SIEMENS

Data sheet

6ES7515-2FN03-0AB0

SIMATIC S7-1500F, CPU 1515F-2 PN, central processing unit with 1.5 MB work memory for program and 4.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 6 ns bit performance, SIMATIC Memory Card required *** approvals and certificates according to entry 109817466 at to be considered! ***

15-

factored according to	7
for word operations, typ.	7 ns
for fixed point arithmetic, typ.	9 ns
for floating point arithmetic, typ.	37 ns
CPU-blocks	
Number of elements (total)	8 000; Blocks (OB, FB, FC, DB) and UDTs
DB A Number range	1 60 000; subdivided into number range that can be used by the
Number range	1 60 999; subdivided into: number range that can be used by the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999
• Size, max.	4.5 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
Number range	0 65 535
Size, max.	1 Mbyte
FC	
Number range	0 65 535
• Size, max.	1 Mbyte
OB	
• Size, max.	1 Mbyte
 Number of free cycle OBs 	100
 Number of time alarm OBs 	20
 Number of delay alarm OBs 	20
 Number of cyclic interrupt OBs 	20; With minimum OB 3x cycle of 250 μs
 Number of process alarm OBs 	50
 Number of DPV1 alarm OBs 	3
 Number of isochronous mode OBs 	2
 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	
Counters, timers and their retentivity S7 counter	2 048
Counters, timers and their retentivity S7 counter • Number	2 048
Counters, timers and their retentivity S7 counter • Number Retentivity	
Counters, timers and their retentivity S7 counter • Number Retentivity — adjustable	2 048 Yes
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter	Yes
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number	
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity	Yes Any (only limited by the main memory)
Counters, timers and their retentivity S7 counter • Number Retentivity — adjustable IEC counter • Number Retentivity — adjustable	Yes
Counters, timers and their retentivity S7 counter • Number Retentivity — adjustable IEC counter • Number Retentivity — adjustable S7 times	Yes Any (only limited by the main memory) Yes
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number	Yes Any (only limited by the main memory)
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity Retentivity Retentivity	Yes Any (only limited by the main memory) Yes 2 048
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number Retentivity adjustable adjustable	Yes Any (only limited by the main memory) Yes
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number Retentivity adjustable IEC timer	Yes Any (only limited by the main memory) Yes 2 048 Yes
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number Retentivity adjustable IEC timer Number	Yes Any (only limited by the main memory) Yes 2 048
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity Retentivity — Retentivity — Retentivity — Retentivity — Retentivity — Retentivity — Retentivity	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory)
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number Retentivity adjustable IEC timer Number Retentivity adjustable	Yes Any (only limited by the main memory) Yes 2 048 Yes
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Adjustable IEC timer Adjustable Data areas and their retentivity	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number Retentivity adjustable IEC timer Number Retentivity adjustable	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers,
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Adjustable IEC timer Adjustable Data areas and their retentivity	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags),	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Counters, timers and their retentivity S7 counter Number Retentivity adjustable IEC counter Number Retentivity adjustable S7 times Number Retentivity adjustable IEC timer Number Retentivity adjustable IEC timer Retentivity adjustable IEC timer Retentivity Retentivity Retentivity adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Number Retentivity — adjustable LEC timer Number Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Stentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Setentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks Retentivity adjustable	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF 16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Stentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF 16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Number Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks Retentivity adjustable Retentivity preset Local data	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF 16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte Yes No
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Number Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks Retentivity adjustable Retentivity preset Local data per priority class, max.	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF 16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte
Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Retentivity — adjustable S7 times Number Retentivity — adjustable IEC timer Number Retentivity — adjustable IEC timer Retentivity — adjustable IEC timer Number Retentivity — adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Number of clock memories Data blocks Retentivity adjustable Retentivity preset Local data	Yes Any (only limited by the main memory) Yes 2 048 Yes Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB 4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF 16 kbyte 8; 8 clock memory bit, grouped into one clock memory byte Yes No

