SIEMENS

Data sheet

6ES7513-1AM03-0AB0



SIMATIC S7-1500, CPU 1513-1 PN, central processing unit with work memory 600 KB for program and 2.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 25 ns bit performance, SIMATIC Memory Card required **** approvals and certificate according to entry 109815653 at support.industry.siemens.com to be observed! ****

General information	
Product type designation	CPU 1513-1 PN
HW functional status	FS01
Firmware version	V3.0
Product function	
• I&M data	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 μs (distributed) and 1 ms (central)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V18 (FW V3.0); with older TIA Portal versions configurable as 6ES7513- 1AL02-0AB0
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	8
Mode buttons	2
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
 Repeat rate, min. 	1/s
Input current	
Current consumption (rated value)	0.73 A
Current consumption, max.	0.9 A
Inrush current, max.	1.15 A; Rated value
² t	0.5 A ² ·s
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus (balanced)	5.5 W
Power loss	
Power loss, typ.	7.5 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	

 integrated (for program) 600 kkyte 25 Mkyte Lead memory Plug-In (SIMATIC Memory Card), max. 32 Gbyte Backup initintanance-free Yes CPU processing times for bit operations, typ. 25 ns for word operations, typ. 170 ns CPU-bit cathered in the second s	
Lead memory ● Plug-in (SIMATIC Memory Card), max. 32 Gbyte Backup • maintenance-free Yes (PU processing times) 55 ns 5 for word operations, typ. 32 ns 5 for word operations, typ. 32 ns 5 for word operations, typ. 32 ns 5 for detating point arithmetic, typ. 42 ns 5 Vestores 170 ns 25 CPU brocks 000; Blocks (OB, FB, FC, DB) and UDTs 00 DB 1 60 999; subdivided into: number range that can be used by 1 user: 1 59 999, and number range of DBs created via SFC 66 60 999 • Size, max. 2.5 Mbyte; For DBs with absolute addressing, the max. size is 6 FB • Number range 0 65 535 600 kbyte • Number range 0 65 535 600 kbyte • Size, max. 600 kbyte 00 • Size, max. 600 kbyte 00 • Number of thre exple OBS 100 100 • Number of thre exple OBS 20 100 • Number of thre size and OBS 20 100 • Number of thre size and OBS 20 100 <t< td=""><td></td></t<>	
• Plug-in (SIMATIC Memory Card), max. 32 Gbyte Backup • naintenance-free Yes CPU processing times 52 ns 57 ns for bit operations, typ. 32 ns 57 ns for fixed point arithmetic, typ. 42 ns 57 ns for fixed point arithmetic, typ. 42 ns 57 ns CPU-blocks 70 ns CPU-blocks Number of elements (total) 4 000; Blocks (OB, FB, FC, DB) and UDTs 70 ns DB 1 60 999; subdivided into: number range that can be used by 1 user: 1 59 999, and number range that can be used by 1 user: 1 59 999, and number range that can be used by 1 user: 1 59 999, and number range that can be used by 1 user: 1 50 999, and number range that can be used by 1 user: 1 56 999, and number range • Number range 0 65 535 • Size, max. 25 Mbyte; For DBs with absolute addressing, the max. size is 64 FE • Number of time alarm OBS 20 • Number of time alarm OBS 20 • Number of proceed DBS 20 • Number of DPV1 alarm OBS 20 • Number of isochronous mode OBS 2 • Number of disochronous mode OBS 2 • Number of disochronous mode OBS 2 •	
Backup • maintenance-free Yes CPU processing times	
• maintenance-free Yes CPU processing times	
CPU processing times for bit operations, typ. 25 ns for word operations, typ. 32 ns for fixed point arithmetic, typ. 42 ns for floating point arithmetic, typ. 10 ns CPU-blocks Number of elements (tota) DB • Number of elements (tota) DB • Number range • Number range • Size, max. • Size, max. • Size, max. • Number range • Number range • Size, max. • Size, max. • Number range • Size, max. • Out, 65 535 • Size, max. • Size, max. • Out, 65 535 • Size, max. • Size, max. • Size, max. • Number range • Number of free cycle OBs • Number of span= OBS • Number of cyclic	
for bit operations, typ. 25 ns for word operations, typ. 32 ns for fixed point arithmetic, typ. 170 ns CPU-blocks Value of elements (total) DB 4 000; Blocks (OB, FB, FC, DB) and UDTs DB 1 60 999; subdivided into: number range that can be used by 1 user 1 59 999, and number range of DBs created via SFC 66 60 999 • Size, max. 2.5 Mbyte; For DBs with absolute addressing, the max. size is 64 FB 0 65 535 • Size, max. 600 kbyte FC • Number range • Size, max. 600 kbyte OB 0 65 535 • Size, max. 600 kbyte OB 0 65 535 • Number of free cycle OBs 100 • Number of free cycle OBs 100 • Number of diagnam OBs 20 • Number of cyclic interrupt OBs 20 • Number of process alarm OBs 3 • Number of synchronous and OBs 3 • Number of startup OBs 3 • Number of synchronous alarm OBs 2 • Number of synchronous alarm OBs 2 • Number of synchronous alarm OBs 3 • Number of synchronous entor OBs 2 • Number of synchronous entor OBs 2 <	
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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)	
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Retentivity — adjustable Yes IEC counter • Number Any (only limited by the main memory)	
— adjustable Yes IEC counter Any (only limited by the main memory)	
IEC counter Number Any (only limited by the main memory) 	
Number Any (only limited by the main memory)	
Refeativity	
- 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), max. 256 kbyte; in total; available retentive memory for bit memories, t	mers,
counters, DBs, and technology data (axes): 216 KB	
Extended retentive data area (incl. timers, counters, flags), max. 2.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF	
Flag	
• Size, max. 16 kbyte	

