SIEMENS

Data sheet

6ES7510-1SJ01-0AB0



SIMATIC DP, CPU 1510SP F-1 PN for ET 200SP, Central processing unit with Work memory 150 KB for program and 750 KB for data, 1st interface: PROFINET IRT with 3-port switch, 72 ns bit performance, SIMATIC Memory Card required, BusAdapter required for Port 1 and 2

General information	
Product type designation	CPU 1510SP F-1 PN
HW functional status	FS05
Firmware version	V2.9
Product function	
 I&M data 	Yes; I&M0 to I&M3
 Module swapping during operation (hot swapping) 	Yes; Multi-hot swapping
 Isochronous mode 	Yes; Only with PROFINET; with minimum OB 6x cycle of 625 µs
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17 (FW V2.9) / V13 SP1 Update 4 (FW V1.8) or higher
Configuration control	
via dataset	Yes
Control elements	
Mode selector switch	1
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
Input current	
Current consumption (rated value)	0.6 A
Current consumption, max.	0.9 A
Inrush current, max.	4.7 A; Rated value
l²t	0.14 A ^{2.} s
Power	
Infeed power to the backplane bus	8.75 W
Power loss	
Power loss, typ.	5.6 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
 integrated (for program) 	150 kbyte
 integrated (for data) 	750 kbyte
Load memory	
 Plug-in (SIMATIC Memory Card), max. 	32 Gbyte
Backup	

maintenance-free	Yes
CPU processing times	
for bit operations, typ.	72 ns
for word operations, typ.	86 ns
for fixed point arithmetic, typ.	115 ns
for floating point arithmetic, typ.	461 ns
CPU-blocks	
Number of elements (total)	4 000; 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.	750 kbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	0
Number range	065535
• Size, max. FC	100 kbyte
	0 65 525
 Number range Size, max. 	0 65 535 100 kbyte
OB	
• Size, max.	150 kbyte
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 Failsafe, two RTGs with one "Cyclic interrupt OB" or one "Free
	cycle OB" (F-OB) each are possible
 Number of process alarm OBs 	50
 Number of DPV1 alarm OBs 	3
 Number of isochronous mode OBs 	1
 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	24. Up to 0 possible for E blocks
per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	Vee
— adjustable IEC counter	Yes
Number	Any (only limited by the main memory)
Retentivity	Any (only limited by the main memory)
— adjustable	Yes
S7 times	
Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB
Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
 Retentivity adjustable 	Yes
Retentivity preset	No
 Retentivity preset Local data per priority class, max. 	

Subject to change without notice © Copyright Siemens

Address area	
Number of IO modules	1 024; max. number of modules / submodules
I/O address area	
Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
Address space per module	
Address space per module, max.	288 byte; For input and output data respectively
Address space per station	
 Address space per station, max. 	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
llendurene er eftermetter	046 bytes for ET 2003F modules + 512 bytes for ET 200AL modules
Hardware configuration	
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
● Via CM	1
Number of IO Controllers	
 integrated 	1
• Via CM	0
Rack	
 Modules per rack, max. 	80; CPU + 64 modules + server module (mounting width max. 1 m) + 16 ET 200AL modules
 Quantity of operable ET 200SP modules, max. 	64
Quantity of operable ET 2003F modules, max. Quantity of operable ET 200AL modules, max.	16
Number of lines, max.	1
PtP CM	
Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
• Туре	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
Number	16
Clock synchronization	
 supported 	Yes
• to DP, master	Yes; Via CM DP module
● to DP, slave	Yes; Via CM DP module
• in AS, master	Yes
● in AS, slave	Yes
 on Ethernet via NTP 	Yes
Interfaces	
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1; Via CM DP module
Optical interface	No
1. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45
Number of ports	3; 1. integr. + 2. via BusAdapter
integrated switch	Yes
BusAdapter (PROFINET)	Yes; compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x M12
Protocols	
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes

