SIEMENS

Data sheet

6ES7677-2SB42-0GL0



Figure similar

SIMATIC ET 200SP Open Controller, CPU 1515SP PC2 F + HMI 512PT, 8 GB RAM (basic device 6ES7677-2DB40-0AA0), 128 GB CFast with Windows 10 IoT Enterprise LTSC 2019 64-bit, S7-1500 Failsafe Software Controller CPU 1505SP F V2x and WinCC Runtime Advanced V17 preinstalled, with 512 PowerTags license; interfaces: 1x slot CFast, 1x slot SD/MMC, 1x connection for ET 200SP BusAdapter PROFINET, 1x 10/100/1000 Mbps Ethernet, 2x USB 3.0, 2x USB 2.0, 1x DisplayPort; documentation on CFast,

General information	
Product type designation	CPU 1515SP PC2 F
HW functional status	from FS04
Firmware version	V21.9
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17
Installed software	
 Visualization 	WinCC Runtime Advanced V17
 Control 	S7-1500 Software Controller CPU 1505SP F
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)	1.8 A; Full processor load, incl. ET 200SP modules and using USB
Current consumption (in no-load operation), typ.	0.5 A
Current consumption, max.	2.9 A
I ² t	0.426 A²-s; with starting current inrush
Power	
Active power input, max.	55 W; incl. ET 200SP modules and using USB
Infeed power to the backplane bus	8.75 W
Power loss	
Power loss, typ.	15 W; without ET 200SP modules and without using USB
Processor	
Processor type	Intel Atom E3940, 1.6 GHz, 4 cores
Memory	
Type of memory	DDR3L
Main memory	8 GB RAM
CFast memory card	Yes; 128 GB flash memory
SIMATIC memory card required	No
Work memory	
integrated (for program)	1.5 Mbyte

a integrated (for data)	E Mbyto
• integrated (for data)	5 Mbyte
integrated (for CPU function library of CPU Runtime)	20 Mbyte
Load memory	
integrated (on PC mass storage)	320 Mbyte
Backup	
• with UPS	Yes; all memory areas declared retentive
with non-volatile memory	Yes
CPU processing times	
for bit operations, typ.	10 ns
for word operations, typ.	12 ns
for fixed point arithmetic, typ.	16 ns
for floating point arithmetic, typ.	64 ns
CPU-blocks	
Number of elements (total)	6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global
	constants, etc. are also regarded as elements
DB	
Number, max.	5 999; Number range: 1 to 65535
• Size, max.	5 Mbyte
FB	
Number, max.	5 998; Number range: 1 to 65535
• Size, max.	1 024 kbyte
FC	
Number, max.	5 999; Number range: 1 to 65535
• Size, max.	1 024 kbyte
OB	
• Size, max.	1 024 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
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	
 per priority class 	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	, (only minion by the ment memory)
— adjustable	Yes
S7 times	
• Number	2 048
	£ 0.10
Retentivity	Von
— adjustable	Yes
IEC timer	Annual Control
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes
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
Local data	
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192
I/O address area	
Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
Subprocess images	
Number of subprocess images, max.	32
Hardware configuration	
Integrated power supply	Yes
Number of distributed IO systems	20
Number of DP masters	
Via CM	1
Number of IO Controllers	
• via PC interfaces	1
Rack	
 Modules per rack, max. 	64; CPU 1515SP PC + 64 modules + server module
 Quantity of operable ET 200SP modules, max. 	64
 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	
• Type	Hardware clock
 Hardware clock (real-time) 	Yes; Resolution: 1 s
Backup time	6 wk; At 40 °C ambient temperature, typically
 Deviation per day, max. 	10 s; Typ.: 2 s
Clock synchronization	
• supported	Yes
• to DP, master	
	Yes
• on Ethernet via NTP	
	Yes
• on Ethernet via NTP	Yes Yes
on Ethernet via NTPon Windows clock, device	Yes Yes
on Ethernet via NTP on Windows clock, device Interfaces	Yes Yes Yes
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces	Yes Yes Yes 2
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces	Yes Yes Yes 1 1
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces	Yes Yes Yes 1 1 1; Via CM DP module
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces	Yes Yes Yes 1 1
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots	Yes Yes Yes 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces	Yes Yes Yes 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface	Yes Yes Yes 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface 1. Interface	Yes Yes Yes 2 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface type	Yes Yes Yes 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface type automatic detection of transmission rate	Yes Yes Yes 2 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface Interface type automatic detection of transmission rate Autonegotiation	Yes Yes Yes 2 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface Interface type automatic detection of transmission rate Autonegotiation Autocrossing	Yes Yes Yes 2 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes Yes
