6ES7515-2FM02-0AB0

Data sheet



SIMATIC S7-1500F, CPU 1515F-2 PN, central processing unit with work memory 750 KB for program and 3 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 30 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1515F-2 PN
HW functional status	FS01
Firmware version	V2.9
Product function	
 I&M data 	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 μs (distributed) and 1 ms (central)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17 (FW V2.9) / V16 (FW V2.8) or higher; with older TIA Portal versions configurable as 6ES7515-2FM01-0AB0
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	6.1 cm
Control elements	
Number of keys	8
Mode buttons	2
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	0.8 A
Current consumption, max.	1.1 A
Inrush current, max.	2.4 A; Rated value
I ² t	0.02 A ² ·s
Power	
Infeed power to the backplane bus	12 W
Power consumption from the backplane bus (balanced)	6.2 W
Power loss	
Power loss, typ.	6.3 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes

Mank magnetic	
Work memory	750 khi ta
• integrated (for data)	750 kbyte
• integrated (for data)	3 Mbyte
Load memory	22 Ob. 4a
Plug-in (SIMATIC Memory Card), max. Packup	32 Gbyte
Backup maintenance-free	Yes
	T es
CPU processing times	00
for bit operations, typ.	30 ns
for word operations, typ.	36 ns 48 ns
for fixed point arithmetic, typ.	
for floating point arithmetic, typ. CPU-blocks	192 ns
	0.000; Planks (OR ER EO DR) and URT-
Number of elements (total) DB	8 000; Blocks (OB, FB, FC, DB) and UDTs
	1 CO 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.	3 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	500 kbyte
FC	
Number range	0 65 535
• Size, max.	500 kbyte
ОВ	
• Size, max.	500 kbyte
 Number of free cycle OBs 	100
 Number of time alarm OBs 	20
 Number of delay alarm OBs 	20
 Number of cyclic interrupt OBs 	20; With minimum OB 3x cycle of 500 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	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	512 kbyte; In total; available retentive memory for bit memories, timers,

	counters DBs and technology data (aves): 470 KB
Extended retentive data area (incl. timera accustors (incl.	counters, DBs, and technology data (axes): 472 KB
Extended retentive data area (incl. timers, counters, flags), max.	3 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	o, o clock memory bit, grouped into one clock memory byte
Retentivity adjustable	Yes
Retentivity adjustable Retentivity preset	No
Local data	NO
• per priority class, max.	64 kbyte; max. 16 KB per block
	04 kbyte, max. 10 kb per block
Address area	
Number of IO modules	8 192; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
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
Fime 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
nterfaces	2
Number of PROFINET interfaces	2
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
 Number of ports 	2
 integrated switch 	Yes

District	
Protocols	Very ID-A
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device SIMATIC communication	Yes
SIMATIC communication Oner IF communication	Yes
Open IE communication Web corner	Yes; Optionally also encrypted
Web server	Yes
Media redundancy PROFINET IO Controller	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
PROFINET IO Controller	
Services	Von
— PG/OP communication	Yes
— Isochronous mode	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
— Of which IO devices with IRT, max.	64
 Number of connectable IO Devices for RT, max. 	256
— of which in line, max.	256
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8; in total across all interfaces
 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 IRT	, ,
— for send cycle of 250 μs	250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 μs of the isochronous OB is decisive
— for send cycle of 500 μs	500 μs to 8 ms
— for send cycle of 1 ms	1 ms to 16 ms
— for send cycle of 2 ms	2 ms to 32 ms
— for send cycle of 4 ms	4 ms to 64 ms
 With IRT and parameterization of "odd" send cycles 	Update time = set "odd" send clock (any multiple of 125 μ s: 375 μ s, 625 μ s 3 875 μ s)
Update time for RT	
— for send cycle of 250 μs	250 μs to 128 ms
— for send cycle of 500 μs	500 μs to 256 ms
— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 2 ms	2 ms to 512 ms
— for send cycle of 4 ms	4 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
 activation/deactivation of I-devices 	Yes; per user program
 Asset management record 	Yes; per user program
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