Hordman, Hordman	PROFINET IO Device	Yes
Open II: communication Yes: Optionally also encrypted Yes Web server Yes Web server Yes POCIPIE TO Communication Yes POCIPIE TO Common Mode Yes POCIPIE TO Communication Yes POCIPIE TO Communication Yes POCIPIE TO Constrained Yes POCIPIE TO Communication Yes		
• Media relandancy Yes • Media relandancy Yes, MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services - PGOP communication Yes - Inductionus mode Yes - Direct data exchange Yes, Requirement: IRT and isochronous mode (MRPD optional) - FIROT Yes, Persues program - PROFIlenergy Yes, per user program - PROFIlenergy Yes, per user program - Protocol control connectable IO Devices, max. 64 - Number of connectable IO Devices for RT. 64 - Number of Connectable IO Devices for RT. 64 - Number of Connectable IO Devices for RT. 64 - Number of Connectable IO Devices for RT. 64 - Number of Connectable IO Devices for RT. 75 - Updating times 75 - For send cycle of 250 µs 75 - For send cycle of 150 µs 75 - For send cycle of 17 ns 1 ns to 16 ns - For send cycle of 17 ns 1 ns to 16 ns - For send cycle of 17 ns 1 ns to 16 ns - For send cycle of 17 ns 1 ns to 17 ns		
Hedia redundancy: Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PPOTINET IO Controller Services Hedia redundancy: Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PPOTINET IO Controllers Yes; Program Yes; Requirement: IRT and isochronous mode (MRPD optional) Yes; Program		
PPOOP communication Yes - PGOP communication Yes - Insorthorous mode Yes - Orrect data sechange Yes - PROPlementy Yes - Prioritzed startup Yes - Number of connectable IO Devices, max. 64 - Number of IO Devices and can be antillation of the connectable IO Devices for RT, max. 64 - Number of IO Devices and can be antillation of the connectable IO Devices for RT, max. 64 - Number of IO Devices per tool, max. 64 - Number of IO Devices per tool, max. 64 - Number of IO Devices per tool, max. 64 - Number of IO Devices per tool, max. 64 - Number of IO Devices per tool, max. 64 - Number of IO Devices per tool, max. 7 - Ior send cycle of 250 µs 7 - for send cycle of 250 µs 60 µs - for send cycle of 20 µs 7		
Services Yes - PCPCP communication Yes - North Cold calls exchange Yes, Requirement: IRT and isochronous mode (MRPD optional) - RT Yes, Provided data exchange - PROFinenryy Yes, portuger pogram - Provided data exchange Yes, iportuger pogram - Provided data exchange Yes, iportuger pogram - Of which In devices with IRT, max. France - Of which In the max. 64 - Number of connectable IO Devices for RT. 64 - Number of IO Devices per tool, max. 6 - Which In the max. 64 - Wunder of IO Devices per tool, max. 6 - Updating times 6 - for send cycle of 250 µs 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum vaptate time of 20 evices, and on the quantity of configured user data Update time for IRT 250 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum vaptate time of 251 µs of the isochronous CB is decisive - for send cycle of 250 µs 250 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum vaptate time of 251 µs of the isochronous CB is decisive - bor send cycle of 250 µs 250 µs to 128 ms - bor send cycle of 250 µs 250 µs to 128 ms		
FGOP communication For and cycle of 250 µs For send cycle of 250		
 Isochronous mode Vesi Proceeding of the sector of the sector		Yes
Phontized signup Ves, Max. 32 PROFINET devices Number of connectable IO Devices, max. Of which IO devices with IRT, max. Aunther of connectable IO Devices for RT, max. ac of which In line, max. G4 Sin total across all interfaces Sin total across all interfaces Sin total across all interfaces Judgets the for IRT Judget time for IRT	•	
 Phontized slarup Yes, Max. 32 PROFINET devices Number of connectable IO Devices, max. Of which IO devices with IRT, max. Annuber of connectable IO Devices for RT, max. Of which Io line, max. Of which Io line, max. Annuber of connectable IO Devices for RT, max. Annuber of Devices that can be simultaneously activated/deactivated, max. Annuber of Devices per tool, max. Annuber of IO Devices per tool, max. For send cycle of 250 µs For send cycle of 270 µs For send cycle of 250 µs For send cycle of 250 µs For send cycle of 270 µs For send cycle of 250 µs For send cycle of 270 µs For send cycle of 270 µs For send cycle of 270 µs For send cycle of 250 µs For send cycle of 250 µs For send cycle of 270 µs For send cycle of 270 µs For send cycle of	- PROFlenergy	Yes; per user program
PROFIBUS or PROFINET Of which 10 devices with IRT, max. - Number of connectable IO Devices for RT. max. - of which in line, max. - update state and be simultaneously activated/deactivated, max. - update state and be - of resent cycle of ID Devices per tool, max. - update state and the update time also depends on communication share set for PROFINET 10, on the number of IO devices, and on the update time for IRT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 1ms - for send cycle of 250 µs - for send cycle of 4 ms - for send cycle of 4 ms - for send cycle of 250 µs - for send		
 Number of connectable IO Devices for RT, max. 	- Number of connectable IO Devices, max.	
max. 64 Number of IO Devices that can be simultaneously activated, max. 8 Number of IO Devices per tool, max. 8 Updating times 8 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 250 us to 4 ms. Note: In the case of IRT with isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the soch or send cycle of 250 us - for send cycle of 250 us 500 us to 4 ms. Note: In the case of IRT with isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode, the minimum update time of 252 is of the isochnonous mode. - for send cycle of 250 us 250 us to 128 ms - for send cycle of 1750 us 250 us to 128 ms - for send cycle of 250 us 500 us to 256 ms - for send cycle of 1 ms 1 ms to 151 ms - for send cycle of 2 ms 2 ms to 512 ms - for send cycle of 10 ms 1 ms to 151 ms - for send cycle of 10 controlers with shared device, max. 4 ms to 64 ms <td> — Of which IO devices with IRT, max. </td> <td>64</td>	 — Of which IO devices with IRT, max. 	64
	 — Number of connectable IO Devices for RT, 	64
	max.	
simultaneously activated/deactivated, max. - Number of 10 Devices per tool, max. - Updating times Update time for IRT - 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 1 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle o	— of which in line, max.	64
		8; in total across all interfaces
share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data 250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive 500 µs to 8 ms; Note: In the case of IRT with isochronous oB is decisive 500 µs to 8 ms; Note: In the case of IRT with isochronous OB is decisive 500 µs to 8 ms; Note: In the case of IRT with isochronous OB is decisive minimum update time of 625 µs of the isochronous OB is decisive 500 µs to 8 ms; Note: In the case of IRT with isochronous OB is decisive minimum update time of 625 µs of the isochronous OB is decisive to resend cycle of 4 ms - for send cycle of 4 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 1 ms - for send cycle of 1 ms - for send cycle of 4 ms - hor send cycle of 4 ms - hor send cycle of 4 ms - shared device - PROFInerry - Shared device - Number of IO Controllers with shared device, max. - Asset management record 2. Interface PROFIBUS DP master - PROFIBUS DP master - Number of IDP slaves, max. - Number of DP slaves, max.		
	— Updating times	share set for PROFINET IO, on the number of IO devices, and on the
 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 2 ms for send cycle of 4 ms for send cycle of 4 ms for send cycle of 4 ms with IRT and parameterization of "odd" send cycles Update time of 625 µs of the isochronous OB is decisive for send cycle of 4 ms with IRT and parameterization of "odd" send cycles Update time are to "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs. Update time are to "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs. for send cycle of 500 µs for send cycle of 1 ms for send cycle of 1 ms for send cycle of 1 ms for send cycle of 2 ms for send cycle of 4 ms the to 512 ms for send cycle of 4 ms the to 512 ms for send cycle of 4 ms the to 512 ms the to 512 ms for send cycle of 4 ms the to 512 ms for send cycle of 4 ms the to 512 ms the sochronous mode No isochronous mode No the cycle of 10 Controllers with shared device, max. activation/deactivation of 1-devices the cycle program Asset management record the cycle program Asset management record the cycle program therface types Number of ports therface types Stand device No<td>Update time for IRT</td><td></td>	Update time for IRT	
 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 With IRT and parameterization of "odd" send cycles With IRT and parameterization of "odd" send cycles for send cycle of 250 µs 250 µs to 128 ms for send cycle of 2 ms a 875 µs 375 µs 375 µs 375 µs 500 µs to 256 ms for send cycle of 1 ms for s	— for send cycle of 250 μs	
for send cycle of 2 ms2 ms to 32 ms for send cycle of 4 ms4 ms to 64 ms With IRT and parameterization of "odd" send cyclesUpdate time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs 3 875 µs)Update time tor RT for send cycle of 250 µs250 µs to 128 ms for send cycle of 250 µs500 µs to 256 ms for send cycle of 1 ms1 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 2 ms for send cycle of 2 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 2 ms for send cycle of 2 ms for send cycle of 4 ms4 ms to 512 ms PROFINET IO Device Services Services for send cycle of 2 ms activation/deactivationYes activation/deactivation of 1-devicesYes; per user program Asset management recordYes; per user program Asset management recordYes PROFIBUS DP masterYes Number of DP slaves, max.48; Of which 4 each reserved for ES and HMI Number of DP slaves, max	— for send cycle of 500 μs	
