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 $500~\mu s$ (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
l²t	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 DDs and technology data (avera), 470 (47
Extended retentive data area /incl. timeses counters (form)	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	., , ,
Retentivity adjustable	Yes
Retentivity preset	No
Local data	
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192; 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
Number of distributed to systems	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	3.3
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
interfaces	
Number of PROFINET interfaces	2
1. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X1
,	2
Number of portsintegrated switch	Yes
■ IIICGIAICU SWIIUII	1 60

Dystocals	
Protocols	Versi ID-4
IP protocol PROFINET IO Controller	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device SIMATIC communication	Yes
SIMATIC 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	Voc
— 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 max to 512 ms - PROFINET IO Device - PROFINET IO Controllers with shared device, max - Isochronous mode - No - Isochronous mode - No - PROFINET IO Controllers with shared device, max - Redundancy - Profiticed startup - No - Shared device - Number of IO Controllers with shared device, max - Autocrossing - Ves: per user program - Autocrossing - Ves: per user program - Autocrossing - Nest of connections - Number of connections max - Number of connections - Number of connections - Number of connections reserved for ESI-HMI/web - Number of connections reserved for ESI-HMI/web - Number of connections - Number of connect	PROFINITIO R	V.
Open IE communication Web server Media redundancy No PROFINET IO Controller Services PG/OP communication Isochronous mode No Direct data exchange No Direct data exchange No IRT PROFilenergy Prioritized startup Number of connectable IO Devices, max. Number of connectable IO Devices for RT, max. In Number of connectable IO Devices for RT, max. Number of IO Devices per tool, max. Number of IO Controllers with shared device, max. Number of IO Controllers with shared device, max. Number of IO Controllers with shared device, max. - Shared device Number of IO Controllers with shared device, max. - Activation/deactivation of I-devices PROFIstef Number of IO Controllers with shared device, max. - Autorocessing Number of connections, max. - Number of connections, max. - Number of connections reserved for ESH-Milweb Number of connections reserved for ESH-Milweb Number of connections reserved for ESH-Milweb Number of connections was integrated interfaces Number of connections, supported Number of connections, supported Number of connections of the CE 2439-2 Edition 2.0, MRP Maringer, MRP Client	PROFINET IO Device	Yes
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 — Psices RI45 (Ethemet) 1 100 Mbps — Autocrossing — Asset management record Proficate No — Autocrossing — Number of connections, max. — Number of connections wis integrated interfaces — Number of connections reserved for ES/HMIlweb — Number of connections with sharpaded interfaces — H-Sync Forwarding — Media redundancy — Media redundancy — Media redundancy — MRP — MRP Interconnection, supported Yes, MRP patomanager according to IEC 62439-2 Edition 3.0 Where of the control of the c		
PROFINET IO Controller Services - PGOP communication - Isochronous mode - Direct data exchange - No - PROFinengry - Profitized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max Of which in line, max Number of connectable IO Devices for RT, max Number of to Devices shat can be simultaneously activated/deactivated, max Number of IO Devices shat can be simultaneously activated/deactivated, max Number of IO Devices shat can be simultaneously activated/deactivated, max Number of IO Devices shat can be simultaneously activated/deactivated, max Number of IO Devices shat can be quantity of configured user data - Update time for RT - for send cycle of 1 ms - FROFINET IO Device - PGOP communication - Isochronous mode - IRT - FROFINET IO Device - PROFINET IO Device - PROFINET IO Device - Isochronous mode - IRT - FROFINET IO Device - PROFINET IO Device - Isochronous mode - IRT - FROFINET IO Device - Isochronous mode - IRT - PROFINET IO Device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Number of IO Controllers with shared device, max Asset management record - Profitized startup - Asset management record - Ves; per user program - Asset management record - Ves; per user program - Asset management record - Autocrossing - Autocrossing - Autocrossing - Autocrossing - Number of connections, max Number of connections was integrated interfaces - Number of connections reserved for ES/HMI/web - Number of connections reserved for ES/HMI/web - Number of For routing paths - Redundancy mode - H-Ryn for forwarding - Media redundancy - MRP - MRP interconnection, supported - MRP - MRP interconnection, supported - Ves. MRP Autonanager according to IEC 62439-2 Edition 3.0	•	
PROFINETIO Controller Services - PG/OP communication - Isochronous mode - No - Direct data exchange - IRT - RROFinergy - Prioritized startup - Number of connectable 10 Devices, max Aumber of Londers and the same of th	Web server	
Services - PG/OP communication - Isochronous mode - Direct data exchange - IRT - PROFilenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max of which in line, max Number of connectable IO Devices for RT, max of which in line, max Number of Devices shat can be simultaneously activated/deadtivated, max Number of Devices per tool, max Number of Devices per tool, max Updating times - The minimum value of the update time also depends on communicatic 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 - PGOP communication - IRT - FROFInergy - Prioritized startup - No - PROFInergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Autorocossing - Interface types RJ 45 (Eithermet) - (100 Mbps - Autonegotiation - Autorocossing - Industrial Ethernet status LED - PROFIce of Connections, max Number of connections with integrated interfaces - Number of connections max Num	·	No
- PG/OP communication	PROFINET IO Controller	
	Services	
