SIEMENS

Data sheet

6ES7516-3FN01-0AB0



SIMATIC S7-1500F, CPU 1516F-3 PN/DP, Central processing unit with work memory 1.5 MB for program and 5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 3rd interface: PROFIBUS, 10 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1516F-3 PN/DP
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	100
Mains/voltage failure stored energy time	5 ms
Repeat rate, min.	1/s
Trepeatrate, min.	
Input current	
Current consumption (rated value)	0.85 A
Inrush current, max.	2.4 A; Rated value
l ² t	$0.02 \text{ A}^2 \cdot \text{s}$
Power	
Infeed power to the backplane bus	12 W
Power consumption from the backplane bus	6.7 W
(balanced)	
Power loss	
Power loss, typ.	7 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	1.5 Mbyto
• integrated (for program)	1.5 Mbyte
• integrated (for data)	5 Mbyte
Load memory	22 Ch. 4-
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	Yes
maintenance-free	165
CPU processing times	
for bit operations, typ.	10 ns
for word operations, typ.	12 ns
for fixed point arithmetic, typ.	16 ns
for floating point arithmetic, typ.	64 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.	5 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	22.03.00
Number range	0 65 535
• Size, max.	1 Mbyte
- OIZE, IIIdA.	,

FC	
Number range	0 65 535
• Size, max.	1 Mbyte
OB	
• Size, max.	1 Mbyte
 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 250 μs
 Number of process alarm OBs 	50
Number of DPV1 alarm OBs	3
 Number of isochronous mode OBs 	2
 Number of technology synchronous alarm OBs 	2
 Number of startup OBs 	100
 Number of asynchronous error OBs 	4
 Number of synchronous error OBs 	2
 Number of diagnostic alarm OBs 	1
Nesting depth	
• per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags),	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, flags), max.	5 Mbyte; When using PS 60W 24/48/60V 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
Address area	
Number of IO modules	8 192; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
Number of subprocess images, max.	32
Hardware configuration	
Number of distributed IO systems	64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	· · · · · · · · · · · · · · · · · · ·
• integrated	1
• 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	