Services - PGOP communication - Web server - Mindo redundancy - Mindo redundancy - PGOP Communication - Web server - PGOP communication - Isochronous mode - Direct data exchange - PROFINET IO Controllers - PROFINET OR Services - PROFINET OR Services - PROFINET OR Services - PROFINET OR Services - Number of connectable IO Devices, max 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 smultaneously activate/disectivated, max Number of IO Devices that can be smultaneously activated/disectivated, max Number of IO Devices per tool, max, - Updating times - PGOP communication - Update time for RT - for send cycle of 1 ms - PROFINET IO Device - PGOP communication - Isochronous mode - PGOP communication - Isochronous mode - PROFINET IO Device - PROFINET IO, on the number of IO devices, and on the quantity of configured user data - In maximum of the update time also depends on communication shares set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data - In maximum of IO Device Services - PGOP communication - Isochronous mode - Isochronous mode - PROFINET IO Device - PROFINET IO Controllers with shared device, max Redundancy - Profitzed startup - No - Shared device - Number of IO Controllers with shared device, max Autocrossing - Ves. Profitser - Autocrossing - Ves. Profitser - Number of connections max Number of connections reserved for ESI-HMI/web - Number of connections - Number of connections max Number of connections - Number of connections - Number of connections - Number of connections was integrated interfaces - Number of connections - Number of connec	PROFINITIO R	V.
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Web server Media redundancy PROFINET IO Controller Services — PGCOP communication — Isochronous mode — No — PROFinenergy — Prioritized startup — Number of connectable IO Devices, max. — of which in line, max. — of which in line, max. — Number of IO Devices per tool, max. — Where of IO Devices per tool, max. — Updating times — PGOP communication Update time for RT — For send cycle of 1 ms — PROFinenergy — Prioritized startup — Number of IO Devices per tool, max. — Updating times — Where of IO Devices per tool, max. — Updating times — 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 — PROFINET IO Bevice Services — PROFInenergy — Prioritized startup — No — Shared device — Number of IO Devices — PROFInenergy — Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Puttorices of Strotting and the startup of IO Devices Ruffs (Ethernet) 1 100 Mbps — Autorossing — Asset management record Profices PROFIser No PROFIcer Ves Autorossing — Number of connections, max. — Number of connections wis integrated interfaces — Number of connections wis integrated interfaces — Number of connections reserved for ES/HMIlweb — Number of connections with sharpated interfaces — H-Sync Forwarding — Media redundancy — Media redundancy — MRP — MRP Interconnection, supported — MRP on document and the face		
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	Services	
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- Prioritized startup - Number of connectable IO Devices, max 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 simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - Updating times - Very Interest	— IRT	No
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AS-I, PROFIBUS or PROFINET 32 — Number of connectable IO Devices for RT, max. — of which in line, max. — Number of IO Devices that can be simultaneously activated/deactivated, max. — Number of IO Devices per tool, max. — Updating times Devices per tool, max. — Updating times Devices PROFINET IO Device Services — PG/OP communication — Isochronous mode — Isochronous mode — IRT — PROFIenergy — Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record Devices PROFIes the maximum and the program Profit IO Device Services — PG/OP communication — Isochronous mode — No — IRT — PROFienergy — Prioritized startup — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record Profit Io Device PROFIes the maximum and the profit in t	— Prioritized startup	No
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Update time for RT — for send cycle of 1 ms PROFINET IO Device Services — PG/OP communication Yes — Isochronous mode No — IRT — PROFlenergy Yes; per user program — Prioritized startup No — Shared device Yes — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices Yes; per user program Interface types RJ 45 (Ethernet) • 100 Mbps Yes • Autoregotiation Yes • Industrial Ethernet status LED Yes Protocols PROFlosafe Number of connections, max. • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy — Media redundancy — Media redundancy — Media redundancy — MRP interconnection, supported Yes; as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager, MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	— Updating times	
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PROFINET IO Device Services - PG/OP communication		1 ms to 512 ms
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- IRT - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Yes; per user program - Asset management record - Yes; per user program - Asset management record - Yes; per user program - Yes; per user program - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Yes - Asset management record - Yes; per user program - Asset management record - Yes; per user program - Yes; per user progr		
- PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Autocrossing • Industrial Ethernet status LED PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy - Media redundancy - MRP - MRP interconnection, supported Yes; per user program Yes; vas; per user program Yes Yes **Ves, yez user program **Yes **Ves, yez user program **Yes **Pospram **Pres **Pospram **Pospram **Pres **Pospram **Pospram **Pres **Pospram **Posp		
- Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths • H-Sync forwarding Media redundancy - Media redundancy - MRP - MRP interconnection, supported Nes; wes - Ves; wes - Ves, v2.4 / v2.6 - Ves - V		
- Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autorossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections, max. • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of Sr routing paths • Number of Sr routing paths Redundancy mode • H-Sync forwarding - MRP - MRP - MRP interconnection, supported Yes; as MRP ring node according to IEC 62439-2 Edition 3.0		
— Number of IO Controllers with shared device, max. — activation/deactivation of I-devices Yes; per user program Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of S7 routing paths • Nedia redundancy — Media redundancy — Media redundancy — MRP Media redundancy — MRP interconnection, supported Yes; as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	·	
max. — activation/deactivation of I-devices — Asset management record Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding — Media redundancy — Media redundancy — MRP interconnection, supported Yes; per user program Yes Yes Yes Yes Yes Yes Yes Ye	2.13.10.2	
— Asset management record Interface types RJ 45 (Ethernet) ● 100 Mbps ● Autonegotiation ● Autocrossing ● Industrial Ethernet status LED Protocols PROFIsafe Number of connections ● Number of connections, max. ● Number of connections reserved for ES/HMI/web ● Number of S7 routing paths Redundancy mode ● H-Sync forwarding Media redundancy — Media redundancy — Media redundancy — MRP MRP interconnection, supported Yes; per user program Yes Yes Yes Yes Yes Yes Yes Ye	max.	
Interface types RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy — Media redundancy — Media redundancy — Media redundancy — MRP MRP MRP MRP MRP MRP MRP Sinterconnection, supported Yes Yes Yes Yes Yes Yes Yes Y		
RJ 45 (Ethernet) • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy — Media redundancy — Media redundancy — MRP MRP interconnection, supported Yes Yes Yes Yes Yes Yes Yes Y	·	Yes; per user program
• 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy — Media redundancy — Media redundancy — MRP MRP MRP Manager; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client — MRP interconnection, supported	Interface types	
 Autorogotiation Autocrossing Industrial Ethernet status LED Yes Industrial Ethernet status LED Yes Protocols PROFIsafe Yes; V2.4 / V2.6 Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy Media redundancy MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 	RJ 45 (Ethernet)	
 Autocrossing Industrial Ethernet status LED Yes Protocols PROFIsafe Yes; V2.4 / V2.6 Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding H-Sync forwarding Media redundancy Media redundancy Media redundancy 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 	• 100 Mbps	Yes
● Industrial Ethernet status LED Protocols PROFIsafe Number of connections ● Number of connections, max. ● Number of connections reserved for ES/HMI/web ● Number of connections via integrated interfaces ● Number of s7 routing paths 16 Redundancy mode ● H-Sync forwarding Media redundancy — Media redundancy — Media redundancy — MRP MRP MRP interconnection, supported Yes Yes Yes Yes Yes MRP client Yes; V2.4 / V2.6 Yes; V2.4 / V2.6 Yes; V2.4 / V2.6 Yes; V2.4 / V2.6 Yes; V2.4 / V2.6 Yes Yes 192; via integrated interfaces of the CPU and connected CPs / CMs 10 10 10 10 10 10 10 10 10 1	 Autonegotiation 	Yes
Protocols PROFIsafe PROFIsafe Yes; V2.4 / V2.6 Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of s7 routing paths Number of S7 routing paths Redundancy mode H-Sync forwarding Yes Media redundancy — Media redundancy — MrP MRP MRP interconnection, supported Yes; V2.4 / V2.6 Yes; V2.4 / V2.6 Yes; V2.4 / V2.6 Number of connections 192; via integrated interfaces of the CPU and connected CPs / CMs 108 108 Number of s7 routing paths 16 Redundancy mode Only via 1st interface (X1) Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	 Autocrossing 	Yes
PROFIsafe Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy Media redundancy Media redundancy MRP MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; WRP ring node according to IEC 62439-2 Edition 3.0	 Industrial Ethernet status LED 	Yes
Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy Media redundancy MRP MRP MRP MRP Automanager according to IEC 62439-2 Edition 3.0	Protocols	
Number of connections Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy Media redundancy MRP MRP MRP MRP Automanager according to IEC 62439-2 Edition 3.0	PROFIsafe	Yes; V2.4 / V2.6
 Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 		
 Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP interconnection, supported Number of Connections reserved for ES/HMI/web 10 Number of Connections reserved for ES/HMI/web 108 108<!--</td--><td></td><td>192: via integrated interfaces of the CPU and connected CPs / CMs</td>		192: via integrated interfaces of the CPU and connected CPs / CMs
 Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP 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 		
 Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy Media redundancy MRP 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 		
Redundancy mode • H-Sync forwarding Media redundancy — Media redundancy — MRP MRP MRP 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	<u> </u>	
 ◆ H-Sync forwarding Media redundancy — Media redundancy — MRP — MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client — MRP interconnection, supported Yes Yes MRP ring node according to IEC 62439-2 Edition 3.0 		
Media redundancy — Media redundancy — MRP MRP MRP MRP interconnection, supported Media redundancy only via 1st interface (X1) Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	·	Yes
 Media redundancy MRP MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP interconnection, supported Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 		100
 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 	·	only via 1st interface (Y1)
— MRP interconnection, supported Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	-	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP
	 MRP interconnection, supported 	3
	— MRPD	Yes; Requirement: IRT
— Switchover time on line break, typ. 200 ms; For MRP, bumpless for MRPD		
— Switchover time of line break, typ. — Number of stations in the ring, max. 50		
— realition of stations in the filig, max.	— Number of Stations in the Illig, Illax.	00