I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	oz najte, i m ozupate zno m ano processo mizago
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	,
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
Hardware configuration	
Number of distributed IO systems	64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	2
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
Modules per rack, max.	32; CPU + 31 modules
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
Backup time	6 wk; At 40 °C ambient temperature, typically
 Deviation per day, max. 	10 s; Typ.: 2 s
Operating hours counter	
Number	16
Clock synchronization	
supported	Yes
• in AS, master	Yes
in AS, slave	Yes
• on Ethernet via NTP	Yes
	Yes
on Ethernet via NTP	Yes 2
on Ethernet via NTP Interfaces	
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface	
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface	2
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet)	2 Yes; X1
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports	2 Yes; X1 2
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch	2 Yes; X1 2
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols	Yes; X1 2 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols IP protocol	Yes; X1 2 Yes Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols IP protocol PROFINET IO Controller	Yes; X1 2 Yes; IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes; X1 2 Yes; IPv4 Yes Yes Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes; X1 2 Yes; IPv4 Yes Yes Yes Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes; X1 2 Yes IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server	Yes; X1 2 Yes; IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy	Yes; X1 2 Yes; IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface Interface types	Yes; X1 2 Yes; IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes; X1 2 Yes Yes; IPv4 Yes
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes; X1 Yes; IPv4 Yes Yes Yes Yes Yes Yes Yes Ye
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types RJ 45 (Ethernet)	Yes; X1 Yes; IPv4 Yes Yes Yes Yes Yes Yes Yes Ye
on Ethernet via NTP Interfaces Number of PROFINET interfaces 1. Interface Interface types	Yes; X1 Yes; IPv4 Yes