- 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 µs: 375 µs, 625 µs 3 875 µs) Update time for RT 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 - for send cycle of 4 ms 4 ms to 512 ms - for send cycle of 2 ms 2 ms to 512 ms - for send cycle of 2 ms 4 ms to 512 ms - for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device Yes - schortnorus mode No - RT Yes - Schortnorus mode Yes; per user program - Asset management record Yes; per user program - Asset management record Yes; yes; via CM DP module • Number of ports 1 Protocols Yes • PROFIBUS DP master Yes • PROFIBUS DP master Yes • SIMATIC communication Yes • PROFIBUS DP master Yes • Number of con	-	
	-	
cycles μs 3 875 μs) Update time for RT - for send cycle of 250 μs 250 μs to 128 ms - for send cycle of 500 μs 500 μs to 256 ms - for send cycle of 1 ms 1 ms to 512 ms - for send cycle of 2 ms 2 ms to 512 ms - for send cycle of 4 ms 4 ms to 512 ms - for send cycle of 4 ms 4 ms to 512 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 Services - PG/OP communication Yes - IRT Yes - 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; yer user program 2. Interface 1 Protocols - • RS 485 Yes; Via CM DP module • Number of ports 1 • PROFIBUS DP master Yes • PROFIBUS DP master Yes • PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-Li, PROFIBUS DP master • Number		
Update time for RT - for send cycle of 250 µs 250 µs to 128 ms - for send cycle of 500 µs 500 µs to 256 ms - for send cycle of 1 ms 1 ms to 512 ms - for send cycle of 4 ms 2 ms to 512 ms - for send cycle of 4 ms 4 ms to 512 ms - for send cycle of 4 ms 4 ms to 512 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 500 Services - - Isochronous mode No - IRT Yes - PROFIenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max. 4 - activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program 2. Interface 1 Interface types 1 • RS 485 Yes; Via CM DP module • Number of ports 1 Protocols 1 • PROFIBUS DP master Yes • SIMATIC communication Yes • SIMATIC communication Yes<		
 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 2 ms for send cycle of 4 ms t ms to 512 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 Services PG/OP communication Yes Isochronous mode No IRT Yes; per user program Shared device Yes; per user program Asset management record Yes; per user program Asset management record Yes; per user program Asset management record Yes; per user program Asset for bords Number of ports PROFIBUS DP master PROFIBUS DP master Yes SiMATIC communication Yes Yes SiMATIC communication Yes PROFIBUS DP master Number of connections, max. Number of DP slaves, max. PROFIBUS OF master Number of DP slaves, max. PROFIBUS OF PROFIBUS OF PR		με 5 675 με)
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 4 ms 2 ms to 512 ms for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device 500 µs to 256 distributed µs Services		250 us to 128 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 for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device 5 Services PG/OP communication Yes IRT Yes PROFlenergy Yes; per user program Shared device Yes Number of IO Controllers with shared device, max.		
for send cycle of 2 ms 2 ms to 512 ms for send cycle of 4 ms 4 ms to 512 ms PROFINET ID Device		
for send cycle of 4 ms 4 ms to 512 ms PROFINET IO Device Services PG/OP communication Yes Ischronous mode No IRT Yes PROFilenergy Yes; per user program Shared device Yes Activation/deactivation of I-devices Yes; per user program activation/deactivation of I-devices Yes; per user program activation/deactivation of I-devices Yes; per user program Asset management record Yes; per user program 2. Interface 1 Interface types 1 - RS 485 Yes; Via CM DP module - Number of ports 1 PROFIBUS DP master Yes - PROFIBUS DP slave Yes - SIMATIC communication Yes PROFIBUS DP master Yes - Number of connections, max. 48; Of which 4 each reserved for ES and HMI - Number of DP slaves, max. 12; In total, up to 256 distributed I/O devices can be connected via AS- 1, PROFIBUS or PROFIBUS or PROFINET	— for send cycle of 2 ms	2 ms to 512 ms
PROFINET IO Device Services - PG/OP communication Yes - Isochronous mode No - IRT Yes - PROFlenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max. 4 - activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program - Asset management record Yes; per user program 2. Interface Interface types • RS 485 Yes; Via CM DP module • Number of ports 1 Protocols Yes • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; in total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services Services Services	-	4 ms to 512 ms
	Services	
- IRTYes- PROFlenergyYes; per user program- Shared deviceYes- Number of IO Controllers with shared device, max.4- activation/deactivation of I-devicesYes; per user program- activation/deactivation of I-devicesYes; per user program- Asset management recordYes; Via CM DP module• Number of ports1Protocols1• PROFIBUS DP master • PROFIBUS DP masterYes• SIMATIC communicationYes• SIMATIC communicationYes• Number of connections, max.48; Of which 4 each reserved for ES and HMI• Number of DP slaves, max.125; In total, up to 256 distributed I/O devices can be connected via AS- i, PROFIBUS or PROFINETServices	— PG/OP communication	Yes
PROFlenergyYes; per user program Shared deviceYes Number of IO Controllers with shared device, max.4 activation/deactivation of I-devicesYes; per user program activation/deactivation of I-devicesYes; per user program Asset management recordYes; per user program Asset management recordYes; ver user program Asset management recordYes; ver user programInterfaceInterfaceInterface typesYes; Via CM DP module• Number of ports1ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveYes• SIMATIC communicationYesPROFIBUS DP masterYes• Number of connections, max.48; Of which 4 each reserved for ES and HMI• Number of DP slaves, max.125; in total, up to 256 distributed I/O devices can be connected via AS- i, PROFIBUS or PROFIBUS or PROFINETServices	— Isochronous mode	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 2. Interface Yes; via cM DP module Interface types 1 • RS 485 Yes; Via CM DP module • Number of ports 1 Protocols Yes • PROFIBUS DP master Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	— IRT	Yes
 Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Yes; per user program Asset management record Yes; per user program 2. Interface Interface types • RS 485 Yes; Via CM DP module • Number of ports 1 Protocols Yes • PROFIBUS DP master Yes • SIMATIC communication Yes PROFIBUS DP master Yes • SIMATIC conmunication Yes PROFIBUS DP master Yes • Number of DP slaves, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET	— PROFlenergy	Yes; per user program
max	— Shared device	Yes
Asset management record Yes; per user program 2. Interface Interface types • RS 485 • Number of ports 1 Protocols • PROFIBUS DP master • PROFIBUS DP slave • SIMATIC communication Yes PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max. • Number of DP slaves, max. • Services		4
2. Interface Interface types • RS 485 Yes; Via CM DP module • Number of ports 1 Protocols 1 • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services Services	 activation/deactivation of I-devices 	Yes; per user program
Interface types • RS 485 Yes; Via CM DP module • Number of ports 1 Protocols 1 • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services Services	— Asset management record	Yes; per user program
• RS 485 Yes; Via CM DP module • Number of ports 1 Protocols 1 • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services	2. Interface	
• Number of ports 1 Protocols - • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS- i, PROFIBUS or PROFINET Services	Interface types	
Protocols • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • SIMATIC communication Yes PROFIBUS DP master Yes • Number of connections, max. 48; Of which 4 each reserved for ES and HMI • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services		
PROFIBUS DP master PROFIBUS DP slave PROFIBUS DP slave SIMATIC communication Yes PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Services Services	·	1
PROFIBUS DP slave Yes SIMATIC communication Yes PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Services Services Yes Ye		
SIMATIC communication Yes PROFIBUS DP master Number of connections, max. Number of DP slaves, max. Ves Services		
PROFIBUS DP master • Number of connections, max. • Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Services		
Number of connections, max. Number of DP slaves, max. Services Services A8; Of which 4 each reserved for ES and HMI 125; In total, up to 256 distributed I/O devices can be connected via AS- i, PROFIBUS or PROFINET		Yes
Number of DP slaves, max. 125; In total, up to 256 distributed I/O devices can be connected via AS- i, PROFIBUS or PROFINET Services		40. Of which A cook records of for EO and UNA
i, PROFIBUS or PROFINET Services		
- FG/OF continunication Yes		Vec
		105