- 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 simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - Updating times - In max of the professional professiona	— PG/OP communication	Yes
- IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - Update time for RT - for send cycle of 1 ms - FROFINET IO Devices - PC/OP communication - Isochronous mode - IRT - PROFlenergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - Autocrossing - Interface types RJ 45 (Ethemet) - Industrial Ethemet status LED - Protocols - Number of connections, max Number of ST routing paths - MRP - MRP Interconnection, supported - MRP Interconnection, su	 Isochronous mode 	No
PROFlenergy Prioritized startup No No No Number of connectable IO Devices, max. No 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. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. Number of IO Devices per tool, max. No	 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 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
- 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 - Yes PROFINET IO, on the number of IO devices, and on the quantity of configured user data - PROFINET IO Device - PO/OP communication - IRT - PROFInergy - Profixed startup - Profixed startup - Shared device - Number of IO Controllers with shared device, max. - activation/deactivation of I-devices - Asset management record - 100 Mps - Autocrossing - Industrial Ethernet status LED - PROFIsafe - Number of connections, max. - Number of Syrouting paths - Number of connections with eigenfaces - Number of connections max. - Number of connections with eigenfaces - Number of connec	— PROFlenergy	Yes; per user program
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 The minimum value of the update time also depends on communication area share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data The minimum value of the update time also depends on communication area share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data PROFINET IO Device Services — PG/OP communication — Isochronous mode — No — IRT — PROFInergy — 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 • Autocrossing • Autocrossing • Autocrossing • Industrial Ethernet status LED PROFIsafe Number of connections, max. • Number of connections, max. • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections wis integrated interfaces • Number of S7 routing paths Redundancy mode • H-Sync forwarding Media redundancy — Media redundancy — Media redundancy — Media redundancy — MRP Manager, MRP Client Yes; as MRP R rung node according to IEC 62439-2 Edition 2.0, MRP Manager, MRP Client Yes; as MRP R rung node according to IEC 62439-2 Edition 2.0, MRP Manager, MRP Client Yes; as MRP R rung 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	— Prioritized startup	No
max. — of which in line, max. — Number of 10 Devices that can be simultaneously activate/deactivated, max. — Number of 10 Devices per tool, max. — Updating times The minimum value of the update time also depends on communicative share set for PROFINET IO, on the number of 10 devices, and on the quantity of configured user data Update time for RT — for send cycle of 1 ms PROFINET IO Device Services — PG/OP communication — Isochronous mode — IRT — No — PROFienergy — Prioritized startup — No — Shared device — Number of 10 Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record Interface types RJ 45 (Ehment) — 100 Mbps — Autonegotiation — 4 utororossing — Industrial Ethernet status LED PROFIsafe Number of connections, max. — Number of connections reserved for ES/HMI/web — Number of connections reserved for ES/HMI/web — Number of 57 routing paths Redundancy mode — Hedia redundancy — Media redundancy — Media redundancy — MRP interconnection, supported Yes: as RP 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	 Number of connectable IO Devices, max. 	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
- 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 - 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 - for send cycle of 1 ms - PROFINET IO Device - PG/OP communication - Isochronous mode - IRT - PROFInergy - Prioritized startup - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - Asset management record - Autocrossing - Industrial Ethernet status LED - PROFicate - Number of connections - Number of connections - Number of connections via integrated interfaces - Number of connections - Number of connections via integrated interfaces - Number of connections via integrated interfaces - Number of connections - Number of co	•	32
Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max 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 Tor send cycle of 1 ms Tor send cycle of 1 ms Tor send cycle of 1 ms PROFINET IO Device Services PG/OP communication Isochronous mode IRT PROFIenergy Prioritized startup No Shared device Number of IO Controllers with shared device, max activation/deactivation of I-devices Asset management record Intorface types Asset management record Autorossing Autorossing Autorossing Industrial Ethernet status LED PROFIeste Number of connections Number of connections reserved for ES/HMI/web Number of S7 routing paths Redundancy MRP interconnection, supported MRP Client MRP interconnection, supported Ves: sa MRP ring node according to IEC 62439-2 Edition 3.0		
simultaneously activated/deactivated, max. Number of IO Devices per tool, max. Updating times The minimum value of the update time also depends on communicative 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 Ins to 512 ms PROFINET IO Device Services PG/OP communication Isorronous mode No IRT PROFInerry PROFlenerry Profitized startup Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Personous RJ 45 (Ethernet) Interface byps RJ 45 (Ethernet) Autocrossing Autocrossing Autocrossing Autocrossing Yes Industrial Ethernet status LED Protocols PROFIsafe Number of connections, max. Number of connections via integrated interfaces Number of connections reserved for ES/HMI/web Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy Media redundancy MRP interconnection, supported NaRP interconnection, supported Pes; MRP Automanager according to IEC 62439-2 Edition 3.0		
- Updating times	simultaneously activated/deactivated, max.	