- Number of connectable IO Devices, max - Of which IO devices with IRT, max Number of connectable IO Devices for RT, - Number of connectable IO Devices for RT, - Number of connectable IO Devices for RT, - Number of IO Devices that can be simultaneously authoride/disease/vated, max Number of IO Devices that can be simultaneously authoride/disease/vated, max Updating times - Updating times - Updating times - Update time for IRT - For send cycle of 250 µs - For send	Number (1997)	
- Of which In Devices with IRT, max.	 Number of connectable IO Devices, max. 	256; In total, up to 1 000 distributed I/O devices can be connected via
Number of commerciable IO Devices for RT, max of which in line, max of which in line, max Number of IO Devices that can be simultaneously activate/deactivated, max Number of IO Devices per tool. max Updating times Updating times for send cycle of 250 µs for send cycle of 250 µs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 1 ms for send cycle of 2 ms for send cycle of 2 ms for send cycle of 1 ms for send cycle of 2 ms for send cycle of 3 ms for send cycle of 4 ms for send cycle of 3 ms for send cycle of 4 ms for send cycle of 5 ms for send cycle	— Of which IO devices with IDT may	
max. — Number of ID Devices that can be simultaneously activated/deactivated, max. — Number of ID Devices per tool, max. — Updating times Update time for IRT — for send cycle of 250 µs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 1 ms — for send		
		200
simultaneously advaled/deactivated, max. — Number of I/O Devices per tool, max. — Updating times The minimum value of the update time also depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the quantity of configured user data Update time for IRT — for send cycle of 250 µs — for send cycle of 1 ms — for send cycle of 2 ms — with IRT and parameterization of "odd" send cycles Update time for RT — for send cycle of 2 ms — with IRT and parameterization of "odd" send cycles Update time for RT — for send cycle of 10 ms —	— of which in line, max.	256
Number of I/O Devices per tool, max. Update time for IRT for send cycle of 250 µs for send cycle of 250 µs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 1 ms for send cycle of 4 ms with IRT and parameterization of "odd" send cycles into 8 ms. of 1	 Number of IO Devices that can be 	8; in total across all interfaces
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. For send cycle of 500 µs For send cycle of 500 µs For send cycle of 4 ms For send cycle of 500 µs For send cycl	simultaneously activated/deactivated, max.	
share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles - with IRT and parameterization of "odd" send cycles - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles - for send cycle of 2 for send cycle of 350 µs - for send cycle of 250 µs - for send cycle of 350 µs - for send cycle of 3	 Number of IO Devices per tool, max. 	8
Update time for IRT	 Updating times 	
Update time for IRT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 150 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - with IRT and parameterization of "odd" send cycles - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 1 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 4 ms - for send cycle of 4 ms - for send cycle of 500 µs - for send cycle		
for send cycle of 250 µs for send cycle of 1 ms for send cycle of 1 ms for send cycle of 1 ms for send cycle of 4 ms with IRT and parameterization of "odd" send cycles With IRT and parameterization of "odd" send cycles for send cycle of 250 µs for send cycle of 250 µs for send cycle of 500 µs for send cycle of 500 µs for send cycle of 500 µs for send cycle of 4 ms for send cycle of 500 µs for send cycle of 1 ms for send cycle of 250 µs for send cycle of 1 ms for send cycle of 1 ms for send cycle of 1 ms for send cycle of 250 µs for send cycle of 1 ms for send cycle of	Update time for IRT	quality of configured abor data
minimum update time of 375 μs of the isochronous OB is decisive — for send cycle of 10 ms — for send cycle of 1 ms — for send cycle of 4 ms — for send cycle of 4 ms — With RT and parameterization of "odd" send cycles — by decision of the send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 500 μs — for send cycle of 27 ms — for send cycle of 27 ms — for send cycle of 28 ms — for send cycle of 4 ms — FROFINET in O Device Services — PGIOP communication — Isochronous mode — No — IRT — PROFilenergy — Shared device — Number of 10 Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record 2. Interface Interface Interface bypes • RJ 45 (Ethernet) • IP protocol • PROFINET IO Device • SIMATIC controller • PROFINET (O Con	·	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the
- for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 4 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 - for send c	, ,	
- for send cycle of 1 ms - for send cycle of 1 ms - With IRT and parameterization of "odd" send - For send cycle of 500 µs - For send cycle of 10 ms - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 4 ms - For Send cycle of 500 µs - For Send cycle of	— 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 Update time for RT - for send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 µs -	— for send cycle of 1 ms	1 ms to 16 ms
- With IRT and parameterization of "odd" send cycles Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 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 - FOF/INET IO Device Services - PG/O'P communication - Isochronous mode - IRT - PROFIenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record 2. Interface Interface types • RJ 45 (Elhernet) • Integrated switch Protocols • IP protocol • IP protocol • IP ProFINET IO Controller • PROFINET IO Device • PROFINET IO Device • PROFINET IO Controller • PROFIN	— for send cycle of 2 ms	2 ms to 32 ms
cycles Update time for RT — for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms PROFINET IO Device Services — PG/OP communication — IRT — PROFIenergy — Shared device — Number of IO Controllers with shared device, — nax. — activation/deactivation of I-devices — Asset management record 2. Interface Interface types • RJ 45 (Ethernet) • IP protocol • IP protocol • PROFINET IO Controller • PRO		
Update time for RT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 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 - FOG/IP Communication - Isochronous mode - IRT - PROFINERTY - PROFINERTY - PROFINERT (I) Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Fog. per user program - Asset management record - Fog. per user program - Sest management record - Fog. per user program - Sest management record - Fog. per user program - Fog.	·	
- for send cycle of 250 μs - for send cycle of 100 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 2 ms - for send cycle of 4 ms - for send cycle	·	μs ა 8/5 μs)
- for send cycle of 500 µs		250 us to 128 ms
for send cycle of 1 ms		
for send cycle of 2 ms		·
— for send cycle of 4 ms PROFINET IO Device Services — PG/OP communication Yes — IRT Yes — PROFlenergy Yes; per user program — Shared device Yes; per user program — Asset management record Yes; per user program 2. Interface Unterface Interface types ■ RJ 45 (Ethernet) Yes; X2 ■ Number of 10 Controller Services 1 ■ Number of ports 1 ■ Number of ports 1 ■ Profociols ■ IP protocols ■ IP protocol ■ PROFINET IO Controller Yes ■ SIMATIC communication Yes ■ SIMATIC communication Yes ■ Open IE communication Yes ■ Media redundancy No PROFINET IO Controller ■ PGO/P communication Yes		
PROFINET IO Device Services - PG/OP communication - Isachronous mode - IRT - PROFlenergy - Shared device - Number of IO Controller swith shared device, max activation/deactivation of I-devices - Asset management record 2. Interface Interface types - RJ 45 (Ethernet) - Interface sypes - RJ 45 (Ethernet) - Interface sypes - PROFINET IO Controller - Interface sypes - PROFINET IO Device - PROFINET IO Device - PROFINET IO Device - SIMATIC communication - Open IE communication - Yes - Web server - Media redundancy - Media redundancy - PROFINET IO Controller - Isochronous mode - Direct data exchange - IRT - PROFlenergy - Prioritized slartup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max Of which in line, max Number of IO Devices that can be - Si, in total across all interfaces		
Services - PG/OP communication - Isochronous mode - IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - RI 4 5 (Ethernet) - Number of ports - Interface types • RI 45 (Ethernet) - Number of ports - Interface types • RI 45 (Ethernet) - Number of ports - Interface types • PROFINET IO Controller - Yes; IPV4 - PROFINET IO Device - Yes - SIMATIC communication - Yes - Media redundancy - Media redundancy - Media redundancy - PROFINET IO Controller - Services - PG/OP communication - Isochronous mode - Direct data exchange - No - PROFINET IO Connectable IO Devices, max Number of connectable IO Devices for RT, max Number of LO Devices that can be - Si, in total across all interfaces		1 110 10 0 12 110
- Isochronous mode - IRT - IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - Services - RJ 45 (Ethernet) - Interface types - RJ 45 (Ethernet) - Interface types - RJ 45 (Ethernet) - Interface types - PROFINET IO Controller - PROFINET IO Controller - PROFINET IO Controller - Web server - Media redundancy - PROFINET IO Controller - Services - PROFILE Servi		
- IRT	— PG/OP communication	Yes
- PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record 2. Interface Interface types • RJ 45 (Ethernet) • Number of ports • Integrated switch • No Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Ves; Optonally also encrypted • Web server • Media redundancy • Media redundancy • Media redundancy • PROFINET IO Controller • Ves • Media redundancy • Media redundancy • No PROFINET IO Controller Services - PG/OP communication • Ves - IRT - PROFinergy - Prioritized startup - Number of connectable IO Devices, max Number of IO Devices that can be 8; in total across all interfaces	— Isochronous mode	No
- Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program 2. Interface Interface types • RJ 45 (Ethernet) Yes; X2 • Number of ports 1 • integrated switch No Protocols • IP protocol • PROFINET IO Controller Yes • SIMATIC communication Yes • SIMATIC communication Yes • Web server Yes • Media redundancy No PROFINET IO Controller Services - PG/OP communication Yes - Isochronous mode No - Direct data exchange No - IRT No - PROFIenergy Yes; per user program No - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be	— IRT	Yes
- Number of IO Controllers with shared device, max. - activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program 2. Interface Interface types • RJ 45 (Ethernet) Yes; X2 • Number of ports 1 • integrated switch No Protocols • IP protocol Yes; IPv4 • PROFINET IO Controller Yes • SIMATIC communication Yes • Web server Yes • Media redundancy No PROFINET IO Controller Services - PG/OP communication Yes - IRT No - Direct data exchange No - Direct data exchange No - Number of connectable IO Devices, max. - Number of connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be	— PROFlenergy	Yes; per user program
max. — activation/deactivation of I-devices — Asset management record 2. Interface Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Web server • Media redundancy • Media redundancy • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Controller • Yes • SIMATIC communication • Yes • SIMATIC communication • Yes • Pes • SIMATIC communication • Yes • PROFINET IO Controller • PROFINET IO Controller Services — PG/OP communication • Yes — Isochronous mode • Direct data exchange — IRT • No — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — Number of IO Devices that can be 8; in total across all interfaces	 Shared device 	Yes
activation/deactivation of I-devices Asset management record 2. Interface Interface types R J 45 (Ethernet) Interface types	 Number of IO Controllers with shared device, 	4
- Asset management record Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protoccols • IP protoccol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Web server • Media redundancy • Media redundancy PROFINET IO Controller Services - PG/OP communication - Isr - PROFINET IO Controller Services - PROFINET IO Controller Services - PG/OP communication - Ves - Isochronous mode - Direct data exchange - IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max Of which in line, max Number of IO Devices that can be - Ves; per user program - Ves; per user program - No - 1 total, up to 1 000 distributed I/O devices can be connected via - AS-i, PROFIBUS or PROFINET - 32 - Number of IO Devices that can be - Si, in total across all interfaces		
Interface types RJ 45 (Ethernet) Integrated switch Integrated swi		· · · · · · · ·
Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy PROFINET IO Controller Services - PG/OP communication - Isochronous mode - Direct data exchange - IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices for RT, max of which in line, max Of which in line, max Number of IO Devices that can be 1		Yes; per user program
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● Media redundancy PROFINET IO Controller Services	•	
PROFINET IO Controller Services		
Services		
 — Isochronous mode — Direct data exchange — IRT — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — Number of IO Devices that can be No 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 32 32 33 32 32 33 34 35 36 37 38 39 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 32 33 34 35 36 37 38 39 30 31 32 32 33 34 35 36 37 38 39 30 30 31 32 32 33 34 35 36 37 38 39 30 30 30 31 32 32 33 34 35 36 37 38 39 30 30		
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 IRT PROFlenergy Prioritized startup No Number of connectable IO Devices, max. Number of connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be No Yes; per user program No 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 32 32 32 Number of IO Devices that can be 8; in total across all interfaces 	— Isochronous mode	No
 — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — Number of IO Devices that can be Yes; per user program No 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 32 32 8; in total across all interfaces 	 Direct data exchange 	No
 — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — Number of IO Devices that can be No 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 32 32 8; in total across all interfaces 	— IRT	No
 Number of connectable IO Devices, max. Number of connectable IO Devices for RT, max. Of which in line, max. Number of IO Devices that can be 32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 32 32 32 32 32 8; in total across all interfaces 		Yes; per user program
AS-i, PROFIBUS or PROFINET Number of connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be AS-i, PROFIBUS or PROFINET 32 32 Number of IO Devices that can be 8; in total across all interfaces	•	No
 Number of connectable IO Devices for RT, max. of which in line, max. Number of IO Devices that can be in total across all interfaces 	 Number of connectable IO Devices, max. 	
max. — of which in line, max. — Number of IO Devices that can be 8; in total across all interfaces	North and Co. 111 10 Dec. 1 Co. DT	
 — of which in line, max. — Number of IO Devices that can be 8; in total across all interfaces 	•	32
Number of IO Devices that can be8; in total across all interfaces		32
· ·		
		o, total across all internaces

