# **SIEMENS**

#### Data sheet

### 6ES7516-3AN01-0AB0



SIMATIC S7-1500, CPU 1516-3 PN/DP, Central processing unit with Work memory 1 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 1516-3 PN/DP
HW functional status	FS03
Firmware version	V2.5
Engineering with	
<ul> <li>STEP 7 TIA Portal configurable/integrated as of version</li> </ul>	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, film.	113
Input current	
Current consumption (rated value)	0.85 A
Inrush current, max.	2.4 A; Rated value
l²t	0.02 A²·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 Mbyta
• integrated (for program)	1 Mbyte
• integrated (for data)	5 Mbyte
Load memory	00 Ob. 4.
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	W
maintenance-free	Yes
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
<b>C</b>	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
FD.	DB is 64 KB
FB	0 65 525
Number range	0 65 535
• Size, max.	1 Mbyte

FC	
Number range	0 65 535
• Size, max.	1 Mbyte
ОВ	
• Size, max.	1 Mbyte
Number of free cycle OBs	100
Number of time alarm OBs	20
Number of delay alarm OBs	20
<ul> <li>Number of cyclic interrupt OBs</li> </ul>	20; With minimum OB 3x cycle of 250 µs
<ul> <li>Number of process alarm OBs</li> </ul>	50
<ul> <li>Number of DPV1 alarm OBs</li> </ul>	3
<ul> <li>Number of isochronous mode OBs</li> </ul>	2
<ul> <li>Number of technology synchronous alarm OBs</li> </ul>	2
<ul> <li>Number of startup OBs</li> </ul>	100
<ul> <li>Number of asynchronous error OBs</li> </ul>	4
<ul> <li>Number of synchronous error OBs</li> </ul>	2
<ul> <li>Number of diagnostic alarm OBs</li> </ul>	1
Nesting depth	
• per priority class	24
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
114go), 111an.	