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 PROFINET IO Device Services — PC/OP communication — Isochronous mode — IRT — No — 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 — Autocrossing — Industrial Ethernet status LED — Yes Protocols PROFISafe Number of connections, max. — Number of connections reserved for ES/HMII/web — Number of Strouting paths — Number of Strouting paths — Media redundancy — MRP — MRP — MRP interconnection, supported 1 ms to 512 ms	•	
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	
for send cycle of 1 ms PROFINET IO Device Services PG/OP communication	Update time for RT	1
PROFINET IO Device Services - PG/OP communication		1 ms to 512 ms
Services - PG/OP communication Yes - Isochronous mode No - Isochronous mode No - IRT No - 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 - 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, max. • Number of connections reserved for ES/HMI/web • Number of connections via integrated interfaces 108 • Number of S7 routing paths Redundancy mode • H-Sync forwarding Yes Media redundancy - Media redundancy - MRP Manager, MRP Client - MRP Manager, MRP Client - MRP interconnection, supported Yes; as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager, MRP Client - MRP Manager, MRP Client - MRP interconnection, supported		1 1110 to 0 12 1110
Isochronous mode IRT 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 Autocrossing Autocrossing Autocrossing Industrial Ethernet status LED Ves Protocols PROFIsafe Number of connections, max Number of connections, max Number of connections via integrated interfaces Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding MRP MRP MRP interconnection, supported MRP interconnection, supported MRP interconnection, supported Ves, per user program Yes; per user program		Vas
- 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 - Yes; per user program - Asset management record - Yes; per user program - Yes - Asset management record - Yes - Autocrossing - Yes - Autocrossing - Autocrossing - Yes - Yes, V2.4 / V2.6 - Number of connections - Number of connections - Number of connections - Number of connections, max 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 connections via integrated interfaces - Number of S7 routing paths - 108 - Number of S7 r		
- 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 • Number of connection	·	
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 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; Va 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 S7 routing paths Yes Media redundancy MRP Automanager according to IEC 62439-2 Edition 3.0 		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 	•
	— 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 filing, max.	— Number of Stations in the Illig, Illax.	00

SIMATIC communication	
SIMATIC communication	Ves
• S7 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
 several passive connections per port, 	Yes
supported	
• ISO-on-TCP (RFC1006)	Yes
Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	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
Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
County policies	Basic256Sha256
 User authentication 	"anonymous" or by user name & password
Number of connections, max.	10
Number of nodes of the client interfaces, max.	2 000
Number of elements for one call of	300
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 per connection (except 	1
OPC_UA_ReadList,OPC_UA_WriteList,OPC_UA_M max.	
 Number of simultaneous calls of the client 	5
instructions OPC_UA_ReadList,OPC_UA_WriteList and OPC_UA_MethodCall, max.	
Number of registerable nodes, max.	5 000
Number of registerable modes, max. 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, custom address space
 Application authentication 	Yes
Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
User authentication	"anonymous" or by user name & password
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.	20
— Sampling interval, min.	100 ms

Dublishing internal aris	000
— Publishing interval, min.	200 ms
Number of server methods, max. Number of inputs/outputs per server method.	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 server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20 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	1.00
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"
Number of leadable program massages in DUN.	block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	800
Number of program alarms Number of alarms for system diagnostics	200
Number of alarms for system diagnostics Number of alarms for motion technology objects.	160
Number of alarms for motion technology objects Test commissioning functions	100
Test commissioning functions	Voci Parallal online access pessible for up to 0 apping a set to 0
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 8
Number of breakpoints 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 technology objects 	2 400
Required Motion Control resources	
— per speed-controlled axis	40
— per speed-controlled axis — per positioning axis	80
— per synchronous axis	160
po. 03	

— 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 cycle of 8 ms (typical value)	14
Controller	
	Yes; Universal PID controller with integrated optimization
PID_Compact PID_3Ctor	
PID_3Step DID_Torre	Yes; PID controller with integrated optimization for valves
PID-Temp Counting and managing.	Yes; PID controller with integrated optimization for temperature
Counting and measuring	V
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	
 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
,	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	
• 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	
Password for display	Yes
Protection level: Write protection	Yes; Specific write protection both for Standard and for Failsafe
·	Yes Specific write protection both for Standard and for Fallsale
Protection level: Read/write protection Protection level: Write protection for Failenge	
Protection level: Write protection for Failsafe Protection level: Complete protection	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.	830 g
last modified:	11/3/2021 🗗