SIEMENS

Data sheet

6ES7511-1FK01-0AB0

*** Spare part *** SIMATIC S7-1500F, CPU 1511F-1 PN, Central processing unit with work memory 225 KB for program and 1 MB for data, 1st interface: PROFINET IRT with 2-port switch, 60 ns bit performance, SIMATIC Memory Card required



General information	
Product type designation	CPU 1511F-1 PN
HW functional status	FS03
Firmware version	V2.5
Engineering with	
 STEP 7 TIA Portal configurable/integrated as of version 	V15 (FW V2.5) / V13 SP1 Update 4 (FW V1.8) or higher
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	6
Mode selector switch	1
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
Input current	
Current consumption (rated value)	0.7 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 (balanced)	5.5 W
(balanced)	
Power loss	
Power loss, typ.	5.7 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	225 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
DB	
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.	1 Mbyte; For non-optimized block accesses, the max. size of the DB 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 	1
 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),	128 kbyte; In total; available retentive memory for bit memories,
Retentive data area (incl. timers, counters, flags), max.	timers, counters, DBs, and technology data (axes): 88 KB
Retentive data area (incl. timers, counters, flags),	

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
Address area	4.004 may number of madulas / submadulas
Number of IO modules	1 024; max. number of modules / submodules
I/O address area	20 like to All invests are in the appears in the
• 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	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	
• Number of DID OM	the number of connectable PtP CMs is only limited by the number
Number of PtP CMs	of available slots
Time of day	