Flag	
• Number, max.	16 kbyte
<ul> <li>Number of clock memories</li> </ul>	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
<ul> <li>Number of lines, max.</li> </ul>	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   •	• 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   2 PROFINET IO Controller   Yes   3 PROFINET IO Device   Yes   3 PROFINET IO Communication   Yes   4 PROFINET IO Communication   Yes   5 PROFINET IO Communication   Yes   5 PROFINET IO Controller   Yes   5 PROFINET IO Communication   Yes   5 PROFINET IO Communication   Yes   5 PROFINET IO Controller   Yes   5 PROFINET IO Communication   Yes   5 PROFINET IO Controller   Yes   5 PROFINET IO Communication   Yes   5 PROFINET IO Communication   Yes   5 PROFINET IO Communication   Yes   6 PROFINET IO Communication   Yes   7 PROFINET IO Controller   Yes   7 PROFINET IO Controller   Yes   8 PROFINET IO Controller   Yes   9 PROFINET IO Controller   Yes   1 PROFINET IO Controller   Yes   2 PROFINET IO Controller   Yes   2 PROFINET IO Controller   Yes   3 PROFINET IO Controller IO Devices   Yes   3 PROFINET IO Controller   Yes   4 PROFINET INTERCEDE INTERCED INTERCE		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 go of the redundancy manager and/or MRP client; max. number of devices in the ring: 50 — MRPD — PROFINET io Pevices, max. — 265: In total, up to 1000 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     PROFIenergy 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
<ul> <li>Number of ports</li> <li>integrated switch</li> <li>RJ 45 (Ethernet)</li> <li>Yes; X1</li> </ul> Protocols <ul> <li>IP protocol</li> <li>PROFINET IO Controller</li> <li>PROFINET IO Device</li> <li>SIMATIC communication</li> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0</li> </ul> PROFINET IO Controller Services <ul> <li>PG/OP communication</li> <li>Yes</li> <li>Services</li> <li>PG open IE communication</li> <li>Yes</li> <li>Services</li> <li>PG/OP communication</li> <li>Yes</li> <li>Soervices</li> <li>PG open IE communication</li> <li>Yes</li> <li>Isochronous mode</li> <li>Yes</li> <li>Open IE communication</li> <li>Yes</li> <li>HRT</li> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50</li> <li>MRPD</li> <li>PROFIenergy</li> <li>Yes</li> <li>Requirement: IRT</li> <li>PROFIenergy</li> <li>Yes</li> <li>Max. 32 PROFINET devices</li> <li>Number of connectable IO Devices, max.</li> </ul>	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	<ul><li>Number of ports</li></ul>	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 PROFINET IO Controller  Yes Prioritized startup Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 PROFINET IRT PROFIenergy Yes Prioritized startup Yes; Max. 32 PROFINET devices Number of connectable IO Devices, max.	• 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
<ul> <li>PROFINET IO Controller</li> <li>PROFINET IO Device</li> <li>Yes</li> <li>SIMATIC communication</li> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>PROFINET IO Controller</li> </ul> Services <ul> <li>PG/OP communication</li> <li>Yes</li> <li>Services</li> </ul> PG/OP communication <ul> <li>Yes</li> <li>Sorvices</li> </ul> PG/OP communication <ul> <li>Yes</li> <li>Sorvices</li> </ul> PG/OP communication <ul> <li>Yes</li> <li>Open IE communication</li> <li>Yes</li> <li>Open IE communication</li> <li>Yes</li> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> </ul> Yes; Requirement: IRT <ul> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> </ul> 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 American Services in the ring: 50 - MRPD - PROFILE one American Services in the ring: 50 - PROFILE one American Services in the ring: 50 - PROFILE one American Services in the ring: 50 - MRPD -	• IP protocol	Yes; IPv4
<ul> <li>SIMATIC communication</li> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0</li> </ul> PROFINET IO Controller Services <ul> <li>PG/OP communication</li> <li>S7 routing</li> <li>Isochronous mode</li> <li>Open IE communication</li> <li>Yes</li> <li>IRT</li> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> </ul> 256; In total, up to 1 000 distributed I/O devices can be connected	<ul> <li>PROFINET IO Controller</li> </ul>	Yes
<ul> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0</li> </ul> PROFINET IO Controller Services <ul> <li>PG/OP communication</li> <li>S7 routing</li> <li>Isochronous mode</li> <li>Open IE communication</li> <li>Yes</li> <li>IRT</li> <li>MRP</li> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> </ul> 256; In total, up to 1 000 distributed I/O devices can be connected	PROFINET IO Device	Yes
<ul> <li>● Web server</li> <li>● Media redundancy</li> <li>PROFINET IO Controller</li> <li>Services</li> <li>— PG/OP communication</li> <li>— S7 routing</li> <li>— Isochronous mode</li> <li>— Open IE communication</li> <li>— IRT</li> <li>— MRP</li> <li>— MRP</li> <li>— MRPD</li> <li>— PROFlenergy</li> <li>— PROFlenergy</li> <li>— PROFINET IO Cottroller</li> <li>Yes</li> <li>— Wes</li> <li>— Was</li> <li>— PROFINET Gevices in the ring: 50</li> <li>Yes; Requirement: IRT</li> <li>Yes; Requirement: IRT</li> <li>Yes; Max. 32 PROFINET devices</li> <li>— Number of connectable IO Devices, max.</li> </ul>	<ul> <li>SIMATIC communication</li> </ul>	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	<ul> <li>Open IE communication</li> </ul>	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
<ul> <li>— PG/OP communication</li> <li>— S7 routing</li> <li>— Isochronous mode</li> <li>— Open IE communication</li> <li>— IRT</li> <li>— MRP</li> <li>— MRP</li> <li>— Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>— MRPD</li> <li>— Yes; Requirement: IRT</li> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>Yes</li> <li>— 256; In total, up to 1 000 distributed I/O devices can be connected</li> </ul>	PROFINET IO Controller	
<ul> <li>S7 routing</li> <li>Isochronous mode</li> <li>Open IE communication</li> <li>IRT</li> <li>MRP</li> <li>MRP Tedundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>MRPD</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> </ul>	Services	
<ul> <li>— Isochronous mode</li> <li>— Open IE communication</li> <li>— IRT</li> <li>— MRP</li> <li>— MRPD</li> <li>— MRPD</li> <li>— Wes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>— MRPD</li> <li>— Yes; Requirement: IRT</li> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>Yes</li> <li>— Number of connectable IO Devices, max.</li> </ul>	— PG/OP communication	Yes
<ul> <li>Open IE communication</li> <li>IRT</li> <li>MRP</li> <li>MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>MRPD</li> <li>Yes; Requirement: IRT</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> </ul> Yes Yes Yes; Max. 32 PROFINET devices 256; In total, up to 1 000 distributed I/O devices can be connected	— S7 routing	Yes
<ul> <li>— IRT</li> <li>— MRP</li> <li>— Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>— MRPD</li> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> </ul> 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
<ul> <li>MRP</li> <li>Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50</li> <li>MRPD</li> <li>Yes; Requirement: IRT</li> <li>PROFlenergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>Yes; Max. 32 PROFINET devices</li> <li>256; In total, up to 1 000 distributed I/O devices can be connected</li> </ul>	— Open IE communication	Yes
number of devices in the ring: 50	— IRT	Yes
<ul> <li>— PROFlenergy</li> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>Yes</li> <li>Yes; Max. 32 PROFINET devices</li> <li>256; In total, up to 1 000 distributed I/O devices can be connected</li> </ul>	— MRP	
<ul> <li>— Prioritized startup</li> <li>— Number of connectable IO Devices, max.</li> <li>Yes; Max. 32 PROFINET devices</li> <li>256; In total, up to 1 000 distributed I/O devices can be connected</li> </ul>	— 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.	