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface Interface type automatic detection of transmission rate Autorossing Number of connections	Yes Yes Yes 2 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface type automatic detection of transmission rate Autorossing Number of connections Interface types	Yes Yes Yes 2 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes Yes Yes 88
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces Graphics interface Interface Interface type automatic detection of transmission rate Autonegotiation Autocrossing Number of connections Interface types RJ 45 (Ethernet)	Yes Yes Yes 2 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes Yes Yes Yes Yes 88 Yes; Via BusAdapter BA 2x RJ45
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces oraphics interface Interface Interface type automatic detection of transmission rate Autonegotiation Autocrossing Number of connections Interface types RJ 45 (Ethernet) — Transmission rate, max.	Yes Yes Yes 2 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes Yes Yes Yes 88 Yes; Via BusAdapter BA 2x RJ45 100 Mbit/s
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on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces oraphics interface Interface type automatic detection of transmission rate Autonegotiation Autocrossing Number of connections Interface types RJ 45 (Ethernet) — Transmission rate, max. — Industrial Ethernet status LED Number of ports	Yes Yes Yes Yes Yes 2 1 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes Yes Yes Yes Yes Yes Yes 2
on Ethernet via NTP on Windows clock, device Interfaces Number of industrial Ethernet interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces Number of RS 485 interfaces Number of USB interfaces Number of SD card slots Video interfaces oraphics interface Interface Interface type automatic detection of transmission rate Autonegotiation Autocrossing Number of connections Interface types RJ 45 (Ethernet) — Transmission rate, max. — Industrial Ethernet status LED	Yes Yes Yes Yes Yes 2 1 1; Via CM DP module 4; 2x USB 2.0, 2x USB 3.0 on front side 1 1x DisplayPort PROFINET Yes

Protocol Yes; Pu4 Yes; Pu4 Yes; Pu4 Yes PN6 NET O Controller Yes PN6 NET O Controller Yes Yes SMATC Controller Yes O Co		BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC,
PPOPINET ID device PROFINET ID	Protocols	E. LEGINOTO, EN LEGITO, EN LA CONTO, EN CONTOTO, EN CONTOTO,
POPOPINET ID Device SIMATIC communication Web server PROFINETIO Controller Services	IP protocol	Yes; IPv4
Services - Open IE communication - Web server - Yes, Optionally also encrypted - Web server - Yes, Optionally also encrypted - Web server - Isochronous mode - Services	PROFINET IO Controller	Yes
• Veb Servier • Veb Servier FRORINETIO Controlors Services — Isochronous mode — shortest clock pulse — PROFilenergy — Prioritized startup — Prioritized startup — Prioritized startup — Number of connectable I/O Devices, max. — Of which I/O devices with IRT, max. — Of which I/O devices that can be simultaneously activated detachated, max. — Of which I/O max. — Number of connectable I/O Devices for RT, max. — Of which I/O devices that can be simultaneously activated detachated, max. — Of which I/O max. — Number of I/O Devices bath can be simultaneously activated detachated, max. — I/O Devices changing during operation (partner ports), supported Update time for IRT — For send cycle of 500 us — for send cycle of 500 us — for send cycle of 500 us — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 2 ms — which IRT and parameterization of 'cdd' send cycles Update time for IRT — for send cycle of 1 ms — in so 16 ms — in so 16 ms — in sol 10 ms — for send cycle of 1 ms — in sol 10 ms — for send cycle of 1 ms — in sol 10 ms —	PROFINET IO Device	Yes
Number of IO Devices that can be simultaneously advantage of 10 Devices por 100, max.	SIMATIC communication	Yes
Services	Open IE communication	Yes; Optionally also encrypted
Services	Web server	Yes