• Number of controller • Number of ports • Number of protocol • PROFINET IO Controller • PROFINET IO Controller • Sevices • PROFINET IO Controller • Sevices • POID Communication • Yes • In Ag. Raber • Number of PROFINET interfaces • Number of prots • Interface Uses • Number of prots • Ru 45 (Ethernet) • PROFINET IO Controller • PROFINET IO Device • PROFINET IO Device • SiMATIC communication • Ves ever • Wed is redundancy • Yes • Nedia redundancy • Yes • PROFINET IO Controller • Yes • Nerice according to IEC 62439-2 Edition 2.0 PROFINET IO Controller • Yes • Web server • Nedia redundancy • Yes (Fig. 1) • Yes (Fig. 2) • PROFINET IO Controller • Yes • Web server • Media redundancy • Yes, Yes • Media redundancy • Yes, Yes • Media redundancy • Yes, Yes • Media redundancy • Yes, Yes, Yes • Media redundancy • Yes, Yes, Was Predundancy was per according to IEC 62439-2 Edition 2.0 PROFINET IO Controller • Yes • Requirement: IRT • Yes • Requirement: IRT • MRP • MRP • MRP • Yes, As MRP redundancy manager and/or MRP client; max. • number of devices in the ring: 50 • Yes, Max. 32 PROFINET devices • PROFINET devices • Requirement: IRT • PROFINED of the ring: 50 • Yes, Max. 32 PROFINET devices • Requirement: IRT • Of which IO devices with IRT, max. • Number of connectable IO Devices, max. • Number of connectable IO Devices for RT, max.	Backup time	6 wk; At 40 °C ambient temperature, typically
Operating hours counter Number Clock synchronization Supported In AS, master AS, slave Interfaces Interface Interfaces Number of PROFINET interfaces Number of PROFINET interfaces PROFINET IO Controller Nes Similar Communication PROFINET IO Controller Services PG/OP communication PROFINET IO Controller Services PG/OP communication PROFINET IO Controller Services PROFINET IO Controller Yes Services PROFINET IO Controller Yes Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Yes Services PROFINET IO Controller PROFINET IO Controller Services PROFINET IO Controller PROFINET IO Controller PROFINET IO Contr		
Number 16 Clock synchronization supported Yes	· · ·	
* supported * in AS, master * in AS, slave * on Ethernet via NTP * Ves * Interfaces Number of PROFINET interfaces 1 1. Interface Interface types * Number of ports * Ves * Number of ports * Pes * Number of ports * Pes * Number of ports * Pes * Number of ports * PROFINET interfaces * IP protocol * PROFINET in Controller * PROFINET IO Controller * PROFINET IO Device * PROFINET IO Device * SIMATIC communication * Yes * SIMATIC communication * Yes * Web server * Media redundancy * Yes MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services - PG/OP communication * Yes - Open IE communication * PROFINET IO Controller Services - PG/OP communication * Yes - Open IE communication * Yes - Number of connectable IO Devices, max. * Number of connectable IO Devices, max. * Ves; Max. 32 PROFINET devices - Of which IO devices with IRT, max. - Number of connectable IO Devices for RT, * 128		16
* supported * in AS, master * in AS, slave * on Ethernet via NTP * Ves * Interfaces Number of PROFINET interfaces 1 1. Interface Interface types * Number of ports * Ves * Number of ports * Pes * Number of ports * Pes * Number of ports * Pes * Number of ports * PROFINET interfaces * IP protocol * PROFINET in Controller * PROFINET IO Controller * PROFINET IO Device * PROFINET IO Device * SIMATIC communication * Yes * SIMATIC communication * Yes * Web server * Media redundancy * Yes MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services - PG/OP communication * Yes - Open IE communication * PROFINET IO Controller Services - PG/OP communication * Yes - Open IE communication * Yes - Number of connectable IO Devices, max. * Number of connectable IO Devices, max. * Ves; Max. 32 PROFINET devices - Of which IO devices with IRT, max. - Number of connectable IO Devices for RT, * 128	Clock synchronization	
in AS, slave in AS, slave ves von Ethernet via NTP Yes Number of PROFINET interfaces 1 1. Interface Interface types Number of ports integrated switch RJ 45 (Ethernet) Protocols IPPOFINET IO Controller PROFINET IO Device SIMATIC communication PROFINET IO Controller Ves SIMATIC communication Ves Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Yes Media redundancy Yes Media redundancy Yes PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Yes Services PROFINET IO Controller Services PROPOP communication Yes Services PROPOP co		Yes
interfaces Number of PROFINET interfaces 1 Interface Interface types Number of ports Integrated switch RI 45 (Ethernet) PROFINET IO Controller PROFINET IO Controller PROFINET IO Communication Web server Media redundancy PROFINET IO Controller PROFINET IO Controller PROFINET IO Communication PROFINET IO Communication PROFINET IO Controller PROFINET IO Controller Services PROFINET IO Controller Yes: As MRP redundancy manager and/or MRP client: max. number of devices in the ring: 50 Yes: Requirement: IRT PROFINET I devices PROFINET I devices PROFINET I devices PROFINET I devices can be connected via As-i, PROFINET I devices PROFINET I devices can be connected via As-i, PROFINET I devices PROFINET I devices can be connected via As-i, PROFINET I devices PROFINET I devices can be connected via As-i, PROFINET I devices PROFINET I devices can be connected via As-i, PROFINET I devices		Yes
• on Ethernet via NTP Interfaces Number of PROFINET interfaces 1 1. Interface Interface types • Number of ports • integrated switch • RJ 45 (Ethernet) Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • PROFINET IO Device • SIMATIC communication • Web server • Media redundancy • Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - RT - MRP - MRP - MRP - Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD - PROFINET Wes - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Number of connectable IO Devices for RT. 128	● in AS, slave	Yes
Number of PROFINET interfaces 1		Yes
Number of PROFINET interfaces 1	Interfaces	
Interface types Number of ports Integrated switch RJ 45 (Ethernet) Protocols Protocols Profine Ti O Controller PROFINET IO Device SilMATIC communication Open IE communication Wes Media redundancy PROFINET IO Controller Services PROFOP communication Yes PROFONE Ti O Controller Services PROFINE Ti O Controller Services PROFOR communication Yes Nes Copen IE communication Yes PROFOR is communication Yes Nery PROFOR in the ring: 50 Yes; Requirement: IRT PROFILE ring: 50 Yes; Requirement: IRT PROFILE startup Proritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128		1