— Equidistance	No
— Isochronous mode	No
 Activation/deactivation of DP slaves 	Yes
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
Autonegotiation	Yes
Autocrossing	Yes
 Industrial Ethernet status LED 	Yes
RS 485	
 Transmission rate, max. 	12 Mbit/s
Protocols	
PROFIsafe	Yes; V2.4 / V2.6
Number of connections	
 Number of connections, max. 	96; via integrated interfaces of the CPU and connected CPs / CMs
 Number of connections reserved for ES/HMI/web 	10
 Number of connections via integrated interfaces 	64
Number of connections per CP/CM	32
Number of S7 routing paths	16
Redundancy mode	Voc
H-Sync forwarding Media redundancy	Yes
— Media redundancy	Yes; only via BusAdapter
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
- MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
 — Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
 — Number of stations in the ring, max. 	50
SIMATIC communication	
 PG/OP communication 	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
Data record routing	Yes
• S7 communication, as server	Yes
S7 communication, as client	Yes
User data per job, max. Open IE communication	See online help (S7 communication, user data size)
• TCP/IP	Yes
— Data length, max.	64 kbyte
— several passive connections per port,	Yes
supported	
 ISO-on-TCP (RFC1006) 	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; Max. 5 multicast circuits
	Yes
• DNS • SNMP	Yes
SNMP DCP	Yes
• LLDP	Yes
ELDI Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
 Number of connections, max. 	4
 Number of nodes of the client interfaces, 	1 000