- Isochronous mode - shortest clock puise - shortest clock puise - PROFlenergy - PROFlenergy - Promitzed startup - PROFlenergy - Promitzed startup - Ves - Promitzed startup - Ves - Promitzed startup - Ves, max. 32 PROFINET devices; if you want to use the "Promitzed startup" functionality in STLP? for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g., SCALANGE X250) - Number of connectable IO Devices, max Of which in line, max Of which in line, max Number of connectable IO Devices for RT, max of which in line, max Number of 10 Devices that can be simultaneously advicated togeth-holds max Number of 10 Devices that can be simultaneously advicated togeth-holds max Number of 10 Devices per tool, max Updating times - Number of 10 Devices per tool, max Updating times - Update time for IRT - for send cycle of 1 ms - with IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - For send cycle of 1 ms - for send cycle	PROFINET IO Controller	
- shortest clock pulse - IRT - PROFilenergy - Profilenergy - Profilenergy - Profilenergy - Profiled startup - Number of connectable IO Devices, max ISB - Of which In line, max ISB - Of which In line, max ISB - Of which In line, max ISB - Of which I line, max Updating times - IsB - Of send cycle of 500 μs - Of send cycle of 500 μs - Of send cycle of 1 ms - Of send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - Of send cycle of 500 μs - Of send cycle of 500 μs - Of send cycle of 1 ms - Of send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - Of send cycle of 4 ms - Of send cycle of 4 ms - Of send cycle of 500 μs - Of send cycle of 500 μs - Of send cycle of 4 ms - Of send cycle of 4 ms - Of send cycle of 500 μs -	Services	
- IRT - PROFlenergy Yes - PROFlenergy - Prioritized startup Yes, max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionally in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device must be separated by means of a switch (e.g. SCALANCE X200) and the device of which in line, max. - In Devices changing during operation (partner ports). - For send cycle of 100 ps. - For	— Isochronous mode	Yes
PROFILED STATE OF PROFINE TO STATE TO THE PROFINET IN 1995 MINES AND STEP TO THE PROFILE IN 1995 MINES AND STEP TO THE PROFINET IN 1995 MINES AND STEP TO THE PROFILE IN 1995 MINES AND STEP TO T	— shortest clock pulse	500 μs
Prioritized startup Ves.; max. 22 PROFINET devices; tryou want to use the "Prioritized startup" functionality in STEP for the PROFINET interface of the Use CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) - Number of connectable IO Devices, max. - Of which IO devices with IRT, max. - Of which In line, max. - Number of connectable IO Devices for RT, max. - Number of connectable IO Devices for RT, max. - Number of IO Devices that can be simultaneously activated/deactivated, max. - IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max. - Updating times - 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. - Updating times - To send cycle of 1 ms - To send eycle of 1 ms - To send eycle 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 - To send cycle of 500 µs - To	— IRT	Yes
unuctionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) - Number of connectable IO Devices, max.	— PROFlenergy	Yes
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- of which in line, max Number of connectable IO Devices for RT, max Number of IO Devices that can be simultaneously activated/deach/vate/, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Updating times - Updating times - Updating times - 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 4 ms - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - 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 3 ms - For send cycle of 4 ms - For send cycle of 5 ms	 Number of connectable IO Devices, max. 	128
- Number of connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Updating times - 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 4 ms - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 1 ms - For send cycle of 1 ms - 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 - With IRT and parameterization of "odd" send cycles - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - 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 - With IRT and parameterization of "odd" send cycles - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - 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 2 ms - For send cycle of 3 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 o	 Of which IO devices with IRT, max. 	64