Number of ports integrated switch RJ 45 (Ethernet) Protoccols IP protoccol PROFINET IO Controller Services PROFINET IO Controller Yes Nes Nes Nes Nes Nes Nes Nes	1. Interface	
 integrated switch RJ 45 (Ethernet) Yes; X1 Protocols IP protocol Yes; IPv4 PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Services PGFOP in E communication Yes Sorrouting Yes Isochronous mode Yes Open IE communication Yes IRT MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 Yes; Requirement: IRT PROFIenergy PROFIenergy Prioritized startup Number of connectable IO Devices, max. 128, In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 	Interface types	
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 Yes PS routing Pes PG/OP communication Yes Popen IE communication Yes Popen IE communication Yes Popen IE communication Yes Popen IE communication Yes Profile communication Yes Profile communication Yes Pes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 Yes; Requirement: IRT PROFIenergy Yes Prioritized startup Prioritized startup Yes; Max. 32 PROFINET devices Italian total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Plumber of connectable IO Devices for RT,	Number of ports	2
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PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Pes Media redundancy Pes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes PSFORD FROFINET IO Controller Services PG/OP communication Yes PSFORD FROFINET IO Controller Services PG/OP communication Yes PSFORD Yes PSFORD Yes PSFORD FROFINET PSFORD Yes PROFINET Yes PROFINET PROFINET PROFINET PROFINET PROFINET PROFINET PROFINET PROFINET PROFINET PSFORD Yes PROFINET PSFORD YES PROFINET PSFORD YES PROFINET PSFORD YES PROFINET PSFORD YES PSFORD Y	• RJ 45 (Ethernet)	Yes; X1
PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PGS/OP communication Yes PGS/OP communication Yes Services PG/OP commu	Protocols	
PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PRO/OP communication Yes Services PRO/OP communication Yes Isochronous mode Yes Open IE communication Yes NRP Ves; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD PROFIenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128	IP protocol	Yes; IPv4
SIMATIC communication Open IE communication Yes Web server Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRP — Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — Yes; Requirement: IRT — PROFIenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, — MRP IVES 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 128	 PROFINET IO Controller 	Yes
Open IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes Stroiting Isochronous mode Open IE communication Yes Open IE communication Yes IRT MRP MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 Yes; Requirement: IRT PROFIenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET A Number of connectable IO Devices for RT, 128	 PROFINET IO Device 	Yes
Web server Media redundancy PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRP — MRP — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, 128 Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes Yes Yes Yes Yes Yes Yes Ye	 SIMATIC communication 	Yes
● Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRPD - PROFIenergy - Prioritized startup - Number of connectable IO Devices for RT, - MRP - Number of connectable IO Devices for RT, - Number of connectable IO Devices for RT, - MRP - Number of connectable IO Devices for RT, - MRP - Number of connectable IO Devices for RT, - MRP - Number of connectable IO Devices for RT, - MRP - Number of connectable IO Devices for RT, - MRPO - PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, - 128	 Open IE communication 	Yes
PROFINET IO Controller Services - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Open IE communication Yes - IRT Yes - MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup Yes; Max. 32 PROFINET devices - Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, 128	• Web server	Yes
Services - PG/OP communication Yes - S7 routing Yes - Isochronous mode Yes - Open IE communication Yes - IRT Yes - MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup Yes; Max. 32 PROFINET devices - Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET - Of which IO devices with IRT, max Number of connectable IO Devices for RT, - 128	Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
 — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRP — Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, — 128 	PROFINET IO Controller	
 S7 routing Isochronous mode Open IE communication IRT MRP MRP MRPD Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. — Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 	Services	
- Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD - Yes; Requirement: IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - Number of connectable IO Devices for RT, - 128	— PG/OP communication	Yes
 Open IE communication IRT MRP MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 	— S7 routing	Yes
— IRT — MRP — MRP — Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, Yes Yes; Requirement: IRT Yes; Max. 32 PROFINET devices 128; In total, up to 256 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,	— Isochronous mode	Yes
 MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 	 Open IE communication 	Yes
number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup Yes; Max. 32 PROFINET devices - Number of connectable IO Devices, max. 128; In total, up to 256 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, 128	— IRT	Yes
 PROFlenergy Prioritized startup Number of connectable IO Devices, max. Of which IO devices with IRT, max. Number of connectable IO Devices for RT, Yes Yes; Max. 32 PROFINET devices 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. 128 	— MRP	
 Prioritized startup Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 	— MRPD	Yes; Requirement: IRT
 Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 128 	— PROFlenergy	Yes
via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 128	— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices for RT, 128	— Number of connectable IO Devices, max.	
,	— Of which IO devices with IRT, max.	64
max.	 Number of connectable IO Devices for RT, 	128
	max.	

