SIEMENS

Data sheet

6ES7511-1AK02-0AB0

SIMATIC S7-1500, CPU 1511-1 PN, Central processing unit with working memory 150 KB for program and 1 MB for data, 1. interface: PROFINET IRT with 2 port switch, 60 NS bit-performance, SIMATIC memory card necessary



General information	
Product type designation	CPU 1511-1 PN
HW functional status	FS03
Firmware version	V2.8
Product function	
● I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes; Distributed and central; with minimum OB $6x$ cycle of $625~\mu s$ (distributed) and 1 ms (central)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V16 (FW V2.8) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7511-1AK01-0AB0
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	8
Mode buttons	2

Supply voltage	
Type of supply voltage	24 V DC
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
- Nepeatrate, min.	1,70
Input current	
Current consumption (rated value)	0.7 A
Current consumption, max.	0.95 A
Inrush current, max.	1.9 A; Rated value
l²t	0.02 A ² ·s
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus	5.5 W
(balanced)	
Power loss	
Power loss, typ.	5.7 W
Tower loss, typ.	0.1 11
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	150 kbyte
• integrated (for data)	1 Mbyte
Load memory	
 Plug-in (SIMATIC Memory Card), max. 	32 Gbyte
Backup	
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	60 ns
for word operations, typ.	72 ns
for fixed point arithmetic, typ.	96 ns
for floating point arithmetic, typ.	384 ns
CPU-blocks	
Number of elements (total)	2 000; Blocks (OB, FB, FC, DB) and UDTs
	2 000; Blocks (OB, FB, FC, DB) and UDTs 1 60 999; subdivided into: number range that can be used by

• Size, max.	1 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	150 kbyte
FC	
Number range	0 65 535
• Size, max.	150 kbyte
ОВ	
• Size, max.	150 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
Counters, timers and their retentivity	
S7 counter	2 048
• Number	2 040
Retentivity	Yes
— adjustable IEC counter	165
Number	Any (only limited by the main memory)
	Any (only limited by the main memory)
Retentivity — adjustable	Yes
— adjustable S7 times	165
Number	2 048
Retentivity	2 040
— adjustable	Yes
— adjustable IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	, (,
— adjustable	Yes
— guiusiaule	

ata areas and their retentivity	
Retentive data area (incl. timers, counters, flags),	128 kbyte; In total; available retentive memory for bit memories,
max.	timers, counters, DBs, and technology data (axes): 88 KB
Extended retentive data area (incl. timers, counters, flags), max.	1 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
Number, 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
ddress area	
Number of IO modules	1 024; 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
lardware configuration	
Number of distributed IO systems	32; 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	4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	1
● Via CM	4; A maximum of 4 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	

•	Num	her	οf	PtP	CMs
•	INUIII	וסט	OI.	ı u	CIVIO

the number of connectable PtP CMs is only limited by the number of available slots

Clock • Type • Backup time • Deviation per day, max. 10 s: Typ.: 2 s	Time of day	
• Backup time • Deviation per day, max. • Deviation per day, max. Operating hours counter • Number • Number • Number • Number • Number • Sevices • One Ethernet via NTP Interface Interface Interface types • Number of ports • Ru 4s (Ethernet) • PROFINET IO Controller • Media redundancy • Media redundancy • PROFINET IO Controller • Media redundancy • Yes • PROFINET IO Controller • Services — PG/OP communication • Yes • Nescondance • PROFINET IO Controller • Services • PROFINET IO Controller • Yes • Media redundancy • Yes • Nescondance • Yes • Yes • Yes • Nescondance • Yes • Ye	Clock	
Deviation per day, max. Operating hours counter Number Number Supported	• Type	Hardware clock
Operating hours counter Number 16 Clock synchronization supported Yes in AS, master Yes on Ethernet via NTP Yes Interfaces Number of PROFINET interfaces 1 I. Interface Upes Number of ports 2 integrated switch Yes; X1 Protocols IP protocol Yes; X1 PROFINET IO Controller Yes SIMATIC communication Yes SIMATIC communication Yes Media redundancy Yes PROFINET IO Controller Services PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes Direct data exchange Yes; Requirement: IRT and isochronous mode (MRPD optional) HRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 Yes; PROFILER max. number of devices in the ring: 50 Yes; Requirement: IRT PROFIlenergy Yes; per user program	Backup time	6 wk; At 40 °C ambient temperature, typically
Number 16 Clock synchronization supported Yes in AS, master Yes in AS, slave Yes on Ethernet via NTP Interfaces Number of PROFINET interfaces 1 1. Interface Interface types Number of prots 2 integrated switch Yes; X1 Protocols IP protocol Yes; IPv4 PROFINET IO Controller Yes SIMATIC communication Yes SIMATIC communication Yes SIMATIC communication Yes Media redundancy Yes Media redundancy Yes Media redundancy Yes PROFINET IO Controller Services — PG/OP communication Yes — Isochronous mode — Direct data exchange Yes; Requirement: IRT and isochronous mode (MRPD optional) — IRT Yes — MRP — MRP — MRP — MRP — MRPD — Yes; Requirement: IRT — MRP — MRPD — Yes; Peruser program Yes; per user program	 Deviation per day, max. 	10 s; Typ.: 2 s
Clock synchronization • supported • in AS, master • in AS, slave • on Ethernet via NTP / ves • in AS, slave • on Ethernet via NTP / ves • in AS, slave • on Ethernet via NTP / ves • in AS, slave • on Ethernet via NTP / ves • on Ethernet via NTP / ves • linterfaces Number of PROFINET interfaces 1 1. Interface Interface types • Number of ports • Number of ports • PA 45 (Ethernet) / ves • PA 54 (Ethernet) / ves; IPv4 • PROFINET IO Controller • PROFINET IO Device • PROFINET IO Device • PROFINET IO Device • SIMATIC communication • Ves • PROFINET IO Controller • Web server • Media redundancy • Yes PROFINET IO Controller Services - PC/OP communication - S7 routing - Isochronous mode - Direct data exchange - Direct data exchange - Direct data exchange - Direct data exchange - RRP - MRP - MRP - MRP - Manager; MRP Client; max. number of devices in the ring: 50 - Yes; Requirement: IRT - MRP - Manager; MRP Client; max. number of devices in the ring: 50 - Yes; Requirement: IRT - PROFlenergy - Yes; per user program	Operating hours counter	
supported in AS, master in AS, slave interfaces Interfaces	• Number	16
• in AS, slave • in AS, slave • on Ethernet via NTP Interfaces Number of PROFINET interfaces 1 1. Interface Interface types • Number of ports • RJ 45 (Ethernet) 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 — S7 routing — Isochronous mode — Direct data exchange — Direct data exchange — IRT — MRP — MRP — MRP Menager; MRP Client; max. number of devices in the ring: 50 — MRPD — PROFIenergy Yes: per user program	Clock synchronization	
in AS, slave on Ethernet via NTP res Interfaces Number of PROFINET interfaces 1 1. Interface Interface Uppes Number of ports integrated switch RJ 45 (Ethernet) Protocols IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Ves SIMATIC communication Ves Media redundancy PROFINET IO Controller Wes PROFINET IO Controller Yes Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Yes PROFINET IO Controller Yes PROFINET IO Controller Yes Services PROFINET IO Controller Yes PROFINET IO Controller Services PROFINET IO Controller Yes PROFINET IO Controller Services PROFINET IO Controller Yes PROFINET IO Controller Yes PROFINET IO Controller Yes PROFINET IO Controller Number of devices in the ring: 50 PROFINET IO Controller Yes; Requirement: IRT Pes PROFILER INT Pes PROFILER INT PROF	supported	Yes
• on Ethernet via NTP Interfaces Number of PROFINET interfaces 1 I. Interface Interface Upes • Number of ports • Number of ports • Number of ports • RJ 45 (Ethernet) Protocols • IP protocol • IP protocol • PROFINET IO Controller • PROFINET IO Device • PROFINET IO Device • SIMATIC communication • Ves SIMATIC communication • Web server • Media redundancy PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Upes — Direct data exchange — IRT — MRP — MRP — MRPD — MRPD — MRPD — MRPD — PROFInergy Yes: Proview Press 1 1 1 1 1 1 1 1 1 1 1 1	• in AS, master	Yes
Interfaces Number of PROFINET interfaces 1. Interface types • Number of ports • Number of ports • RJ 45 (Ethernet) 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 — S7 routing — Isochronous mode — Direct data exchange — IRT — MRP — MRP — MRPD — MRPD — PROFINET IOT 1 Ves 1 Ves	• in AS, slave	Yes
Number of PROFINET interfaces 1. Interface Interface types • Number of ports • Number of ports • Number of ports • RJ 45 (Ethernet) Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Ves • SIMATIC communication • Web server • Media redundancy PROFINET IO Controller Services - PG/OP communication Yes - Isochronous mode - Direct data exchange - IRT - MRP - MRPD - PROFINET - MRPD - PROFInery Yes; Requirement: IRT - MRP - Ves; Requirement: IRT - MRP - PROFInery - Ves; Requirement: IRT - MRP - PROFInery - Ves; Requirement: IRT - Yes; PROFInergy - Yes; Profirement: IRT - Yes; PROFInergy - Yes; Profirement: IRT - Yes; PROFINERT -	• on Ethernet via NTP	Yes