of which in line, max Number of IO Devices that can be simultaneously activated/ideactivated, max IO Devices changing during operation (partner ports), supported Number of IO Devices per tool, max Updating times With IRT and parameterization of "odd" send cycles For send cycle of 500 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 With IRT and parameterization of "odd" send cycles 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 4 ms For send cycle of 4 ms For send cycle of 500 µs For send cycle of 4 ms For send cycl	— of which in line, max.	64
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Update time for IRT — for send cycle of 500 μs — for send cycle of 2 ms — for send cycle of 4 ms — with IRT and parameterization of "odd" send cycles — With IRT and parameterization of "odd" send cycles — 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 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — time to 512 ms — for send cycle of 4 ms — time to 512 ms — for send cycle of 4 ms — linputs, max. — 8 kbyte — linputs, max. — 8 kbyte — Uupdate time for RT — send cycle of 4 ms — shortest clock pulse — iRT — PROFINET IO Device — Services — IRT — PROFlenergy — Prioritized startup — Prioritized startup — Prioritized startup — Prioritized startup — Sand device — Number of IO Controllers with shared device, max. — Asset management record — Number of IO Controllers with shared device, max. — Asset management record — Yes Autorossing — RJ 45 (Elhernet) — Yes FILEFICENTIES Ves integrated	— Updating times	set for PROFINET IO, on the number of IO devices, and on the quantity of
- for send cycle of 1 ms	Update time for IRT	
- for send cycle of 2 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 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 500 μs - For send cycle of 500 μs - Inputs, max Outputs, max Outputs, max Sk kbyte - Isochronous mode - shortest clock pulse - IRT - PROFIenergy - Prioritized startup - PROFIenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record - Interface type - Interface type - Interface - Interface types - RJ 45 (Ethernet) - Yes; Integrated - FL 45 (Ethernet) - Yes; Integrated	— for send cycle of 500 μs	500 μs to 8 ms
- for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles be imine = set "odd" send clock (any multiple of 125 μs: 625 μs 3 875 μs) minimum cycle time for RT - 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 500 μs - for send cycle of 4 ms - liputs, max Outputs, max Outputs, max Outputs, max Outputs, max Sk kbyte - shortest clock pulse - FROFIenergy - Prioritized startup - Yes - PROFIenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record - Yes - Number of IO Controllers with shared device, max Asset management record - Yes - Interface type Interface type utunatic detection of transmission rate - RJ 45 (Ethernet) - FRJ 45 (Ethernet) - Yes; Integrated	— for send cycle of 1 ms	1 ms to 16 ms
Update time = set "odd" send clock (any multiple of 125 µs: 625 µs 3 875 µs) minimum cycle time start from 500 µs Update time for RT - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - linputs, max Outputs, max Outputs, max Outputs, max Sk kbyte PROFINET IO Device Services - Isochronous mode - shortest clock pulse - IRT - PROFlenergy - Prioritized startup - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record Interface type Interface type Interface type Interface type Interface type Interfaces FRJ 45 (Ethernet) Yes; Integrated Yes; Integrated	— for send cycle of 2 ms	2 ms to 32 ms
Update time for RT - 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 5 ms - for send cycle of 4 ms - for send cycle of 5 ms - for send cycle of 4 ms - for send cycle of 2 ms - lnputs, max 8 kbyte PROFINET IO Device Services - Isochronous mode - shortest clock pulse - shortest clock pulse - shortest clock pulse - shortest clock pulse - pROFlenergy - Yes - PROFlenergy - Yes - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record - Yes Interface Interface type Interface type Autonospitation - Yes Autorossing - RJ 45 (Ethernet) - Yes; Integrated - RJ 45 (Ethernet) - Yes; Integrated - Number of IO Controllers with shorted - Yes; Integrated	— for send cycle of 4 ms	4 ms to 64 ms
- 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 2 ms - land tycle of 3 kbyte PROFINET IO Device Services - Isochronous mode - shortest clock pulse - IRT - Yes - PROFlenergy - Prioritized startup - Yes - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record - Number of IO Controllers with shared device, max Asset management record - Yes Interface type automatic detection of transmission rate - Yes - Autoreossing - RJ 45 (Ethernet) - Yes; Integrated	— With IRT and parameterization of "odd" send cycles	