 Number of IO Devices per tool, max. 	8
 Updating times 	The minimum value of the update time also depends on communication
	share set for PROFINET IO, on the number of IO devices, and on the
	quantity of configured user data
Update time for RT	
— for send cycle of 1 ms	1 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	No
— PROFlenergy	Yes; per user program
— Prioritized startup	No
— Shared device	Yes
 Number of IO Controllers with shared device, 	4
max.	Veet not tree management
activation/deactivation of I-devices	Yes; per user program
Asset management record	Yes; per user program
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
 Autonegotiation 	Yes
 Autocrossing 	Yes
 Industrial Ethernet status LED 	Yes
Protocols	
PROFIsafe	Yes; V2.4 / V2.6
Number of connections	
Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs / CMs
Number of connections reserved for ES/HMI/web	10
 Number of connections via integrated interfaces 	128
 Number of S7 routing paths 	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
— Media redundancy	only via 1st interface (X1)
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP
	Manager; MRP Client
 MRP interconnection, supported 	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
 Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
 Number of stations in the ring, max. 	50
SIMATIC communication	
PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
S7 routing	Yes
Data record routing	Yes
S7 communication, as server	Yes
S7 communication, as client	Yes
User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
 Data length, max. 	64 kbyte
— Data length, max.— several passive connections per port,	64 kbyte Yes
-	
 several passive connections per port, 	
 several passive connections per port, supported 	Yes
 — several passive connections per port, supported ISO-on-TCP (RFC1006) 	Yes
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. 	Yes Yes 64 kbyte
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP 	Yes Yes 64 kbyte Yes
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP — Data length, max. 	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP — Data length, max. — UDP multicast 	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 118 multicast circuits
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP — Data length, max. — UDP multicast DHCP 	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 118 multicast circuits Yes
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP — Data length, max. — UDP multicast DHCP DNS 	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 118 multicast circuits Yes Yes
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP — Data length, max. — UDP multicast DHCP DNS SNMP 	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 118 multicast circuits Yes Yes Yes
 — several passive connections per port, supported ISO-on-TCP (RFC1006) — Data length, max. UDP — Data length, max. — UDP multicast DHCP DNS SNMP DCP 	Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 118 multicast circuits Yes Yes Yes Yes Yes