Packup time Backup time Backu		
Operating hours counter ● Number 16 (Clock synchronization Yes Yes • to DP, master Yes • in AS, slave Yes • on Ethernet via NTP Yes Interfaces Yes Number of PROFINET interfaces 2 Number of PROFIBUS interfaces 1 Interface Number of ports 2 • integrated switch Yes Yes • Number of PROFINET interfaces 2 Number of PROFINET interfaces 1 Interface Yes Yes • Number of PROFINET interfaces 2 Number of PROFIBUS interfaces 1 Interface Yes Yes • Number of ports 2 • Integrated switch Yes Yes • RJ 45 (Ethernet) Yes; X1 Protocols IP protocol Yes; IPv4 • PROFINET IO Controller Yes • PROFINET IO Device Yes • SIMATIC communication Yes • Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Yes • Media redundancy Yes • Marp Yes As MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50 • MRPD Yes; Requirement; IRT Yes • Marp Yes; Marx 32 PROFINET devices • Prioritized startup Yes; Marx 32 PROFINET devices • Prioritized startup Yes; Marx 32 PROFINET devices	• Type	Hardware clock
Operating hours counter	·	
Number 16 Clock synchronization supported Yes 1 to DP, master Yes 1 in AS, master Yes 2 in AS, slave Yes 3 on Ethernet via NTP Yes 1 Interfaces Number of PROFINET interfaces 2 Number of PROFIBUS interfaces 1 I. Interface Interface Interface Yes 1 Number of ports 2 1 interface Yes 1 RJ 45 (Ethernet) Yes, X1 Protocols 1 Protocol Yes, IPv4 1 PROFINET IO Controller Yes 2 SIMATIC communication Yes 3 SIMATIC communication Yes 4 Media redundancy Yes MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Yes 5 Media redundancy Yes 5 Media redundancy Yes 5 Media redundancy Yes 5 Media redundancy Yes 6 Media redundancy Yes 7 Noting Yes 7 Noting Yes 8 Noting Yes 9 Noting Yes 1 Noting Yes 2 Noting Yes 3 Noting Yes 4 Noting Yes		10 s; Typ.: 2 s
Clock synchronization • supported • to DP, master • in AS, master • in AS, slave • on Ethernet via NTP Interfaces Number of PROFINET interfaces Number of PROFIBUS interfaces 1 1. Interface lypes • Number of ports • integrated switch • RJ 45 (Ethernet) Protocols • IP protocol • IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Web server • Media redundancy PROFINET IO Controller Services — PG/OP communication — S' routing — Isochronous mode — Open IE communication — S' routing — Isochronous mode — Open IE communication — Yes — NamP — MRP — MRP — MRPD — PROFINET IO To Verice signal mass. — PROFINET greated startup — PROFINET of Openice of Vesical mass. — PROFINET of Openice of Vesical mass. — MRPD — PROFINET of Openication — Yes — MRPD — PROFINET of Openication — Yes — Profiting Yes — PROFINET of Openication — Yes — MRPD — PROFINET of Openication — Yes — MRPD — Yes; Requirement: IRT — Yes — PROFINET of Openication of Vesical mass. — Number of devices in the ring: 50 — PROFINET of Openication Yes; Requirement: IRT — PROFINET of Yes; Requirement: IRT — Yes; Requirement: IRT — Yes; Requirement: IRT — PROFINET of Openication Yes; Max. 32 PROFINET devices — Profitized startup — Number of connectable IO Devices, max. — 266: In total, up to 1 000 distributed I/O devices can be connected	Operating hours counter	
• supported • to DP, master • to DP, master • in AS, master • in AS, slave • on Ethernet via NTP Ves		16
• to DP, master • in AS, master • in AS, slave • in AS, slave • on Ethernet via NTP Ves	Clock synchronization	
in AS, master in AS, slave	• supported	
in AS, slave on Ethernet via NTP res Interfaces Number of PROFINET interfaces 2 Number of PROFIBUS interfaces 1 I. Interface Interface Interface Interface types Number of ports integrated switch FRJ 45 (Ethernet) Protocols IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Ves Open IE communication Ves Media redundancy PROFINET IO Controller Services PROFONET IO Controller Yes Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Open IE communication Yes Open IE communication Yes Nes PGROP communication Yes PROFINET IO Controller Services PROFONET IO Controller Services PROFONET IO Controller Yes Services PROFONET IO Controller Yes Services PROFONET IO Controller Yes Services PROFONET IO Controller Services PROFONET IO Controller Yes PROFINET IO CONTROLLER PROFINE	• to DP, master	Yes
on Ethernet via NTP Yes Interfaces Number of PROFIBUS interfaces 2 Number of PROFIBUS interfaces 1 1. Interface Interface Interface types Number of ports 2 integrated switch Yes 4 PJ 45 (Ethernet) Yes: X1 Protocols IP protocol Yes; IPv4 PROFINET IO Controller Yes PROFINET IO Device Yes SIMATIC communication Yes Open IE communication Yes Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Open IE communication Yes Media redundancy Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication 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 Yes: Requirement: IRT PROFlenergy 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	● in AS, master	Yes
Interfaces Number of PROFIBET interfaces 2 Number of PROFIBUS interfaces 1 I. Interface Interface Interface types • Number of ports • Integrated switch • RJ 45 (Ethernet) Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device • PSIMATIC communication • Open IE communication • Web server • Media redundancy PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — IRT — MRP — PROFINET IO Tourice Yes — PROFINET IO Controller Yes — MRP — MRP — MRP — MRP — MRP — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — Yes; Requirement: IRT — PROFInergy — Prioritized startup — Prioritized startup — Number of connectable IO Devices, max. 256; In total, up to 1 000 distributed I/O devices can be connected	• in AS, slave	Yes
Number of PROFINET interfaces Number of PROFIBUS interfaces 1. Interface Interface types Number of ports Interface types Number of PROFINET Interface Interface types Interface	• on Ethernet via NTP	Yes
Number of PROFIBUS interfaces 1	Interfaces	
Interface ypes • Number of ports • Number of ports • Integrated switch • RJ 45 (Ethernet) Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Evice • SIMATIC communication • Web server • Media redundancy • Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - S7 routing - IRT - MRP - PROFINET IO - PROFInergy - PROFINET IO - PROFINET IO - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - MRPD - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - MRPD - PROFINET IO - MRPD - PROFINET IO - PROFINET IO - MRPD - M		2