ODAATIO : (:	
SIMATIC communication	
3	Yes
	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
	Yes
supported	
	Yes
	64 kbyte
	Yes
•	2 kbyte; 1 472 bytes for UDP broadcast
	Yes; Max. 5 multicast circuits
• DHCP	Yes
• DNS	Yes
	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes
OPC UA Client	Yes
Application authentication	Yes
	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
	Basic256Sha256
— User authentication	"anonymous" or by user name & password
— Number of connections, max.	10
— Number of nodes of the client interfaces, max.	2 000
	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C max.	
— Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.	20
— Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
	1
instructions per connection (except OPC_UA_ReadList,OPC_UA_WriteList,OPC_UA_M max.	
	5
instructions OPC_UA_ReadList,OPC_UA_WriteList and	
OPC_UA_MethodCall, max.	5.000
Number of registerable method calls of	5 000 100
	20
OPC_UA_MethodCall, max.	
S	Yes; Data access (read, write, subscribe), method call, custom address space
P.P. STATE S	Yes
E	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
User authentication	
— Oser autheritication	"anonymous" or by user name & password
	"anonymous" or by user name & password 48
— Number of sessions, max.	
— Number of sessions, max.— Number of accessible variables, max.	48
 Number of sessions, max. Number of accessible variables, max. Number of registerable nodes, max. 	48 100 000

