## **SIEMENS**

## **Data sheet**

## 6ES7677-2DB42-0GL0



Figure similar

SIMATIC ET 200SP Open Controller, CPU 1515SP PC2 + HMI 512PT, 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 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
HW functional status	from FS04
Firmware version	V21.9
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V17
Installed software	
<ul> <li>Visualization</li> </ul>	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
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	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
l²t	0.426 A <sup>2</sup> ·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

a integrated (for data)	F Mhydo
integrated (for data)  integrated (for OPU function library of OPU Burting)	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	
<ul><li>Number, max.</li></ul>	5 999; Number range: 1 to 65535
• Size, max.	5 Mbyte
FB	
<ul> <li>Number, max.</li> </ul>	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 tearing OBs     Number of startup OBs	100
Number of startup OBs     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	
— adjustable	Yes
S7 times	
<ul><li>Number</li></ul>	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	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
• Size, max.	16 kbyte
	TO KDYLE

Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
<ul> <li>Retentivity adjustable</li> </ul>	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	
<ul> <li>Modules per rack, max.</li> </ul>	64; CPU 1515SP PC + 64 modules + server module
<ul> <li>Quantity of operable ET 200SP modules, max.</li> </ul>	64
<ul> <li>Quantity of operable ET 200AL modules, max.</li> </ul>	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
<ul> <li>Hardware clock (real-time)</li> </ul>	Yes; Resolution: 1 s
Backup time	6 wk; At 40 °C ambient temperature, typically
<ul> <li>Deviation per day, max.</li> </ul>	10 s; Typ.: 2 s
Clock synchronization	
<ul><li>supported</li></ul>	Yes
• to DP, master	Yes
on Ethernet via NTP	Yes
<ul> <li>on Windows clock, device</li> </ul>	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	
<ul> <li>Number of ports</li> </ul>	
Number of ports     integrated switch	2
<ul><li>Number of ports</li><li>integrated switch</li><li>BusAdapter (PROFINET)</li></ul>	

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 startup of IO Devices that can be simultaneously advantable in the startup of IO Devices that can be simultaneously advantable in the startup of IO Devices that can be simultaneously advantable in the startup of IO Devices that can be simultaneously advantable in the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously advantable into the startup of IO Devices that can be simultaneously as a startup of IO Devices that can be simultaneously as the simultaneously advantable into the startup of IO Devices and on the quantity of configured user data  - In prosend cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In sock of Inms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of I ms - In so IO Inms - For send cycle of	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 to for 500 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles with IRT and parameterization of "odd" send cycles for 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 for 1 ms - for send cycle of 500 μs - for send cycle of 4 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 of 4 ms - for send cycle of 500 μs - fo	— 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	<ul> <li>Number of connectable IO Devices, max.</li> </ul>	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	<ul> <li>Of which IO devices with IRT, max.</li> </ul>	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	<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	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 — Isochronous mode — IRT — Yes — 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  Interface types  • RJ 45 (Elthernet)  Fyes: Intergrated  • RI-Intergrated  Fyes: Intergrated  • RI-Intergrated  Fyes: Intergrated  • RI-Intergrated  • RI	— 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	<ul> <li>Number of IO Devices per tool, max.</li> </ul>	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 — this to 512 ms — for send cycle of 4 ms — linputs, max. — linputs, max. — 8 kbyte — loutputs, max. — 8 kbyte  PROFINET IO Device  Services — Isochronous mode — shortest clock pulse — shortest clock pulse — PROFlenergy — Prioritized startup — PROFlenergy — 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 (Ethernet) — Yes  Autorossing — RJ 45 (Ethernet) — Yes 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 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 to send cycle of 4 ms  - shortest clock pulse  - shortest clock pulse  - shortest clock pulse  - shortest clock pulse  - pROFIenergy  - Prioritized startup  - Shared device  - Number of IO Controllers with shared device, max.  - Asset management record  - Ves  - Interface type  utomatic detection of transmission rate  - Ru 4 ms to 512 ms  - k ms to 512 ms  - k byte  - shortest clock pulse  - ves  - Linerface type  utomatic detection of transmission rate  - Ru 4 ms to 512 ms  - k byte  - Ru 4 ms to 512 ms  - k byte  - k byte  - k ms to 512 ms  - k byte  - k byte  - k ms to 512 ms  - k byte  - k byte  - k ms to 512 ms  - k byte  - k byte  - k ms to 512 ms  - k byte  - k ms to 51	— 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 Skbyte  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  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 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  PRJ 45 (Ethernet)  500 μs to 256 ms  1 ms to 512 ms 2 ms to 512 ms 4 ms	— 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) FRJ 45 (Ethernet) Ves Integrated Ves Integrated FRJ 45 (Ethernet) Ves Integrated Ves Integrated FRJ 45 (Ethernet) -	— 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
<ul> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Shared device</li> <li>— Number of IO Controllers with shared device, max.</li> <li>— Asset management record</li> <li>Interface</li> <li>Interface type</li> <li>automatic detection of transmission rate</li> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Interface types</li> <li>Interface types</li> <li>Autocrossing</li> <li>→ RJ 45 (Ethernet)</li> <li>Yes; Integrated</li> <li>Yes; Integrated</li> </ul>	<ul> <li>shortest clock pulse</li> </ul>	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	<ul> <li>Prioritized startup</li> </ul>	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	<ul> <li>Number of IO Controllers with shared device, max.</li> </ul>	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
<ul> <li>S7 communication, as server</li> </ul>	Yes
<ul> <li>S7 communication, as client</li> </ul>	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
<ul> <li>Number of program alarms</li> </ul>	1 000
<ul> <li>Number of alarms for system diagnostics</li> </ul>	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	
<ul> <li>Status/control variable</li> </ul>	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	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
<ul> <li>Number of available Motion Control resources for</li> </ul>	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
<ul><li>— per probe</li><li>● Positioning axis</li></ul>	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
<ul><li>vertical installation, min.</li><li>vertical installation, max.</li></ul>	-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	
<ul> <li>Operation, tested according to IEC 60068-2-6</li> </ul>	Yes
Transport, tested acc. to IEC 60068-2-6	Yes
Shock testing	
<ul> <li>tested according to IEC 60068-2-6</li> </ul>	Yes
<ul> <li>tested according to IEC 60068-2-27</li> </ul>	Yes
<ul> <li>tested according to IEC 60068-2-29</li> </ul>	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	
<ul> <li>User program protection/password protection</li> </ul>	
	Yes
Copy protection	Yes Yes
<ul><li>Copy protection</li><li>Block protection</li></ul>	
	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

