Data sheet



Figure similar

SIMATIC ET 200SP Open Controller, CPU 1515SP PC2 + HMI 128PT, 8 GB RAM (basic device 6ES7677-2DB40-0AA0), 128 GB CFast with Windows 10 IoT Enterprise LTSC 2019 64-bit, S7-1500 Software Controller CPU 1505SP V2x and WinCC Runtime Advanced V17 preinstalled, with 128 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,

Product type designation From FS04 Firmware version V21.9 Engineering with • STEP 7 TIA Portal configurable/integrated from version Installed software • Visualization VinCC Runtime Advanced V17 • Control S7-1500 Software Controller CPU 1505SP Configuration control via dataset Yes Control elements Mode selector switch 1 Supply voltage Rated value (DC) permissible range, lower limit (DC) 19.2 V permissible range, upper limit (DC) 28.8 V
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 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
Firmware version Engineering with STEP 7 TIA Portal configurable/integrated from version Installed software Visualization Control S7-1500 Software Controller CPU 1505SP Configuration control via dataset Yes Control elements Mode selector switch 1 Supply voltage Rated value (DC) permissible range, lower limit (DC) 19.2 V
Engineering with STEP 7 TIA Portal configurable/integrated from version Installed software Visualization Control S7-1500 Software Controller CPU 1505SP Configuration control Via dataset Yes Control elements Mode selector switch 1 Supply voltage Rated value (DC) permissible range, lower limit (DC) 19.2 V
STEP 7 TIA Portal configurable/integrated from version Installed software Visualization Control S7-1500 Software Controller CPU 1505SP Configuration control via dataset Yes Control elements Mode selector switch 1 Supply voltage Rated value (DC) permissible range, lower limit (DC) 19.2 V
Installed software • Visualization • Control Configuration control via dataset Control elements Mode selector switch Supply voltage Rated value (DC) permissible range, lower limit (DC) WinCC Runtime Advanced V17 S7-1500 Software Controller CPU 1505SP Yes 1 1 Supply voltage Rated value (DC) 19.2 V
 ◆ Visualization ◆ Control ★ Control ★ Configuration control ★ Visualization control ★ Visualization control ★ Visualization control ★ Visualization Controller CPU 1505SP ★ Control elements ★ Mode selector switch ★ Supply voltage ★ Rated value (DC) ★ Particular Supply voltage ★ Rated value (DC) ★ Particular Supply voltage <
● Control Configuration control via dataset Yes Control elements Mode selector switch Supply voltage Rated value (DC) permissible range, lower limit (DC) S7-1500 Software Controller CPU 1505SP Yes 1 24 V 19.2 V
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
via dataset Yes Control elements Mode selector switch 1 Supply voltage Rated value (DC) 24 V permissible range, lower limit (DC) 19.2 V
Control elements Mode selector switch Supply voltage Rated value (DC) permissible range, lower limit (DC) 19.2 V
Mode selector switch Supply voltage Rated value (DC) permissible range, lower limit (DC) 19.2 V
Supply voltage Rated value (DC) 24 V permissible range, lower limit (DC) 19.2 V
Rated value (DC) 24 V permissible range, lower limit (DC) 19.2 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 A ² ·s; with starting current inrush
Power
Active power input, max. 43 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 Mbyte

intervated (for data)	E Mhuta
• 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	01110
	C.000. In addition to blocks such as DDs. FDs and FCs. LIDTs slabel
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	constants, otor are also regarded as significants
	5 999; Number range: 1 to 65535
Number, max. Size max.	