Veb server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes; "Medium" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 User authentication 	"anonymous" or by user name & password
 Number of connections, max. Number of nodes of the client interfaces, recommended max. 	10 2 000
Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C max.	300
Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.	20
Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
 Number of simultaneous calls of the client instructions for session management, per connection, max. 	1
Number of simultaneous calls of the client instructions for data access, per connection, max.	5
Number of registerable nodes, max.	5 000
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC UA Server	Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms & Condition (A&C), Custom Address Space
 Application authentication 	Yes
— Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
 User authentication 	"anonymous" or by user name & password
 GDS support (certificate management) 	Yes
Number of sessions, max.	48
 Number of accessible variables, max. 	100 000
 Number of registerable nodes, max. 	20 000
 Number of subscriptions per session, max. 	50
— Sampling interval, min.	100 ms
— Publishing interval, min.	100 ms
 Number of server methods, max. 	50
 Number of inputs/outputs per server method, max. 	20
Number of monitored items, recommended max.	4 000; for 1 s sampling interval and 1 s send interval
Number of server interfaces, max. Number of nodes for user-defined server.	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace" 30 000
interfaces, max.	
Alarms and Conditions	Yes
 Number of program alarms 	200
Number of alarms for system diagnostics	100
Further protocols	
• MODBUS	Yes; MODBUS TCP
message functions	
Number of login stations for message functions, max.	64
Program alarms	Yes
Number of configurable program messages, max.	10 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
 Number of program alarms 	1 000
Number of alarms for system diagnostics	200