6 1:1: 0	100
— of which in line, max.	128
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8; in total across all interfaces
•	8
Number of IO Devices per tool, max. Indexing times.	The minimum value of the update time also depends on
— Updating times	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	$250~\mu s$ 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	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
— S7 routing	Yes
 Isochronous mode 	No
 Open IE communication 	Yes
— IRT	Yes
— MRP	Yes
— MRPD	Yes; Requirement: IRT
— PROFlenergy	Yes
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
— 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
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— PROFlenergy	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	128; In total, up to 512 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, 	128
max.	
— of which in line, max.	128
 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
Redundancy mode	
— MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
— MRPD	Yes; Requirement: IRT
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
	Yes
• DCP	Yes
• LLDP	res
Web server	Very Oten dead and group areas
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes
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 monitored items, max. 	1 000; For 1 s sampling interval and 1 s send interval
Further protocols	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
 Number of stations in the ring, max. 	50
Isochronous mode Isochronous operation (application synchronized up	Yes; With minimum OB 6x cycle of 625 µs
to terminal)	
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program alarms	5 000
Number of simultaneously active program alarms	
Number of program alarms	300
Number of alarms for system diagnostics	100
Number of alarms for motion technology objects	80
Test commissioning functions	

	V D
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
 Number of configurable Traces 	4, Op to 312 ND of data per trace are possible
Interrupts/diagnostics/status information	4, Op to 312 ND of data per trace are possible
<u> </u>	4, Op to 312 ND of data per trace are possible
Interrupts/diagnostics/status information	Yes
Interrupts/diagnostics/status information Diagnostics indication LED	
Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED	Yes
Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED	Yes Yes
Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED	Yes Yes Yes
Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX	Yes Yes Yes
Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX Supported technology objects	Yes Yes Yes Yes
Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX Supported technology objects	Yes Yes Yes Yes Yes Yes Yes
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources	Yes Yes Yes Yes Yes Yes Yes Yes Yes The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks)	Yes Yes Yes Yes Yes Yes Yes Yes Yes The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources — per speed-controlled axis	Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources — per speed-controlled axis — per positioning axis	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis	Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per positioning axis per external encoder per output cam per cam track	Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80 20
Interrupts/diagnostics/status information Diagnostics indication LED RUN/STOP LED ERROR LED MAINT LED Connection display LINK TX/RX Supported technology objects Motion Control Number of available Motion Control resources for technology objects (except cam disks) Required Motion Control resources per speed-controlled axis per positioning axis per synchronous axis per external encoder per output cam	Yes Yes Yes Yes Yes Yes Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80 20 160

 Number of positioning axes at motion control cycle of 4 ms (typical value) 	5
 Number of positioning axes at motion control cycle of 8 ms (typical value) 	10
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 repair time of 100 hours)

— Low demand mode: PFDavg in

accordance with SIL3

— High demand/continuous mode: PFH in

accordance with SIL3

< 2.00E-05

< 1.00E-09

Ambient conditions

Ambient temperature during operation

• horizontal installation, min. 0 °C

• horizontal installation, max. 60 °C; Display: 50 °C, at an operating temperature of typically 50

°C, the display is switched off

• vertical installation, min. 0 °C

• 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

Configuration

Programming

Programming language

LADYes; incl. failsafeYes; incl. failsafe

— STL Yes

— SCL— GRAPHYesYes

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
 Protection level: Read/write protection 	Yes
 Protection level: Complete protection 	Yes
Cycle time monitoring	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	430 g