• Size, max.	5 Mbyte
FB Number was	5 000 Northern 2000 At 25505
• 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
	2
Number of technology synchronous alarm OBs Number of startum OBs	
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
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	, any torny minima by the main memory)
·	Voc
— adjustable	Yes
S7 times	0.040
• 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.	410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes
Flag	The state of the s
• Size, max.	16 khyta
	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 Windows clock, device 	Yes
Interfaces	
Number of industrial Ethernet interfaces	2
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1
Number of RS 485 interfaces	1; Via CM DP module
Number of USB interfaces	4; 2x USB 2.0, 2x USB 3.0 on front side
Number of SD card slots	1
Video interfaces	
Graphics interface	1x DisplayPort
1. Interface	
Interface type	PROFINET
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Number of connections	88
Interface types	
• RJ 45 (Ethernet)	Yes; Via BusAdapter BA 2x RJ45
— Transmission rate, max.	100 Mbit/s
Industrial Ethernet status LED	Yes
madotrial Ethornot Status EED	
 Number of ports 	
Number of ports integrated switch	2
Number of portsintegrated switchBusAdapter (PROFINET)	

Protocol Yes; Pu4 Yes; Pu4 Yes PROFINET IO Controller Yes PROFINET IO Device Yes SMATC communication Yes SMATC communication Yes Yes; Optionally also encrypted Yes PROFINET IO Controller Yes Yes; Optionally also encrypted Yes Yes; Optionally also encrypted Yes Y		BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC,
PROPINET ID Device PROPINET ID Device SIMATIC communication Propine E communi	Protocols	E. LEGINOTO, ELLEGITO, ELLEANONO, ELA GONOTO, ELA GONOTO,
SINATIC communication Signature communication Web anner PROFINET IO Corroller Services - Inscrimonus mode - shortest clock pulse - shortest clock pulse - RRT - Profit lided startup - Prioritized startup - Prioritized startup - O which in line, max - Updating times - Updating times - Updating times - Ves esembly supported - Number of connectable IO Devices, max - Updating times - Ves especial to the prioritized startup - Prioritized s	IP protocol	Yes; IPv4
• Open IE communication • Yes, Optionally also encrypted • Web severe • Yes, Optionally also encrypted • Web severe FROFINETIO Controller Services - Isochronous mode - shortest dock pulse - Services - Services - Hord Yes - Services - Services - Hord Yes - Hord Yes - Services - Hord Yes - Yes - Hord Yes	PROFINET IO Controller	Yes
• Viex Deponition • Viex benery **Notification • Viex benery **PROFINET IO Controlor **Profit Controlor **Services** - Isochtmonus mode - shortest clock pulse - shortest clock pulse - PROFIlenergy - Prioritized startup - Prioritized startup - Prioritized startup - Prioritized startup - Number of connectable IO Devices, max Of which II of Gevices with IRT, max Of which II of Ine, max Of which In Ine, max Of which I ine, max Or which I ine max.	PROFINET IO Device	Yes
PROFINET IO Controller Senders	SIMATIC communication	Yes
Services	Open IE communication	Yes; Optionally also encrypted
Services	Web server	Yes
- Isochronius mode - shortest clock pulse - shortest clock pulse - shortest clock pulse - shortest clock pulse - PROFilenergy - Profitzed startup - PROFilenergy - Promitzed startup - Ves - Promitzed startup - Ves - 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 connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be simultaneously advantable in the control 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 for RT, max Of which in line, max Number of IO Devices that can be simultaneously advantable in the control of the	PROFINET IO Controller	
- shortest clock pulse	Services	
PROFilerery	— Isochronous mode	Yes
PROFIberary Prioritized startup Prioritized startup Prioritized startup Startu	— shortest clock pulse	500 μs
Prioritized startup Ves.; max. 22 PROFINIT devices; if you want to use the "Prioritized startup" functionality in STEP for the PROFINET interface of the 2Uth 6 CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) - Number of connectable IO Devices, max. - Of which ID devices with IRT. max. - of which in line, 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. - IO Devices changing during operation (partner ports), supported - 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. - Updating times - To send cycle of 1 ms - To send cycle of 1 ms - To 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 - To send cycle of 500 µs - To send cycl	— IRT	Yes
functionality 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 of which in line, max of which in line line line line line line line l	— PROFlenergy	Yes
- Of which IO devices with IRT, max of which in line, max Number of connectable IO Devices for RT, max of which in line, max With the 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 - Update time for IRT - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 1 ms - With IRT and parameterization of "odd" send cycles with IRT and parameterization of "odd" send cycles in minimum cycle time self toor RTO S2 ms - for send cycle of 1 ms - 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 of 1 ms - 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 500 μs - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle of 1 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle	— Prioritized startup	functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and
- of which in line, 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 IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Updating times - Updating times - The minimum value of the update time also depends on communication share story PROFINET IO, on the number of IO devices, and on the quantity of configured user data Update time for IRT	 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 - Updating times - Updating times - 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 - With IRT and parameterization of "odd" send cycles - For send cycle of 2 ms - 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 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 - 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 - 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 3 ms - For send cycle of 4 ms - State of the send cycle of 4 ms - State of the send cycle of 500 µs - For send cycle of 5	 Of which IO devices with IRT, max. 	64