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 (in total across all ES clients)
Single step	No
Number of breakpoints	8
Status/control	
Status/control variable	Yes; without fail-safe
• Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters
 Number of variables, max. 	
of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
Forcing	Yes; without fail-safe
Forcing, variables	peripheral inputs/outputs (without fail-safe)
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	3 200
— of which powerfail-proof	500
Traces	4 11 1 540 (7) (11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
STOP ACTIVE LED	Yes
Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of
Number of available Motion Control resources for	the PLC program; selection guide via the TIA Selection Tool 2 400
technology objects	2 400
Required Motion Control resources	
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
Positioning axis Number of positioning axes at motion control	11
cycle of 4 ms (typical value)	20
Number of positioning axes at motion control cycle of 8 ms (typical value) Controller.	20
Controller	Voc. Universal PID controller with integrated actionization
PID_Compact PID_3Stop	Yes; Universal PID controller with integrated optimization
PID_3Step PID_Tomp	Yes; PID controller with integrated optimization for valves
PID-Temp Counting and measuring	Yes; PID controller with integrated optimization for temperature
Counting and measuring • High-speed counter	Yes
	160
Standards, approvals, certificates	
Highest safety class achievable in safety mode	Dia
Performance level according to ISO 13849-1 St. cos. to IEC 04500.	PLe
SIL acc. to IEC 61508 Probability of failure (for samine life of 20 years and range)	SIL 3
Probability of failure (for service life of 20 years and repa	
 Low demand mode: PFDavg in accordance with SIL3 	< 2.00E-05
High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09
Ambient conditions	
Ambient temperature during operation	
Ambient temperature during operation	

 horizontal installation, min. 	-30 °C; No condensation
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	-30 °C; No condensation
 vertical installation, max. 	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
 Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	Yes
 Copy protection 	Yes
Block protection	Yes
Access protection	
 protection of confidential configuration data 	Yes
 Password for display 	Yes
 Protection level: Write protection 	Yes
 Protection level: Read/write protection 	Yes
 Protection level: Write protection for Failsafe 	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
 lower limit 	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	70 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	456 g

4/2/2023

last modified: