for send cycle of 1 ms methods Implicate time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 2 ms for send cycle of 1 ms for send cycle of 1 ms for send cycle of 4 ms for send	— PROFlenergy	Yes; per user program
PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be simultaneously activated/deactivated, max. Number of IO Devices per tool, max. Number of IO Devices per tool, 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 IRT for send cycle of 250 μs for send cycle of 500 μs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 2 ms With IRT and parameterization of "odd" send cycles Update time for RT for send cycle of 250 μs 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 250 μs to 4 ms 1 ms to 16 ms 2 ms to 32 ms 4 ms to 64 ms Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT for send cycle of 250 μs for send cycle of 250 μs for send cycle of 20 μs for send cycle of 4 ms for send cycle of 4 ms for send cycle of 4 ms 4 ms to 512 ms for send cycle of 4 ms PROFINET IO Device		
- 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 activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times 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 - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 50	— Number of connectable IO Devices, max.	
- of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - 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 - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - for send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 4 ms - for send cycle of 5 ms - for s	 Of which IO devices with IRT, max. 	64
- Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - Updating times - Updating times - The 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 - For send cycle of 500 μs - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 μs - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 500 μs - For send cycle of 2 ms - For send cycle of 4 ms - For send	 Number of connectable IO Devices for RT, max. 	256
activated/deactivated, max. — 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 — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 500 μs — for send cycle of 4 ms — for send cycle of 500 μs — for send cycle of 4 ms — for send cycle of 500 μs — for send cycle of	— of which in line, max.	256
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 — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 4 ms A ms to 512 ms PROFINET IO Device		8; in total across all interfaces
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 — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms 4 ms to 512 ms — for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device	 Number of IO Devices per tool, max. 	8
Update time for IRT — for send cycle of 250 μs — for send cycle of 500 μs 500 μs to 8 ms — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles Update time for RT — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms A ms to 512 ms PROFINET IO Device	— Updating times	set for PROFINET IO, on the number of IO devices, and on the quantity of
- for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of	Update time for IRT	
- for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cyc	— for send cycle of 250 μs	250 µs to 4 ms
- for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 50		500 μs to 8 ms
- for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send	— for send cycle of 1 ms	1 ms to 16 ms
- for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms PROFINET IO Device	•	2 ms to 32 ms
- With IRT and parameterization of "odd" send cycles Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms PROFINET IO Device Update time = set "odd" send clock (any multiple of 125 μs: 375 μs, 625 μs 3 875 μs) 250 μs to 128 ms 500 μs to 256 ms 1 ms to 512 ms 2 ms to 512 ms	•	4 ms to 64 ms
— for send cycle of 250 μs 250 μs to 128 ms — for send cycle of 500 μs 500 μs to 256 ms — for send cycle of 1 ms 1 ms to 512 ms — for send cycle of 2 ms 2 ms to 512 ms — for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device	— With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 μs : 375 μs , 625 μs 3 875 $\mu s)$
— for send cycle of 500 μs 500 μs to 256 ms — for send cycle of 1 ms 1 ms to 512 ms — for send cycle of 2 ms 2 ms to 512 ms — for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device	Update time for RT	
— for send cycle of 1 ms — for send cycle of 2 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	— for send cycle of 250 μs	250 µs to 128 ms
— for send cycle of 2 ms — for send cycle of 4 ms 2 ms to 512 ms 4 ms to 512 ms PROFINET IO Device		500 μs to 256 ms
— for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device	— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device	— for send cycle of 2 ms	2 ms to 512 ms
PROFINET IO Device	•	4 ms to 512 ms
Services	PROFINET IO Device	
	Services	

— PG/OP communication	Yes
— Isochronous mode	No
— shortest clock pulse	250 μs
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
 activation/deactivation of I-devices 	Yes; per user program
 Asset management record 	Yes; per user program
2. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X160
Number of ports	1
• integrated switch	No
Protocols	
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
	Yes
PROFINET IO Device SIMATIC communication	
SIMATIC communication	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	No
— PROFlenergy	Yes; per user program
 Prioritized startup 	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
 Number of connectable IO Devices for RT, max. 	128
— of which in line, max.	128
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8; in total across all interfaces
 Number of IO Devices per tool, max. 	8
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for RT	ovinigation door data
•	1 ms to 512 ms
— for send cycle of 1 ms PROFINET IO Device	1 1113 to 3 12 1113
Services	Voc
— 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	
Interface types	
RJ 45 (Ethernet)	Yes; X130
Number of ports	1
• Number of ports	
• integrated switch	No
·	No
• integrated switch Protocols	
integrated switchProtocolsIP protocol	Yes; IPv4
• integrated switch Protocols	