Number of clock memories	8: 8 clock memory bit grouped into one clock memory byte
Data blocks	8; 8 clock memory bit, grouped into one clock memory byte
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	2 048; 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) per CM/CP	8 kbyte
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
 Number of subprocess images, max. 	32
Hardware configuration	
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration
	of distributed I/O via PROFINET or PROFIBUS communication
	modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
● Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in
	total
Number of IO Controllers	
• integrated	1 0. A mentioner of 0. OMe (PROFINET + PROFIDUO) can be invested in
• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) 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	avaliable slots
Time of day	
Clock • Type	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
 supported 	Yes
• in AS, master	Yes
• in AS, slave	Yes
on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	1
1. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X1
 Number of ports integrated switch 	2 Yes
Integrated switch Protocols	
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
Media redundancy	Yes

PROFINET IO Controller	
Services	N.
— PG/OP communication	Yes
— Isochronous mode	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
— 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.	100
— of which in line, max.	128
 — Number of IO Devices that can be simultaneously activated/deactivated, max. 	8; in total across all interfaces
	8
— Number of IO Devices per tool, max.	
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the
	quantity of configured user data
Update time for IRT	
— for send cycle of 250 μs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the
	minimum update time of 500 μs 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 	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625
cycles	μs 3 875 μs)
Update time for RT	
— for send cycle of 250 µs	250 μs to 128 ms
— for send cycle of 500 µs	500 µs to 256 ms
 for send cycle of 1 ms 	1 ms to 512 ms
 for send cycle of 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
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
 Number of IO Controllers with shared device, 	4
max. — activation/deactivation of I-devices	Yes; per user program
Activation/deactivation of 1-devices Asset management record	Yes; per user program Yes; per user program
U CONTRACTOR O CON	
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
Autonegotiation	Yes
Autocrossing	Yes
Industrial Ethernet status LED	Yes
Protocols	
PROFIsafe	No
Number of connections	
 Number of connections, max. 	128; 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 	88
 Number of S7 routing paths 	16
Redundancy mode	
 H-Sync forwarding 	Yes
Media redundancy	
— Media redundancy	only via 1st interface (X1)
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP
	Manager; MRP Client

