SIEMENS

Data sheet

6ES7515-2FM01-0AB0



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	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]	6.1 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	165
Mains/voltage failure stored energy time	5 ms
Repeat rate, min.	1/s
• Repeat fate, filli.	113
Input current	
Current consumption (rated value)	0.8 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	6.2 W
(balanced)	
Power loss	
Power loss, typ.	6.3 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	7FO librato
• integrated (for program)	750 kbyte
• integrated (for data)	3 Mbyte
Load memory	00 Ob. 4-
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	V
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	30 ns
for word operations, typ.	36 ns
for fixed point arithmetic, typ.	48 ns
for floating point arithmetic, typ.	192 ns
CPU-blocks	
Number of elements (total)	6 000; 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.	3 Mbyte; For non-optimized block accesses, the max. size of the DB 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 	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	A / L P % LL W
• Number	Any (only limited by the main memory)
Retentivity	Voc
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags),	512 kbyte; In total; available retentive memory for bit memories,
max.	timers, counters, DBs, and technology data (axes): 472 KB
Extended retentive data area (incl. timers, counters,	3 Mbyte; When using PS 60W 24/48/60V DC HF
flags), max.	

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 orga	
Address area Number of IO modules	8 192; max. number of modules / submodules
I/O address area	o 102, max. Hamber of modules / submodules
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	52 kbyte, 7 iii outputs are iii the process image
	8 kbyte
— Inputs (volume)	
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
Hardware configuration	
Number of distributed IO systems	64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
● Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	2
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
Modules per rack, max.	32; CPU + 31 modules
 Number of lines, max. 	1
PtP CM	
Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
 Type 	Hardware clock