Interface Interface types Interface typ		
Interface types • Number of ports • integrated switch • RJ 45 (Ethernet) Protocols • IP protocol • PROFINET IO Controller • Web server • Media redundancy • PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Direct data exchange — IRT — MRP — MRPD — MRPD — MRPD — PROFINET WYes • Ves Yes Yes 2 Yes Yes Yes Yes Yes	Number of PROFINET interfaces	1
 Number of ports integrated switch RJ 45 (Ethernet) Yes; X1 Protocols IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy Yes PROFINET IO Controller Yes Open IE communication Yes; Optionally also encrypted PROFINET IO Controller Services PG/OP communication Yes S7 routing Isochronous mode Pes; Requirement: IRT and isochronous mode (MRPD optional) IRT MRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 MRPD MRPD Yes; Requirement: IRT Yes; Requirement: IRT 		
integrated switch RJ 45 (Ethernet) Protocols IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SiMATIC communication Open IE communication Wes; Optionally also encrypted Web server Media redundancy PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Representation Yes PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFICE Wes PROFICE Wes PROFICE With a part of the properties of the propert		
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Protocols IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy PROFINET IO Controller Services PROFINET IO Controller Yes PROFILE IO CONTROLLER YES	integrated switch	
IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy PROFINET IO Controller Services PROFINET IO Con	• RJ 45 (Ethernet)	Yes; X1
 PROFINET IO Controller PROFINET IO Device Yes SIMATIC communication Open IE communication Web server Media redundancy PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Direct data exchange — IRT — MRP — MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 — MRPD — PROFIenergy Yes; per user program 	Protocols	
 PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Ser routing Isochronous mode Direct data exchange IRT MRP MRP MRPD MRPD PROFINET IO Controller Yes PG/OP communication Yes Services PG/OP communication Yes Services PG/OP communication Yes Services Yes Requirement: IRT and isochronous mode (MRPD optional) Yes Yes MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 Yes; Requirement: IRT Yes; per user program 	• IP protocol	
 SIMATIC communication Open IE communication Web server Media redundancy PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Direct data exchange — IRT — MRP — MRP — MRPD — MRPD — PROFIenergy Yes; Pequirement: IRT Yes; Requirement: IRT Yes; Per user program 	 PROFINET IO Controller 	Yes
Open IE communication Yes; Optionally also encrypted Web server Media redundancy Yes PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Direct data exchange — Direct data exchange — IRT — MRP MRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 Yes; per user program	 PROFINET IO Device 	Yes
 ◆ Web server ◆ Media redundancy Yes PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Direct data exchange — Direct data exchange — IRT — MRP — MRP Manager; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 — MRPD — MRPD — Yes; Requirement: IRT Yes; Requirement: IRT Yes; Requirement: IRT Yes; Requirement: IRT Yes; Per user program 	 SIMATIC communication 	Yes
● Media redundancy PROFINET IO Controller Services	 Open IE communication 	Yes; Optionally also encrypted
PROFINET IO Controller Services - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Direct data exchange Yes; Requirement: IRT and isochronous mode (MRPD optional) - IRT Yes - MRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes; per user program	Web server	Yes
Services - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Direct data exchange Yes; Requirement: IRT and isochronous mode (MRPD optional) - IRT Yes - MRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes; per user program	Media redundancy	Yes
 — PG/OP communication — S7 routing — Isochronous mode — Direct data exchange — IRT — MRP — MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 — MRPD — PROFlenergy Yes Yes; Requirement: IRT Yes; Requirement: IRT Yes; per user program 	PROFINET IO Controller	
 S7 routing Isochronous mode Direct data exchange IRT MRP MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT Yes; Requirement: IRT Yes; Requirement: IRT Yes; per user program 	Services	
 — Isochronous mode — Direct data exchange — IRT — MRP — MRP Manager; MRP Client; max. number of devices in the ring: 50 — MRPD — PROFlenergy Yes Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 — Yes; Requirement: IRT — Yes; per user program 	— PG/OP communication	Yes
 Direct data exchange IRT MRP MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 MRPD PROFlenergy Yes; Requirement: IRT Yes; per user program 	— S7 routing	Yes
 — IRT — MRP — MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 — MRPD — PROFlenergy Yes; Requirement: IRT — Yes; per user program 	— Isochronous mode	Yes
 MRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP Manager; MRP Client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Yes; per user program 	 Direct data exchange 	Yes; Requirement: IRT and isochronous mode (MRPD optional)
Manager; MRP Client; max. number of devices in the ring: 50 — MRPD — PROFlenergy Yes; Per user program	— IRT	Yes
— PROFlenergy Yes; per user program	— MRP	
	— MRPD	Yes; Requirement: IRT
— Prioritized startup Yes; Max. 32 PROFINET devices	— PROFlenergy	Yes; per user program
	— Prioritized startup	Yes; Max. 32 PROFINET devices