 MRP interconnection, supported 	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
 — Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
— Number of stations in the ring, max.	50
SIMATIC communication	
 PG/OP communication 	Yes; encryption with TLS V1.3 pre-selected
S7 routing	Yes
Data record routing	Yes
 S7 communication, as server 	Yes
S7 communication, as server 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. 78 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
 Runtime license required 	Yes; "Small" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
 Application authentication 	Yes
 — Security policies 	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
	Basic256Sha256
 User authentication 	"anonymous" or by user name & password
 Number of connections, max. 	4
 — Number of nodes of the client interfaces, 	1 000
recommended max.	
 — Number of elements for one call of 	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C	
max.	
 Number of elements for one call of 	20
OPC_UA_NameSpaceGetIndexList, max.	
— Number of elements for one call of	100
OPC_UA_MethodGetHandleList, max.	
 Number of simultaneous calls of the client 	1
instructions for session management, per connection, max.	
— Number of simultaneous calls of the client	5
instructions for data access, per connection, max.	5
 Number of registerable nodes, max. 	5 000
— Number of registerable method calls of	100
OPC_UA_MethodCall, max.	100
— Number of inputs/outputs when calling	20
OPC_UA_MethodCall, max.	
• OPC UA Server	Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms &
	Condition (A&C), Custom Address Space
 Application authentication 	Yes
- Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15,
	Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
— User authentication	"anonymous" or by user name & password
 — GDS support (certificate management) 	Yes
— Number of sessions, max.	32
— Number of accessible variables, max.	50 000
— Number of registerable nodes, max.	10 000
- Number of redisterable hones may	

	50
 Number of subscriptions per session, max. 	50
— Sampling interval, min.	100 ms
 Publishing interval, min. 	200 ms
 Number of server methods, max. 	20
 — Number of inputs/outputs per server method, 	20
max.	
 Number of monitored items, recommended 	4 000; for 1 s sampling interval and 1 s send interval
max.	
 Number of server interfaces, max. 	10 of each "Server interfaces" / "Companion specification" type and 20
	of the type "Reference namespace"
 Number of nodes for user-defined server 	15 000
interfaces, max.	N/
Alarms and Conditions	Yes
— Number of program alarms	100
— Number of alarms for system diagnostics	50
Further protocols	
MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm"
	block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
Number of simultaneously active program alarms	
 Number of program alarms 	600
 Number of alarms for system diagnostics 	100
 Number of alarms for motion technology objects 	160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	8
Status/control	0
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	Yes
• Forcing, variables	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
 Number of entries, max. 	1 000
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
STOP ACTIVE LED	Yes
 Connection display LINK TX/RX 	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of
	the PLC program; selection guide via the TIA Selection Tool
 Number of available Motion Control resources for 	1 120
technology objects	
Required Motion Control resources	
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per synchionous axis	

	80
— per external encoder	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) 	11
 — 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
Ambient conditions	
Ambient temperature during operation	20 °C: No condemontant
horizontal installation, min.	-30 °C; No condensation
 horizontal installation, max. 	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	-30 °C; No condensation
 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
Altitude during operation relating to sea level	
 Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
Know-how protection	res
•	Vac
User program protection/password protection	Yes
 User program protection/password protection Copy protection 	Yes
 User program protection/password protection Copy protection Block protection 	
 User program protection/password protection Copy protection Block protection Access protection 	Yes Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data 	Yes Yes Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display 	Yes Yes Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection 	Yes Yes Yes Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection 	Yes Yes Yes Yes Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection Protection level: Write protection 	Yes Yes Yes Yes Yes No
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection 	Yes Yes Yes Yes Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header 	Yes Yes Yes Yes Yes No Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit 	Yes Yes Yes Yes Yes No Yes Adjustable minimum cycle time
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit 	Yes Yes Yes Yes Yes No Yes
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit 	Yes Yes Yes Yes Yes No Yes Adjustable minimum cycle time
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit 	Yes Yes Yes Yes Yes No Yes Adjustable minimum cycle time
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit 	Yes Yes Yes Yes Yes Yes No Yes Adjustable minimum cycle time adjustable maximum cycle time
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions 	Yes Yes Yes Yes Yes Yes No Yes Adjustable minimum cycle time adjustable maximum cycle time 35 mm
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions Width Height Depth 	Yes Yes Yes Yes Yes No Yes Adjustable minimum cycle time adjustable maximum cycle time 35 mm 147 mm
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions Width Height Depth Weights 	Yes Yes Yes Yes Yes Yes No Yes adjustable minimum cycle time adjustable maximum cycle time 35 mm 147 mm 129 mm
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions Width Height Depth 	Yes Yes Yes Yes Yes No Yes adjustable minimum cycle time adjustable maximum cycle time 35 mm 147 mm 129 mm
 User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions Width Height Depth Weights 	Yes Yes Yes Yes Yes Yes No Yes adjustable minimum cycle time adjustable maximum cycle time 35 mm 147 mm 129 mm