Deviation per day, max. Operating hours counter Number Supported Supported Number In AS, master In AS, slave In AS, slave Interface Inte	Backup time	6 wk; At 40 °C ambient temperature, typically
Operating hours counter Number Number Number Number 16 Clock synchronization Supported In AS, slave In AS, slave Interfaces Number of PROFINET interfaces Number of PROFINET interfaces Number of ports Integrated switch R1 45 (Ethernet) PROFINET IO Controller PROFINET IO Device SiMATIC communication Open IE communication Wes server Media redundancy PROFINET IO Controller Services PG/OP communication PS 7 routing - S7 routing - S7 routing - IRT - MRP MRP PROFlenergy PROFINET OD evices on the reduction of the reduct	·	
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 Interface types Number of ports 2 integrated switch Yes X 45 (Ethernet) Yes; X1 Protocols Protocols Profinet Io Controller Yes SIMATIC communication Yes Open IE communication Yes Media redundancy Yes Media redundanc	· · ·	
supported in AS, master in AS, slave interfaces Interfaces		16
supported in AS, master in AS, slave interfaces Interfaces	Clock synchronization	
in AS, master in AS, slave on Ethernet via NTP Yes Interfaces Number of PROFINET interfaces 2 Interface Interface types 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; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PCO/OP communication Yes Open IE communication Yes Media redundancy Yes; MRP Poutomanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PC/OP communication Yes - PS routing - Isochronous mode - Open IE communication Yes - PS revices PROFINET OF Controller Services PROFINET OF Controller PROFINET OF CONTR		Yes
interfaces Number of PROFINET interfaces 2 Interface Vyes Number of ports integrated switch 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 PROFINET IO Controller PROFINET IO Controlle	• •	Yes
Number of PROFINET interfaces 2	● in AS, slave	Yes
Number of PROFINET interfaces 1. Interface 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 — Open IE communication — S7 routing — IRT — MRP — MRP — MRP — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — Yes; Rax. 32 PROFINET devices — Prioritized startup — Number of connectable IO Devices, max. — Number of connectable IO Devices, max. — Number of connectable IO Devices for RT, 12 2 12 2 2 3 4 4 5 4 5 6 4 7 4 5 6 7 6 7 6 7 6 7 7 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 8		Yes
Interface Interface types Number of ports Integrated switch RJ 45 (Ethernet) Protocols PROFINET IO Controller PROFINET IO Controller PROFINET IO Communication Open IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes Open IE communication Yes PROFINET IO Controller Services PG/OP communication Yes Open IE communication Yes PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Yes Open IE communication Yes Open IE communication Yes Open IE communication Yes Res Popen IE communication Yes Profile communication Yes Res PROFINET Yes Res PROFINET Yes Res Profile communication Yes Res PROFINET Yes Requirement: IRT Yes Profile startup Profilized startup Profile startup Number of connectable IO Devices, max. Polymber of connectable IO Devices for RT,	Interfaces	
Interface types Number of ports Integrated switch RJ 45 (Ethernet) Protocols Protocols PROFINET IO Controller PROFINET IO Device SIMATIC communication Popen IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PROFINET Wes Prototic of the first Services PG/OP communication Yes PROFINET Yes Prototic of the first Service of the first Ser	Number of PROFINET interfaces	2
Interface types Number of ports Integrated switch RJ 45 (Ethernet) Protocols Protocols PROFINET IO Controller PROFINET IO Device SIMATIC communication Popen IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PROFINET IO Controller Services PG/OP communication Yes PROFINET Wes Prototic of the first Services PG/OP communication Yes PROFINET Yes Prototic of the first Service of the first Ser	1. Interface	
integrated switch RJ 45 (Ethernet) Yes; X1 Protocols IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Yes Open IE communication Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Serv		
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 PGPOP communication Yes PGPOP communication Yes PGPOP communication Yes PROFINET IO Controller Services PG/OP communication Yes PS routing Pes Popen IE communication Yes Pes Popen IE communication Yes Profile Communication Yes PROFINET Yes Popen IE communication Yes PROFINET Yes PROFINET Yes Pes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 PROFINET PROFINET Yes PROFINET Source PROFINET Source PROFINET Source PROFINET Source PROFIBUS Or PROFINET PROFIBUS Or PROFINET PROFIBUS Or PROFINET	Number of ports	2
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 PG/OP communication Yes PS7 routing Psochronous mode Popen IE communication Yes Popen IE communication Yes Profinet IO Controller Services PG/OP communication Yes Psochronous mode Yes Popen IE communication Yes Popen IE communication Yes Pischronous mode Pres; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD PROFIenergy Prioritized startup Prioritized startup Number of connectable IO Devices, max. PNUmber of connectable IO Devices for RT, PROFIBUS or PROFINET	• integrated switch	Yes
IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes Services PG/OP com	• RJ 45 (Ethernet)	Yes; X1
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 PS Requirement: IRT Yes PROFI nergy Yes; Requirement: IRT PROFI nergy Yes; Max. 32 PROFINET devices 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. PNumber of connectable IO Devices for RT,	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 PROFOP communication Yes Services PROPICE COMMUNICATION Yes Services	• 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 Yes Sorrices PG/OP communication Yes Isochronous mode Yes Open IE communication Yes NRP 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. Of which IO devices with IRT, max. Number of connectable IO Devices for RT, 64 Number of connectable IO Devices for RT, 256	 PROFINET IO Controller 	Yes
Open IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes Yes Services PG/OP communication Yes Yes Services Pessort Testing	PROFINET IO Device	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 — 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. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 256 	 SIMATIC communication 	Yes
● Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRP - MRP - MRP - MRP - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Number of connectable IO Devices for RT, - MRP - Media redundancy - Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PG/OP communication - Yes - Yes - Yes - Number of connectable IO Devices, max. Yes - MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - SRP Automanager according to IEC 62439-2 Edition 2.0 Yes - Pservices - Yes - Yes - S MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - SP MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - PS MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edition 2.0 Yes - ST MRP Automanager according to IEC 62439-2 Edit	 Open IE communication 	Yes
PROFINET IO Controller Services - PG/OP communication	• 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. 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 Number of connectable IO Devices for RT, - 256	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 — MRPD — 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. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 256 	PROFINET IO Controller	
 — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — MRPD — MRPD — 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 — Yes; Max. 32 PROFINET — PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, — 256 	Services	
 Isochronous mode Open IE communication IRT MRP MRP Tes; 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. Of which IO devices with IRT, max. Number of connectable IO Devices for RT, Number of connectable IO Devices for RT, 256 	— PG/OP communication	Yes
 Open IE communication IRT 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. 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. Number of connectable IO Devices for RT, 256 	— 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, — Number of connectable IO Devices for RT, Yes Yes; Requirement: IRT Yes; Max. 32 PROFINET devices 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, 256	— 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. 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. Number of connectable IO Devices for RT, 256 	 Open IE communication 	Yes
number of devices in the ring: 50 - MRPD Yes; Requirement: IRT - PROFlenergy Yes - Prioritized startup - 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 Number of connectable IO Devices for RT, 256	— 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, — See Support See Suppo	— MRP	
 — Prioritized startup — Number of connectable IO Devices, max. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, Yes; Max. 32 PROFINET devices 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. — Number of connectable IO Devices for RT, 	— MRPD	Yes; Requirement: IRT
 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. Number of connectable IO Devices for RT, 256; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 64 256 	— PROFlenergy	Yes
via AS-i, PROFIBUS or PROFINET — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, 256	— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices for RT, 256	— Number of connectable IO Devices, max.	
	— Of which IO devices with IRT, max.	64
max.	— Number of connectable IO Devices for RT,	256
	max.	