— Publishing interval, min.	200 ms
Number of server methods, max.	50
 Number of inputs/outputs per server method, max. 	20
Number of monitored items, max.	2 000; for 1 s sampling interval and 1 s send interval
Number of morniored items, max. Number of server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20
— Number of server interfaces, max.	of the type "Reference namespace"
 Number of nodes for user-defined server interfaces, max. 	5 000
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
S7 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 	800
 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 (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	
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 the PLC program; selection guide via the TIA Selection Tool
 Number of available Motion Control resources for 	2 400
technology objects	
 Required Motion Control resources 	
per speed-controlled axis	40
per positioning axis	80
— per synchronous axis	160

	00
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
Positioning axis	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	7
Number of positioning axes at motion control	14
cycle of 8 ms (typical value)	17
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
PID_3Step	Yes; PID controller with integrated optimization for valves
PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
 High-speed counter 	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
Performance level according to ISO 13849-1	PLe
SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repa	ir time of 100 hours)
Low demand mode: PFDavg in accordance	< 2.00E-05
with SIL3	. 4.005.00
High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	-25 °C; No condensation
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the
Tionzonia motaliation, max.	display is switched off
 vertical installation, min. 	-25 °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	10.00
• min.	-40 °C
min. max.	-40 °C 70 °C
min.max. Altitude during operation relating to sea level	70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. 	
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header 	70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header 	70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection Password for display 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection Password for display Protection level: Write protection	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • Password for display • Protection level: Write protection • Protection level: Read/write protection 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection Protection level: Complete protection programming / cycle time monitoring / header 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection • User program protection/password protection • Copy protection • Block protection Access protection • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection programming / cycle time monitoring / header • lower limit • upper limit 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions 	70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes; incl. failsafe Yes; incl. failsafe Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye

Depth	129 mm
Weights	
Weight, approx.	830 g
last modified:	4/1/2022 🖸