of which in line, max Number of 10 Devices changing during operation (partner ports), supported Number of 10 Devices per tool, max Updating times With IRT and parameterization of "odd" send cycles for send cycle of 4 ms 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 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 4 ms for send cycle of 500 µs for send cycle of 500 µs for send cycle of 1 ms for	— of which in line, max.	64
- Number of ID Devices that can be simultaneously activated discativated, max. - ID Devices changing during operation (partner ports), supported - Number of ID Devices per tool, max. - Updating times - Updating times - Updating times - Updating times - Update time for IRT - For send cycle of 500 µs - 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 4 ms - For send cycle	 Number of connectable IO Devices for RT, max. 	128
activated/deactivated, max. — Io Devices changing during operation (partner ports), supported. — 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 1 ms — 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 — 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 1 ms — In ms to 512 ms — For send cycle of 2 ms — For send cycle of 4 ms — Address area — Inputs, max. — By kbyte — Inputs, max. — By kbyte — Inputs, max. — Skyte — PROFINET IO Device Services — Isochnonous mode — Inputs, max. — Skyte — PROFInergy — Prioritized startup — Shared device — PROFInergy — Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — Asset management record Interface type Interface type • RJ 45 (Elthernet) • Yes Autocrossing • RJ 45 (Elthernet) • Yes integrated • RI Integrated	— of which in line, max.	128
ports), supported Number of IO Devices per tool, max. Updating times The minimum value of the update time also depends on communication share set for PRCFINET 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 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 500 µs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 3 ms for send cycle of 4 ms for send cycle of 4 ms for send cycle of 500 µs for send cyc		8
Update time for IRT		Yes
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 500 µs 500 µs 10 8 ms 1	 Number of IO Devices per tool, max. 	8
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 — 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 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — this to 512 ms — for send cycle of 4 ms — linputs, max. — sk byte — linputs, max. — cutputs, max. — 0 utputs, max. — 8 kbyte PROFINET IO Device Services — Isochronous mode — shortest clock pulse — IRT — PROFlenergy — Yes — Prioritized startup — Prioritized startup — Prioritized startup — Prioritized startup — Sand device — Number of IO Controllers with shared device, max. — Asset management record Yes Autorossing Interface type Autorossing — RJ 45 (Ethernet) Yes (Integrated Yes) PROFINERED (ID Everice) PROFINERED (ID	— 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 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 - to send cycle of 500 μs - loutputs, max. - to be vice - loutputs, max. - to be vice - loutputs, max. - Services - lookronous mode - shortest clock pulse - shortest clock pulse - shortest clock pulse - lookronous mode - shortest clock pulse - 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 - Literface type automatic detection of transmission rate - RJ 45 (Ethernet) - RJ 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 istart 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 - lnputs, 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 types • RJ 45 (Ethernet) 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 4 ms for send cycle of 5 ms for send cycle of 1 ms for send cycle of 1 ms for send cycle of 2 ms for send cycle of 3 ms for send cycle of 3 ms for send cycle of 4 ms for send cycle ms for send cycle of 4 ms for send cycle of 4 ms for send cycle	— 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 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 - Prioritized startup - Shared device - Number of IO Controllers with shared device, max. 4 - Asset management record Interface type Interface type Autonegotiation • RJ 45 (Ethernet) For send cycle of 1 ms 1 ms to 512 m	— With IRT and parameterization of "odd" send cycles	
- for send cycle of 1 ms	Update time for RT	
for send cycle of 2 ms for send cycle of 4 ms Address area Inputs, max Outputs, max Outputs, max 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 Autonerosing Autocrossing Autocrossing Number of IO Controllers with shared Autocrossing FRJ 45 (Ethernet) Yes FRJ 45 (Ethernet) FRJ 45	— for send cycle of 500 μs	500 μs to 256 ms
for send cycle of 4 ms Address area Inputs, max Outputs, max Outputs, max Outputs, max Outputs, max Isochronous mode Isochronous mode shortest clock pulse IRT PROFlenergy PROFlenergy Prioritized startup Shared device Number of IO Controllers with shared device, max Asset management record 2. Interface Interface type Autonegotiation Autocrossing RJ 45 (Ethernet) Ves, Integrated Ves, Integrated FRJ 45 (Ethernet) FRJ 45 (Ethernet) Ves, Integrated Ves, Integrated FRJ 45 (Ethernet) FRJ 45 (Ethernet) Ves, Integrated Ves, Integrated FRJ 45 (Ethernet) FRJ 45 (Ethernet) Ves, Integrated Ves, Integrated FRJ 45 (Ethernet) FRJ 45 (Ethernet) Ves, Integrated FRJ 45 (Ethernet) FRJ 45 (Ether	— for send cycle of 1 ms	1 ms to 512 ms
Address area Inputs, max.	— for send cycle of 2 ms	2 ms to 512 ms
Inputs, max Outputs, max Outputs, max Outputs, max Outputs, max. PROFINET IO Device Services Isochronous mode Isochronous mode IRT PROFlenergy PROFlenergy 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 Integrated Ethernet interface Autonegotiation Yes Autocrossing FRJ 45 (Ethernet) Yes; Integrated Yes; Integrated PROFlenergy PROFlenergy Yes Number of IO Controllers with shared device, max Asset management record Yes Ves Ves Ves Ves Autocrossing Yes PROFlenergy Yes Number of IO Controllers with shared device, max Asset management record Yes Ves Ves Ves Ves Ves PROFlenergy Yes Number of IO Controllers with shared device, max Asset management record Yes Ves PROFlenergy Ves	— 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 PRJ 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 Autonegotiation Yes Autocrossing Yes RJ 45 (Ethernet) Yes; Integrated	— Inputs, max.	8 kbyte