— of which in line, max.	256
 Number of IO Devices that can be 	8; in total across all interfaces
simultaneously activated/deactivated, max.	
 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	$250~\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of $500~\mu s$ 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
— 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 	4
device, max.	
Asset management record	Yes; Per user program
2. Interface	
Interface types	
Number of ports	1
• integrated switch	No Va
• RJ 45 (Ethernet)	Yes; X2

Protocols	
• IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
 SIMATIC communication 	Yes
Open IE communication	Yes
Web server	Yes
Media redundancy	No
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT	No
— MRP	No
— MRPD	No
— PROFlenergy	Yes
 Prioritized startup 	No
— 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
 Number of connectable IO Devices for RT, max. 	32
— of which in line, max.	32
 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 RT	
— for send cycle of 1 ms	1 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT	No
— MRP	No
— MRPD	No
— PROFlenergy	Yes

 Prioritized startup 	No
— Shared device	Yes
 Number of IO Controllers with shared 	4
device, 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

 Autocrossing 	Yes
Industrial Ethernet status LED	Yes
Protocols	
Number of connections	
Number of connections, max.	192; 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 	108
 Number of S7 routing paths 	16
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
Open IE communication	Yes

1 G/GI Communication	,
— 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
• 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 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 time, min.	100 ms
— Send time, min.	200 ms
 Number of server methods, max. 	50
 Number of inputs/outputs per server method, max. 	20
— Number of monitored items, max.	2 000; For 1 s sampling interval and 1 s send interval

Niverban of companint of con-	10
Number of server interfaces, max.	
 Number of nodes for user-defined server interfaces, max. 	5 000
,	
Further protocols	Ver MODRIG TOD
• 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 500 µs
to terminal)	
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	10 000
Number of simultaneously active program alarms	
 Number of program alarms 	600
 Number of alarms for system diagnostics 	200
 Number of alarms for motion technology 	160
objects	
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering
	systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	8
Status/control	
Status/control variable	Yes
 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.	3 200
— of which powerfail-proof	500
Traces	
110000	

Interrupts/diagnostics/status information Diagnostics indication LED • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX Pes

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 	2 400	
for technology objects (except cam disks)		
 Required Motion Control resources 		
— per speed-controlled axis	40	
— per positioning axis	80	
— per synchronous axis	160	
— per external encoder	80	
— per output cam	20	
— per cam track	160	
— per probe	40	
 Positioning axis 		
 Number of positioning axes at motion 	7	
control cycle of 4 ms (typical value)		
 Number of positioning axes at motion 	14	
control cycle of 8 ms (typical value)		
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 	< 2.00E-05	
 High demand/continuous mode: PFH in accordance with SIL3 	< 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
onfiguration	
Programming	
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
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	70 mm
Height	147 mm
Depth	129 mm

Weights	
Weight, approx.	830 g

last modified: 08/24/2018