- for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 5 ms - for send cycle of 5 ms - law to 512 ms - Ms to 512 ms - for send cycle of 2 ms - for send cycle of 2 ms - kbyte - Outputs, max Sk kbyte - Noutputs, max kbyte - Shortest clock puise - Noutputs districtly - Yes - Number of IO Controllers with shared device, max Asset management record - Yes - Number of IO Controllers with shared device, max Asset management record - Yes - Nutrorossing - Yes - Nutrorossing - Yes - Nuterface types - RJ 45 (Ethernet) - Yes; Integrated	Update time for RT	
- for send cycle of 2 ms - for send cycle of 4 ms 4 ms to 512 ms Address area - Inputs, max Outputs, max. 8 kbyte PROFINET IO Device Services - Isochronous mode - shortest clock pulse - IRT - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record Interface type Autocrossing Interface types • RJ 45 (Ethernet) Yes Integrated	— for send cycle of 500 μs	500 μs to 256 ms
— for send cycle of 4 ms 4 ms to 512 ms Address area 8 kbyte — Outputs, max. 8 kbyte PROFINET IO Device ■ Isochronous mode Services Isochronous mode — Isochronous mode No — shortest clock pulse 500 μs — IRT Yes — PROFlenergy Yes — Prioritized startup Yes — Shared device Yes — Number of IO Controllers with shared device, max. 4 — Asset management record Yes 2. Interface type Integrated Ethernet interface automatic detection of transmission rate Yes Autocrossing Yes Interface types Yes • RJ 45 (Ethernet) Yes; Integrated	— for send cycle of 1 ms	1 ms to 512 ms
Address area - Inputs, max. 8 kbyte PROFINET IO Device Services - Isochronous mode No Services Services Services Services - Isochronous mode No Services Service	— for send cycle of 2 ms	2 ms to 512 ms
Inputs, max Outputs, max Outputs, max Outputs, max. PROFINET IO Device Services Isochronous mode Isochronous mode Shortest clock pulse IRT PROFIenergy PROFIenergy Prioritized startup Shared device Number of IO Controllers with shared device, max Asset management record Number of IO Controllers with shared device, max Asset management record Interface type Interface type Autonegotiation Autocrossing RJ 45 (Ethernet) RJ 45 (Ethernet) Ves Integrated Ves PROFIENER Ves Number of IO Controllers with shared device, max Autocrossing Yes Autocrossing Yes Autocrossing RJ 45 (Ethernet) RJ 45 (Ethernet) Yes; Integrated	— for send cycle of 4 ms	4 ms to 512 ms
— Outputs, max. 8 kbyte PROFINET IO Device Services — Isochronous mode No Soo µs — IRT Yes — PROFIenergy Yes — Prioritized startup Yes — Shared device Yes — Number of IO Controllers with shared device, max. Asset management record Yes Interface type Integrated Ethernet interface automatic detection of transmission rate Yes Autocrossing Yes Interface types ■ RJ 45 (Ethernet) Yes; Integrated	Address area	
PROFINET IO Device Services - Isochronous mode No - shortest clock pulse 500 μs - IRT Yes - PROFlenergy Yes - Prioritized startup Yes - Shared device Yes - Number of IO Controllers with shared device, max Asset management record Yes 2. Interface type Integrated Ethernet interface automatic detection of transmission rate Yes Autocrossing Yes ■ RJ 45 (Ethernet) Yes; Integrated No - No - Shore Autocrossing - No - No - Shore Autocrossing - No - No - Shore Autocrossing - No - No - No - Shore Autocrossing - No	— Inputs, max.	8 kbyte
Services - Isochronous mode	— Outputs, max.	8 kbyte
— Isochronous mode No — shortest clock pulse 500 μs — IRT Yes — PROFlenergy Yes — Prioritized startup Yes — Shared device Yes — Number of IO Controllers with shared device, max. 4 — Asset management record Yes 2. Interface Integrated Ethernet interface automatic detection of transmission rate Yes Autorogotiation Yes Autorossing Yes Interface types ● RJ 45 (Ethernet) Yes; Integrated	PROFINET IO Device	
- shortest clock pulse - IRT - Yes - PROFlenergy - Yes - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record 2. Interface Interface type automatic detection of transmission rate Autonegotiation - RJ 45 (Ethernet) Fig. 100 μs Yes 100 μs Yes Yes Yes Interface type Interface type Autocrossing Yes PRJ 45 (Ethernet) Yes; Integrated	Services	
— IRT — PROFlenergy — Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — Asset management record 2. Interface Interface type Interface type automatic detection of transmission rate Autonegotiation Autocrossing FRJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes Yes Ye	— Isochronous mode	No