Interface types Number of ports Integrated switch Integrated swit	Number of PROFIBUS 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; MRP Automanager according to IEC 62439-2 Edition 2.0 PROFINET IO Controller Services PG/OP communication Yes Services PG open IE communication Yes Services PG/OP communication Yes Soervices PG open IE communication Yes Isochronous mode Yes Open IE communication Yes HRT MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50 MRPD PROFIenergy Yes Requirement: IRT PROFIenergy Yes Max. 32 PROFINET devices Number of connectable IO Devices, max. 	1. Interface	
integrated switch RJ 45 (Ethernet) Protocols IP protocol PROFINET IO Controller PROFINET IO Device SiMATIC communication Web server Media redundancy PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — Yes — MRP — MRP — MRP — MRP — Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFINET Wes; Max. 32 PROFINET devices — PROFINET get a factor of the ring: 50 — MRPD — Prioritized startup — Number of connectable IO Devices, max. Yes; Max. 32 PROFINET devices Proficial can be connected and	Interface types	
RJ 45 (Ethernet) Protocols IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SiMATIC communication Pes Open IE communication Web server Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes PS routing Ps services PG/OP communication Yes PS routing PROFINET IO Controller Services PROFINET IO Controller Yes Requirement: IRT PROFILE IN TO Service	Number of ports	2
Protocols IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Pes Web server Media redundancy PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Communication Yes PROFINET IO Controller Services PROFINET IO Controller Services PROFINET IO Communication Yes Prioritized startup PROFILE Communication Yes PROFILE COMMUNICATIO	• integrated switch	Yes
IP protocol PROFINET IO Controller PROFINET IO Device PROFINET IO Device SIMATIC communication Pess Open IE communication Yes Media redundancy PROFINET IO Controller Services PG/OP communication Yes PG/OP communication Yes Popen IE communication Yes PS routing Pess Pess Popen IE communication Yes Profile communication Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 PROFIlenergy Prioritized startup Profilized startup Profilized startup Number of connectable IO Devices, max. 256; In total, up to 1 000 distributed I/O devices can be connected	• 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 Yes Services PG/OP communication Yes Sorvices PG/OP communication Yes Sorvices PG/OP communication Yes Open IE communication Yes Open IE communication Yes MRP Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 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	Protocols	
PROFINET IO Device SIMATIC communication Yes Open IE communication Yes Media redundancy PROFINET IO Controller Services - PG/OP communication Yes - Isochronous mode - IRT - MRP - MRPD - MRPD - MRPD - PROFILE one services, max. PYes - Prioritized startup - Number of connectable IO Devices, max. Yes - SIMATIC communication Yes - Yes - MRP - Yes - As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 - MRPD - Yes; Requirement: IRT - Yes - Prioritized startup - Number of connectable IO Devices, max. 256; In total, up to 1 000 distributed I/O devices can be connected	• IP protocol	Yes; IPv4
 SIMATIC communication Open IE communication 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 Yes IRT 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. 256; In total, up to 1 000 distributed I/O devices can be connected	 PROFINET IO Controller 	Yes
 Open IE communication 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 Yes IRT 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. 256; In total, up to 1 000 distributed I/O devices can be connected	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 — MRPD — PROFIenergy — PROFIenergy — PROFIenergy — Prioritized startup — Number of connectable IO Devices, max. 	 SIMATIC communication 	Yes
Media redundancy PROFINET IO Controller Services - PG/OP communication - S7 routing - Isochronous mode - Open IE communication - IRT - MRP - MRP - MRPD - MRPD - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max. Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 Yes Yes Yes Yes Yes Yes Yes Ye	 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.	• 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	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 — Yes; Requirement: IRT — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. Yes — 256; In total, up to 1 000 distributed I/O devices can be connected 	PROFINET IO Controller	
 S7 routing Isochronous mode Open IE communication IRT MRP MRP Tedundancy manager and/or MRP client; max. number of devices in the ring: 50 MRPD PROFlenergy Prioritized startup Number of connectable IO Devices, max. 	Services	
 — Isochronous mode — Open IE communication — IRT — MRP — MRPD — MRPD — Wes; 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 — Number of connectable IO Devices, max. 	— 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 MRPD Yes; Requirement: IRT PROFlenergy Prioritized startup Number of connectable IO Devices, max. Yes Yes Yes; Max. 32 PROFINET devices 256; In total, up to 1 000 distributed I/O devices can be connected	— S7 routing	Yes
 — IRT — 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. Yes 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	— 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 256; In total, up to 1 000 distributed I/O devices can be connected 	— Open IE communication	Yes
number of devices in the ring: 50	— IRT	Yes
 — PROFlenergy — Prioritized startup — Number of connectable IO Devices, max. Yes Yes; Max. 32 PROFINET devices 256; In total, up to 1 000 distributed I/O devices can be connected 	— MRP	
 — Prioritized startup — Number of connectable IO Devices, max. Yes; Max. 32 PROFINET devices 256; In total, up to 1 000 distributed I/O devices can be connected 	— MRPD	Yes; Requirement: IRT
— Number of connectable IO Devices, max. 256; In total, up to 1 000 distributed I/O devices can be connected	— PROFlenergy	Yes
	— Prioritized startup	Yes; Max. 32 PROFINET devices
	— Number of connectable IO Devices, max.	