recommended max.	
— Number of elements for one call of	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C	300
max.	
 Number of elements for one call of 	20
OPC_UA_NameSpaceGetIndexList, max.	
 — Number of elements for one call of OPC_UA_MethodGetHandleList, max. 	100
— Number of simultaneous calls of the client	1
instructions for session management, per	
connection, max.	
 Number of simultaneous calls of the client 	5
instructions for data access, per connection, max.	5 000
 — Number of registerable nodes, max. — Number of registerable method calls of 	5 000 100
OPC_UA_MethodCall, max.	100
— Number of inputs/outputs when calling	20
OPC_UA_MethodCall, max.	
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address
	space
— Application authentication	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
— GDS support (certificate management)	Yes
— Number of sessions, max.	32
- Number of accessible variables, max.	50 000
 Number of registerable nodes, max. 	10 000
- Number of subscriptions per session, max.	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
 — Number of server methods, max. 	20
 Number of inputs/outputs per server method, 	20
max. — Number of monitored items, recommended	1,000; for 1 a compling interval and 1 a condition val
max.	1 000; 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 	1 000
interfaces, max.	
Alarms and Conditions	Yes
 — Number of program alarms — Number of alarms for system diagnostics 	100 50
Further protocols	50
MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm"
	block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	
Number of loadable program messages in RUN, max. Test commissioning functions	block, ProDiag or GRAPH
Test commissioning functions Joint commission (Team Engineering)	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems
Test commissioning functions Joint commission (Team Engineering) Status block	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients)
Test commissioning functions Joint commission (Team Engineering) Status block Single step	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients)
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max.	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max.	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max.	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max.	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job
Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Status/control • Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing • Forcing	block, ProDiag or GRAPH 2 500 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes; without fail-safe