 — PROFlenergy — Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — Asset management record Interface Interface type automatic detection of transmission rate Autonegotiation Autocrossing Interface types ■ RJ 45 (Ethernet) Yes; Integrated 	 shortest clock pulse 	500 µs
— Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — Asset management record 2. Interface Interface type Interface type automatic detection of transmission rate Autonegotiation Yes Autocrossing Interface types ● RJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes; Integrated Yes Yes; Integrated	— IRT	Yes
- Shared device - Number of IO Controllers with shared device, max Asset management record 2. Interface Interface type Integrated Ethernet interface automatic detection of transmission rate Autonegotiation Yes Autocrossing Interface types ● RJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes Yes Ye	— PROFlenergy	Yes
— Number of IO Controllers with shared device, max. — Asset management record 2. Interface Interface type	 Prioritized startup 	Yes
— Asset management record 2. Interface Interface type Integrated Ethernet interface automatic detection of transmission rate Autonegotiation Yes Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes Yes Yes Yes Yes Yes Yes	— Shared device	Yes
Interface type Integrated Ethernet interface automatic detection of transmission rate Yes Autonegotiation Yes Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes; Integrated	 Number of IO Controllers with shared device, max. 	4
Interface type automatic detection of transmission rate Autonegotiation Autocrossing Autocrossing Yes Interface types • RJ 45 (Ethernet) Integrated Ethernet interface Yes Yes Yes Yes Yes	— Asset management record	Yes
automatic detection of transmission rate Autonegotiation Yes Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes Yes	2. Interface	
Autonegotiation Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes Yes Yes	Interface type	Integrated Ethernet interface
Autocrossing Interface types • RJ 45 (Ethernet) Yes Yes	automatic detection of transmission rate	Yes
Interface types • RJ 45 (Ethernet) Yes; Integrated	Autonegotiation	Yes
RJ 45 (Ethernet) Yes; Integrated	Autocrossing	Yes
· · · · ·	Interface types	
— Transmission rate, max. 1 000 Mbit/s	• RJ 45 (Ethernet)	Yes; Integrated
	— Transmission rate, max.	1 000 Mbit/s

Industrial Ethernet status LED	No
— Industrial Ethernet status LED	No 1
Number of ports	
3. Interface	
Interface type	PROFIBUS with CM DP
Number of connections	44
Interface types	
• RS 485	Yes
Protocols	
PROFIBUS DP master	Yes
PROFIBUS DP device	Yes
SIMATIC communication	Yes
PROFIBUS DP master	
max. number of DP devices	125
Services	
— Equidistance	No
— Isochronous mode	No
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
Interface types	
RS 485	
Transmission rate, max.	12 Mbit/s
Protocols	
PROFIsafe	Yes
Number of connections	
Number of connections, max.	88
Number of connections, max. Number of connections reserved for ES/HMI/web	10
Number of S7 routing paths	16
Redundancy mode	10
Media redundancy	
·	Yes
— MRP	
— MRPD	Yes
— Switchover time on line break, typ.	200 ms
— Number of stations in the ring, max.	50
SIMATIC communication	
PG/OP communication	Yes
• S7 routing	Yes
 S7 communication, as server 	Yes
 S7 communication, as client 	Yes
User data per job, max.	64 kbyte; BSEND/BRCV: 64 KB; PUT/GET: 960 bytes
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 048 byte
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Via Windows and PROFINET interface
• HTTPS	Yes; Via Windows and PROFINET interface
OPC UA	
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes; From SW CPU 1505SP V2.6
OPC UA Server Application authorities:	Yes; Data access (read, write, subscribe), runtime license required
— Application authentication	Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— Security policies	Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256

— User authentication	Yes; "anonymous" or by user name & password
Further protocols	
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.	10 000
Number of simultaneously active program alarms	1 000
 Number of program alarms 	1 000
 Number of alarms for system diagnostics 	200
 Number of alarms for motion technology objects 	160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering systems
Status block	Yes; up to 8 simultaneously
Single step	No
Number of breakpoints	8
Status/control	
Status/control variable	Yes
Variables	Inputs, outputs, memory bits, DB, times, counters
 Number of variables, max. 	