Of which IO devices with IRT, max.	64
Number of connectable IO Devices for RT,	256
max.	256
— of which in line, max.	8; in total across all interfaces
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	o, iii totai across ali iiiteriaces
 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 device, max. 	4
Asset management record	

2. Interface

Interface types

• Number of parts	1
Number of ports into writed a witch	No
• integrated switch	
• RJ 45 (Ethernet) Protocols	Yes; X2
	Yes; IPv4
IP protocol PROFINET IO Controller	Yes
PROFINET IO Controller	
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 device, max. 	4
— Asset management record	Yes; Per user program

3. Interface	
Interface types	
Number of ports	1
• RS 485	Yes; X3
Protocols	
 PROFIBUS DP master 	Yes
 PROFIBUS DP slave 	No
 SIMATIC communication 	Yes

Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
 Autonegotiation 	Yes
 Autocrossing 	Yes
 Industrial Ethernet status LED 	Yes
RS 485	
Transmission rate, max.	12 Mbit/s

Protocols	
Number of connections	
Number of connections, max.	256; 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 	128
 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 	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
Redundancy mode	devices, and on the quality of configured user data
— MRP	Yes; As MRP redundancy manager and/or MRP client; max.
— IVII (I	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, 	Yes
supported	
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
PROFIBUS DP master	
Number of connections, max.	48; for the integrated PROFIBUS DP interface
Services	
— PG/OP communication	Yes
— S7 routing	Yes

Data record routing	Yes
Isochronous mode	Yes
— Equidistance	Yes
— Number of DP slaves	125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
 Activation/deactivation of DP slaves 	Yes
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
 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
 Number of server interfaces, max. 	10
 Number of nodes for user-defined server interfaces, max. 	5 000
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 375 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	10 000
Number of simultaneously active program alarms	600
 Number of program alarms 	600

 Number of alarms for system diagnostics 	200
Number of alarms for motion technology	160
objects	

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	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
nterrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
 Connection display LINK TX/RX 	Yes
Supported technology objects	
Motion Control Number of available Motion Control resources	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 2 400
for technology chicate (except com disks)	2 100

Supported technology objects	
Yes; Note: The number of axes affects the cycle time of the PLC	
program; selection guide via the TIA Selection Tool or SIZER	
2 400	
40	
80	
160	
80	

— per output cam	20
— per cam track	160
— per probe	40
Positioning axis	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	7
 Number of positioning axes at motion control cycle of 8 ms (typical value) 	14
Controller	
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 temperature during operation		
0 °C		
60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off		
0 °C		
40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off		
Ambient temperature during storage/transportation		
-40 °C		
70 °C		

Configuration	
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.	845 g
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