Diagnostic buffer	
present	Yes
 Number of entries, max. 	1 000
— of which powerfail-proof	500
Traces	
 Number of configurable Traces 	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
 Monitoring of the supply voltage (PWR-LED) 	Yes
Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of
Number of available Motion Control resources for	the PLC program; selection guide via the TIA Selection Tool 800
technology objects	
 Required Motion Control resources 	
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
 Positioning axis — Number of positioning axes at motion control 	5
cycle of 4 ms (typical value)	
 Number of positioning axes at motion control 	10
cycle of 8 ms (typical value)	
Controller	Vee: Universal DID controller with integrated entimization
PID_Compact PID_3Stop	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves
PID_3StepPID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repa	ir time of 100 hours)
- Low demand mode: PFDavg in accordance	< 2.00E-05
with SIL3 — High demand/continuous mode: PFH in	< 1.00E-09
accordance with SIL3	
Ambient conditions	
Ambient temperature during operation	
 horizontal installation, min. 	-25 °C; No condensation
 horizontal installation, max. 	60 °C
 vertical installation, min. 	-25 °C; No condensation
 vertical installation, max. 	50 °C
Altitude during operation relating to sea level	
 Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
- SCL	Yes
— GRAPH	Yes
Know-how protection	Vac
 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
 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	100 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	310 g
last modified:	4/1/2022 🖸