Services - Isochronous mode - shortest clock pulse - IRT - PROFlenergy - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Asset management record 2. Interface Interface type automatic detection of transmission rate Autocrossing - RJ 45 (Ethernet) Yes Integrated Ethernet Yes; Integrated Yes; Integrated Yes Yes; Integrated	— 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 Autocrossing Yes Interface types ● RJ 45 (Ethernet) Yes; Integrated	PROFINET IO Device	
- shortest clock pulse - IRT - Yes - PROFlenergy - 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) yes Integrated Yes Yes Yes Yes Yes Integrated Ethernet interface	Services	
— IRT — PROFlenergy — Prioritized startup — Shared device — 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 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 Interface types Autocrossing → RJ 45 (Ethernet) Yes; Integrated 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; Integrated Yes; Integrated	— IRT	Yes
- Shared device Yes - Number of IO Controllers with shared device, max. 4 - Asset management record Yes 2. Interface Interface type Integrated Ethernet interface automatic detection of transmission rate Yes Autonegotiation Yes Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes; Integrated	— PROFlenergy	Yes
— 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 Yes Interface types • RJ 45 (Ethernet) Yes; Integrated	 Prioritized startup 	Yes
— Asset management record Yes 2. Interface Interface type Integrated Ethernet interface automatic detection of transmission rate Yes Autonegotiation Yes Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes; Integrated	— 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 Interface types • RJ 45 (Ethernet) Integrated Ethernet interface Yes Yes Yes Yes Yes Integrated Ethernet interface Yes Yes	Asset management record	Yes
automatic detection of transmission rate Autonegotiation Autocrossing Yes Autocrossing Yes Interface types • RJ 45 (Ethernet) Yes; Integrated	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 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 Ethornot status LED	No
— Industrial Ethernet status LED	No 1
Number of ports Interface.	1
3. Interface	PROFINIA W OM PR
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	No
Number of connections	
Number of connections, max.	88
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	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	V
• Forcing	Yes
• Forcing, variables	Inputs, outputs
Number of variables, max.	200
Diagnostic buffer	V
• present	Yes
Number of entries, max.	1 000
— of which powerfail-proof Traces	300
Number of configurable Traces	4
Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	312 kbyte
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	AO managina
— 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● Positioning axis	40; per probe
Number of positioning axes at motion control cycle	15
of 4 ms (typical value) — Number of positioning axes at motion control cycle	30
of 8 ms (typical value)	
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	Vee
High-speed counter	Yes

Standards, approvals, certificates	
CE mark	Yes
CSA approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
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
and a limit of the state of the	memory card max. 10% load; SD card not used
vertical installation, min.vertical installation, max.	-20 °C 50 °C; from 45°C: with max. 32 ET 200SP modules; 4x 0.3 A USB load; CFast
	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
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	No
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	
	Yes
Copy protection	Yes Yes
Copy protectionBlock protection	
	Yes
Block protection	Yes
Block protection Access protection	Yes Yes
Block protection Access protection protection of confidential configuration data	Yes Yes
Block protection Access protection protection of confidential configuration data Protection level: Write protection	Yes Yes Yes Yes
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection	Yes Yes Yes Yes Yes Yes
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection	Yes Yes Yes Yes Yes Yes
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header	Yes Yes Yes Yes Yes Yes Yes Yes
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Open Development interfaces Size of ODK SO file, max.	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Open Development interfaces Size of ODK SO file, max.	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Programming / cycle time monitoring / header Iower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Programming / cycle time monitoring / header Iower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card Dimensions	Yes Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte Optionally for additional mass storage
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Programming / cycle time monitoring / header lower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card Dimensions Width	Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte Optionally for additional mass storage
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Programming / cycle time monitoring / header Iower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card Dimensions Width Height Depth	Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte Optionally for additional mass storage
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Programming / cycle time monitoring / header Iower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card Dimensions Width Height Depth Weights	Yes Yes Yes Yes Yes Yes Yes adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte Optionally for additional mass storage 160 mm 117 mm 75 mm
Block protection Access protection protection of confidential configuration data Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Programming / cycle time monitoring / header Iower limit upper limit Open Development interfaces Size of ODK SO file, max. Peripherals/Options SD card Dimensions Width Height Depth	Yes Yes Yes Yes Yes Yes Yes Adjustable minimum cycle time adjustable maximum cycle time 5.8 Mbyte Optionally for additional mass storage