 — Of which IO devices with IRT, 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 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 — for send cycle of 500 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — I ms to 16 ms — for send cycle of 4 ms — I ms to 64 ms
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. — 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 625 μs of the isochronous OB is decisive — for send cycle of 500 μs 500 μs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms 4 ms to 64 ms
 — 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 B — 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 — for send cycle of 500 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms
 Number of IO Devices that can be simultaneously activated/deactivated, 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 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 625 μs of the isochronous OB is decisive for send cycle of 500 μs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 4 ms 4 ms to 64 ms
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 — 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 1 ms — for send cycle of 2 ms — for send cycle of 4 ms 250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms 4 ms to 64 ms
the minimum update time of 625 µs of the isochronous OB is decisive — for send cycle of 500 µs 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms 4 ms to 64 ms
the minimum update time of 625 µs of the isochronous OB is decisive — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms the minimum update time of 625 µs of the isochronous OB is decisive 1 ms to 16 ms 2 ms to 32 ms 4 ms to 64 ms
 for send cycle of 2 ms for send cycle of 4 ms 2 ms to 32 ms 4 ms to 64 ms
— for send cycle of 4 ms 4 ms to 64 ms
With IDT and a grant time of the July Indate time = oot haddle and alock (any multiple of 405 yrs 975
— With IRT and parameterization of "odd" Update time = set "odd" send clock (any multiple of 125 μs: 375
send cycles μs, 625 μs 3 875 μs)
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 4 ms 4 ms to 512 ms PROFINET IO Device
Services Services
— PG/OP communication Yes
— S7 routing Yes
— Isochronous mode No
— IRT Yes
— MRP Yes; MRP Automanager acc. to IEC 62439-2 Edition 2.0; MRP
Manager; MRP Client; max. number of devices in the ring: 50
— MRPD Yes; Requirement: IRT
— PROFlenergy Yes; per user program
— Shared device Yes
— Number of IO Controllers with shareddevice, max.
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	
Number of connections	
Number of connections, max.	96; 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 	64
Number of S7 routing paths	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
 Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
 Number of stations in the ring, max. 	50
SIMATIC communication	
 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, supported 	Yes
• 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	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
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, Basic256Sha256
— User authentication	"anonymous" or by user name & password
Number of connections, max.	4
 Number of nodes of the client interfaces, max. 	1 000
— Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_Rea dList/OPC_UA_WriteList, 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 OPC_UA_ReadList,OPC_UA_WriteList,OPC_ UA_MethodCall), max. 	1
 Number of simultaneous calls of the client instructions OPC_UA_ReadList,OPC_UA_WriteList and OPC_UA_MethodCall, 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, 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.	32
 Number of accessible variables, max. 	50 000
— Number of registerable nodes, max.	10 000
— Number of subscriptions per session, max.	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
— Number of server methods, max.	20
 Number of inputs/outputs per server method, max. 	20