— of which status variables, max.	200
— of which control variables, max.	200
Forcing	
• Forcing	Yes
 Forcing, variables 	Inputs, outputs
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
 Number of entries, max. 	1 000
— of which powerfail-proof	300
Traces	
 Number of configurable Traces 	4
Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Number of available Motion Control resources for	2 400
technology objects	
Required Motion Control resources	
— per speed-controlled axis	40; per axis
— per positioning axis	80; per axis
— per synchronous axis	160; per axis
— per external encoder	80; per external encoder
— per output cam	20; per cam
— per cam track	160; per cam track
— per probe	40; per probe
 Positioning axis 	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	15
Number of positioning axes at motion control cycle of 8 ms (typical value)	30
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

Standards, approvals, certificates	
Standards, approvals, certificates CE mark	Yes
CSA approval	Yes
cULus	Yes
FM approval	Yes
	Yes
RCM (formerly C-TICK)	165
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 repair time	
Low demand mode: PFDavg in accordance with	< 2.00E-05
SIL3	2.000-00
 High demand/continuous mode: PFH in accordance with SIL3 	< 1.00E-09 1/h
Ambient conditions	
Ambient temperature during operation	
• min.	-20 °C
horizontal installation, min.	-20 °C
horizontal installation, max.	60 °C; from 55°C: with max. 32 ET 200SP modules; 4x 0.3 A USB load; CFast
vertical installation, min.	memory card max. 10% load; SD card not used
vertical installation, max.	50 °C; from 45°C: with max. 32 ET 200SP modules; 4x 0.3 A USB load; CFast
• Vertical installation, max.	memory card and SD card; max. 10% load
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Vibrations	
 Operation, tested according to IEC 60068-2-6 	Yes
 Transport, tested acc. to IEC 60068-2-6 	Yes
Shock testing	
• tested according to IEC 60068-2-6	Yes
• tested according to IEC 60068-2-27	Yes
• tested according to IEC 60068-2-29	Yes
• Storage/transport, tested acc. to IEC 60068-2-27	Yes
Operating systems	
pre-installed operating system	Windows 10 IoT Enterprise 2019 LTSC, 64 bit, MUI
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes; incl. failsafe
	res, incl. ialisale
— FBD	Yes; incl. failsafe
— FBD — STL	
	Yes; incl. failsafe
— STL	Yes; incl. failsafe Yes
— STL — SCL	Yes; incl. failsafe Yes Yes
— STL — SCL — CFC	Yes; incl. failsafe Yes Yes No
— STL — SCL — CFC — GRAPH	Yes; incl. failsafe Yes Yes No
— STL — SCL — CFC — GRAPH Know-how protection	Yes; incl. failsafe Yes Yes No Yes
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection	Yes; incl. failsafe Yes Yes No Yes Yes
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection	Yes; incl. failsafe Yes Yes No Yes Yes Yes
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection	Yes; incl. failsafe Yes Yes No Yes Yes Yes
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
— STL — SCL — CFC — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection programming / cycle time monitoring / header • lower limit	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Open Development interfaces	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Open Development interfaces • Size of ODK SO file, max.	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
- STL - SCL - CFC - GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • protection of confidential configuration data • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit Open Development interfaces	Yes; incl. failsafe Yes Yes No Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye

Dimensions	
Width	160 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	0.83 kg

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