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	
Number of connections, max.	48; for the integrated PROFIBUS DP interface
 Number of DP slaves, max. 	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
Activation/deactivation of DP slaves	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
Protocols	
PROFIsafe	Yes; V2.4 / V2.6
Number of connections	100, 12.17 12.0
	384; Via integrated interfaces of the CPU
Number of connections	
Number of connections • Number of connections, max.	384; Via integrated interfaces of the CPU
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
Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web	384; Via integrated interfaces of the CPU 10
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	384; Via integrated interfaces of the CPU 10 320
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	384; Via integrated interfaces of the CPU 10 320 64; in total, only 16 S7-Routing connections are supported via PROFIBUS
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 64; in total, only 16 S7-Routing connections are supported via PROFIBUS
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;
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
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
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
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
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.	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
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 200 ms; For MRP, bumpless for MRPD 50
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
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	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
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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 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) Yes 64 kbyte Yes
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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 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 ISO-on-TCP (RFC1006)	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 See online help (S7 communication, user data size) Yes 64 kbyte Yes Yes

— UDP multicast	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	
• 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
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 User authentication 	"anonymous" or by user name & password
 Number of connections, max. 	40
 Number of nodes of the client interfaces, recommended max. 	5 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_U max. 	300 I
 Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max. 	20
 Number of elements for one call of OPC_UA_MethodGetHandleList, max. 	100
 Number of simultaneous calls of the client instructions for session management, per connection, max. 	1
 Number of simultaneous calls of the client instructions for data access, per connection, max. 	5
 Number of registerable nodes, max. 	5 000
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC UA Server	Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms & Condition (A&C), Custom Address Space
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 User authentication 	"anonymous" or by user name & password
 — GDS support (certificate management) 	Yes
Number of sessions, max.	64
 Number of accessible variables, max. 	200 000
 Number of registerable nodes, max. 	50 000
 Number of subscriptions per session, max. 	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"
 Number of nodes for user-defined server interfaces, max. 	30 000
 Alarms and Conditions 	Yes
 Number of program alarms 	400
Number of alarms for system diagnostics	200
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Jitter, max.	1 μs

Number of login stations for massage functions may	64
Number of login stations for message functions, max.	64 Yes
Program alarms Number of configurable program messages may	
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	
Status/control variable	Yes
Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times,
- Fallabio	counters
 Number of variables, max. 	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
Forcing	Yes
Forcing, variables	peripheral inputs/outputs (without fail-safe)
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	3 200
— of which powerfail-proof	1 000
Traces	
Number of configurable Traces	8
Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
• ERROR LED • MAINT LED	Yes Yes
	Yes
MAINT LED ACT LED	Yes Yes; For memory card access
MAINT LEDACT LEDRDY LED	Yes Yes; For memory card access Yes
MAINT LEDACT LEDRDY LEDCOM LED	Yes Yes; For memory card access Yes Yes
 MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX 	Yes Yes; For memory card access Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects	Yes Yes; For memory card access Yes Yes Yes
 MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX 	Yes Yes; For memory card access Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects	Yes Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes; Note: The number of technology objects affects the cycle time of the PLC
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Area Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 12 800
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources Per speed-controlled axis Per positioning axis Per synchronous axis Per external encoder	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED RDY LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per external encoder — per output cam — per cam track	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Your Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 12 800 40 80 160 80 20 160
MAINT LED ACT LED COM LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per external encoder — per output cam — per cam track — per probe Number of available Extended Motion Control resources	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED COM LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources per speed-controlled axis per positioning axis per external encoder per output cam per cam track per probe Number of available Extended Motion Control resources for technology objects Required Extended Motion Control resources	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED COM LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe Number of available Extended Motion Control resources for technology objects Required Extended Motion Control resources — per cam (1 000 points and 50 segments)	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED COM LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources per speed-controlled axis per positioning axis per external encoder per output cam per cam track per probe Number of available Extended Motion Control resources Required Extended Motion Control resources per cam (1 000 points and 50 segments) per cam (10 000 points and 50 segments)	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes
MAINT LED ACT LED COM LED COM LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects Required Motion Control resources per speed-controlled axis per positioning axis per positioning axis per external encoder per output cam per cam track per probe Number of available Extended Motion Control resources for technology objects Required Extended Motion Control resources for technology objects Required Extended Motion Control resources per cam (1 000 points and 50 segments)	Yes; For memory card access Yes Yes Yes Yes Yes Yes Yes Yes Yes