— Number of monitored items, max.	1 000; for 1 s sampling interval and 1 s send interval
Number of server interfaces, max.	10; or 20, depending on type of server interface
Number of nodes for user-defined server	1 000
interfaces, max.	
Further protocols	V MODRIJO TOR
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
Number of simultaneously active program alarms	
Number of program alarms	600
 Number of alarms for system diagnostics 	100
 Number of alarms for motion technology objects 	80
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 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
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of variables, max.	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
Forcing, variables	Peripheral inputs/outputs
 Number of variables, max. 	200
Diagnostic buffer	
• present	Yes
 Number of entries, max. 	1 000
— 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 Yes • ERROR LED Yes MAINT LED Yes • STOP ACTIVE LED Yes Connection display LINK TX/RX Supported technology objects Motion Control Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER • Number of available Motion Control resources 800 for technology objects • Required Motion Control resources 40 - per speed-controlled axis - per positioning axis 80 160 - per synchronous axis 80 - per external encoder 20 - per output cam 160 - per cam track 40 - per probe Positioning axis 5 - Number of positioning axes at motion control cycle of 4 ms (typical value) 10 - Number of positioning axes at motion control cycle of 8 ms (typical value) Controller Yes; Universal PID controller with integrated optimization PID_Compact Yes; PID controller with integrated optimization for valves • PID_3Step Yes; PID controller with integrated optimization for temperature • PID-Temp Counting and measuring • High-speed counter Yes Ambient conditions Ambient temperature during operation -25 °C; No condensation • horizontal installation, min. 60 °C; Display: 50 °C, at an operating temperature of typically 50 • horizontal installation, max. °C, the display is switched off -25 °C; No condensation vertical installation, min. 40 °C; Display: 40 °C, at an operating temperature of typically 40 vertical installation, max. °C, the display is switched off Ambient temperature during storage/transportation -40 °C • min.

• max.

70 °C

Altitude during operation relating to sea level 5 000 m; Restrictions for installation altitudes > 2 000 m, see • Installation altitude above sea level, max. manual Configuration Programming Programming language Yes -LADYes — FBD - STL Yes Yes - SCL — GRAPH Yes Know-how protection • User program protection/password protection Yes Yes Copy protection Yes • Block protection Access protection Yes Password for display • Protection level: Write protection Yes • Protection level: Read/write protection Yes • Protection level: Complete protection Yes Cycle time monitoring adjustable minimum cycle time lower limit adjustable maximum cycle time • upper limit

Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm

Weights	
Weight, approx.	405 g

last modified: 06/11/2020