<ul><li>Of which IO devices with IRT, max.</li></ul>	64
Number of connectable IO Devices for RT,	256
max.	256
— of which in line, max.	8; in total across all interfaces
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	o, iii totai across ali iiiteriaces
<ul> <li>Number of IO Devices per tool, max.</li> </ul>	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
<ul> <li>With IRT and parameterization of "odd" send cycles</li> </ul>	Update time = set "odd" send clock (any multiple of 125 $\mu$ s: 375 $\mu$ s, 625 $\mu$ s 3 875 $\mu$ 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
<ul><li>— Isochronous mode</li></ul>	No
<ul><li>— Open IE communication</li></ul>	Yes
— IRT	Yes
— MRP	Yes
— MRPD	Yes; Requirement: IRT
— PROFlenergy	Yes
— Shared device	Yes
<ul> <li>Number of IO Controllers with shared device, max.</li> </ul>	4
Asset management record	

## 2. Interface

## Interface types

• Number of parts	1
Number of ports	No
• integrated switch	
• RJ 45 (Ethernet)	Yes; X2
Protocols	Voca IDv4
• 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	
<ul><li>— PG/OP communication</li></ul>	Yes
— S7 routing	Yes
— Isochronous mode	No
<ul> <li>Open IE communication</li> </ul>	Yes
— IRT	No
— MRP	No
— MRPD	No
— PROFlenergy	Yes
<ul> <li>Prioritized startup</li> </ul>	No
<ul> <li>Number of connectable IO Devices, max.</li> </ul>	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	32
— of which in line, max.	32
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	8; in total across all interfaces
<ul> <li>Number of IO Devices per tool, max.</li> </ul>	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	
<ul><li>— PG/OP communication</li></ul>	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
<ul> <li>Number of IO Controllers with shared device, max.</li> </ul>	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
<ul> <li>PROFIBUS DP slave</li> </ul>	No
<ul> <li>SIMATIC communication</li> </ul>	Yes

Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
<ul> <li>Autonegotiation</li> </ul>	Yes
<ul> <li>Autocrossing</li> </ul>	Yes
<ul> <li>Industrial Ethernet status LED</li> </ul>	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
<ul> <li>Number of connections reserved for ES/HMI/web</li> </ul>	10
<ul> <li>Number of connections via integrated interfaces</li> </ul>	128
<ul> <li>Number of S7 routing paths</li> </ul>	16
SIMATIC communication	
<ul> <li>S7 communication, as server</li> </ul>	Yes
<ul> <li>S7 communication, as client</li> </ul>	Yes
<ul> <li>User data per job, max.</li> </ul>	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte

<ul> <li>several passive connections per port, supported</li> </ul>	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
PROFIBUS DP master	
Number of connections, max.	48; for the integrated PROFIBUS DP interface
Services	
— PG/OP communication	Yes
— S7 routing	Yes
<ul> <li>Data record routing</li> </ul>	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
<ul> <li>Activation/deactivation of DP slaves</li> </ul>	Yes
OPC UA	
Runtime license required	Yes
OPC UA-Server	Yes; Data access (read, write, subscribe), method call, custom address space
<ul> <li>Application authentication</li> </ul>	Yes
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password
— Number of sessions, max.	48
<ul> <li>Number of accessible variables, max.</li> </ul>	100 000
<ul> <li>Number of registerable nodes, max.</li> </ul>	20 000
— Sampling time, min.	100 ms
— Send time, min.	200 ms
<ul> <li>Number of server methods, max.</li> </ul>	50
<ul> <li>Number of inputs/outputs per server method, max.</li> </ul>	20
<ul> <li>Number of monitored items, max.</li> </ul>	2 000; 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
- Hamber of Stations in the fing, max.	30
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 simultaneously active program alarms	
<ul><li>Number of program alarms</li></ul>	600
<ul> <li>Number of alarms for system diagnostics</li> </ul>	200
<ul> <li>Number of alarms for motion technology</li> </ul>	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	
<ul> <li>Status/control variable</li> </ul>	Yes
<ul><li>Variables</li></ul>	Inputs/outputs, memory bits, DBs, distributed I/Os, timers,
	counters
<ul> <li>Number of variables, max.</li> </ul>	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
• Forcing, variables	Peripheral inputs/outputs
<ul> <li>Number of variables, max.</li> </ul>	200
Diagnostic buffer	
• present	Yes
<ul> <li>Number of entries, max.</li> </ul>	3 200
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes

MAINT LED	Yes
<ul> <li>Connection display LINK TX/RX</li> </ul>	Yes

Connection display Livit 17/100	
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
<ul> <li>Number of available Motion Control resources for technology objects (except cam disks)</li> </ul>	2 400
Required Motion Control resources	40
— per speed-controlled axis	80
— per positioning axis	
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
<ul><li>Positioning axis</li></ul>	
<ul> <li>Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	7
<ul> <li>Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	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
Ambient conditions	
Ambient temperature during operation	
<ul><li>horizontal installation, min.</li></ul>	0 °C
<ul> <li>horizontal installation, max.</li> </ul>	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	

— LAD

Yes

— FBD	Yes
— 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
<ul> <li>Protection level: Write protection</li> </ul>	Yes
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
<ul> <li>Protection level: Complete protection</li> </ul>	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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