 kinematics with up to 4 interpolating axes 	
	Yes; max. 3D + orientation
 kinematics with 5 or more interpolating axes 	Yes; only with S7-1500T Motion Control KinPlus, as of TIA Portal V18 / FW
	V3.0
 user-defined kinematics 	Yes
— SIMATIC Safe Kinematics	Yes; optional, SIMATIC Safe Kinematics V17 or higher
 Positioning axis 	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	55
 Number of positioning axes at motion control cycle of 8 ms (typical value) 	110
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
High-speed counter	Yes
Integrated Functions	
Counter	
Number of counters	8; Event/cycle duration measurement
	32 kHz
Counting frequency, max. Counting functions	VE IV IE
-	Von
Continuous counting Measuring functions	Yes
Measuring functions	
Measuring range	40 5
Cycle duration measurement, min.	10 μs; 5 μs minimum pulse width
Cycle duration measurement, max.	178 s
Accuracy	
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
Potential separation digital outputs	
 between the channels 	No; 8 DI/DQ (X122/X132) and 8 DI/DQ (X142)
Isolation	
Isolation Isolation tested with	707 V DC (type test)
	707 V DC (type test)
Isolation tested with	707 V DC (type test) IP20 control cabinet installation / open type
Isolation tested with Degree and class of protection	
Isolation tested with Degree and class of protection IP degree of protection	
Isolation tested with Degree and class of protection IP degree of protection Standards, approvals, certificates	IP20 control cabinet installation / open type
Isolation tested with Degree and class of protection IP degree of protection Standards, approvals, certificates CE mark UKCA mark	IP20 control cabinet installation / open type Yes
Isolation tested with Degree and class of protection IP degree of protection Standards, approvals, certificates CE mark UKCA mark cULus	IP20 control cabinet installation / open type Yes Yes
Isolation tested with Degree and class of protection IP degree of protection Standards, approvals, certificates CE mark UKCA mark cULus RCM (formerly C-TICK)	IP20 control cabinet installation / open type Yes Yes Yes Yes Yes
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	Yes Yes Yes Yes Yes Yes Yes
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)	IP20 control cabinet installation / open type Yes Yes Yes Yes Yes
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	Yes Yes Yes Yes Yes Yes Yes Yes Yes
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	Yes
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	Yes
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	IP20 control cabinet installation / open type Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
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	Yes
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	IP20 control cabinet installation / open type Yes Yes Yes Yes Yes Yes Yes Yes Yes Y
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	Yes
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	Yes
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	IP20 control cabinet installation / open type Yes Yes Yes Yes Yes Yes Yes Yes PLd (PLe if exclusively F-CPU is used) SIL 2 (SIL 3 if exclusively F-CPU is used) of 100 hours) < 14.00E-04 < 2.00E-05 PLd (if exclusively F-CPU is used) < 14.00E-09 if exclusively F-CPU is used: < 1.00E-09 (at a site altitude of up to 3000 m); <
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	IP20 control cabinet installation / open type Yes Yes Yes Yes Yes Yes Yes Yes PLd (PLe if exclusively F-CPU is used) SIL 2 (SIL 3 if exclusively F-CPU is used) of 100 hours) < 14.00E-04 < 2.00E-05 PLd (if exclusively F-CPU is used) < 14.00E-09 if exclusively F-CPU is used: < 1.00E-09 (at a site altitude of up to 3000 m); <
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 Ambient temperature during operation	Yes
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• max.	70 °C; Long-term storage: +55 °C
Altitude during operation relating to sea level	
Installation altitude above sea level, max.	4 000 m; as of an altitude of 2000 m, the maximum ambient air temperature is reduced by 7 $^{\circ}$ 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	
 User program protection/password protection 	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
 protection of confidential configuration data 	Yes
 Protection level: Write protection 	Yes; Specific write protection both for Standard and for Failsafe
 Protection level: Read/write protection 	Yes
 Protection level: Write protection for Failsafe 	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	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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last modified: