6ES7516-3AN00-0AB0

Data sheet



Spare part 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, Ethernet, 3rd interface, PROFIBUS, 10 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1516-3 PN/DP
HW functional status	FS05
Firmware version	V1.8
Product function	
 Isochronous mode 	Yes; With minimum OB 6x cycle of 375 µs
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V13 SP1 Update 4
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	6.1 cm
Control elements	
Number of keys	6
Mode selector switch	1
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
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 (balanced)	6.7 W
Power loss	
Power loss, typ.	7 W
Memory	
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	1 Mbyte
• integrated (for data)	5 Mbyte
Load memory	
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
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 the user: 1
0	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	
Number range	0 65 535
• Size, max.	512 kbyte
FC	
Number range	0 65 535
• Size, max.	512 kbyte
OB	
• Size, max.	512 kbyte
Number of free cycle OBs	100
Number of time alarm OBs	20
Number of delay alarm OBs	20
Number of cyclic interrupt OBs Number of process clarge OBs	20
Number of process alarm OBs Number of DRV4 alarm OBs	50
Number of DPV1 alarm OBs Number of isophrappy made OBs	3
Number of isochronous mode OBs	2
Number of technology synchronous alarm OBs Number of startum OBs	2
Number of startup OBs Number of savnehreneus error OBs	100
Number of asynchronous error OBs Number of asynchronous error OBs	2
Number of synchronous error OBsNumber of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24
Counters, timers and their retentivity	27
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), max.	512 kbyte; In total; available retentive memory for bit memories, timers,
Flag	counters, DBs, and technology data (axes): 472 KB
Flag	16 kbyte
Size, max.Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	o, o Glock memory bit, grouped into one Glock memory byte
Retentivity adjustable	Yes
Retentivity adjustable 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	20
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	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be
Dook	inserted in total
Rack	22: CDLL : 24 modulos
Modules per rack, max. Number of lines, max.	32; CPU + 31 modules
Number of lines, max. PHD CM	1
PtP CM	the number of connectable DtD CMe is only limited by the number of conflict.
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
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
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
Number of PROFIBUS interfaces	1
1. Interface	
Interface types	
RJ 45 (Ethernet)	Yes; X1
Number of ports	2
integrated switch	Yes
Protocols	
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes
Web server	Yes
Media redundancy	Yes
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	Yes

— IRT	Yes
— PROFlenergy	Yes
 Prioritized startup 	Yes; Max. 32 PROFINET devices
 Number of connectable IO Devices, max. 	256; In total, up to 768 distributed I/O devices can be connected via PROFIBUS or PROFINET
 Of which IO devices with IRT, max. 	64
 Number of connectable IO Devices for RT, max. 	256
— of which in line, max.	256
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8
 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
Update time for IRT	configured user data
·	OFO up to 4 year Notes to the case of IDT with isosphere and a the minimum
— 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
•	2 ms to 32 ms
— for send cycle of 2 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
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes
— Shared device	Yes
Number of IO Controllers with shared device, max.	4
2. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X2
 Number of ports 	1
integrated switch	No
Protocols	
PROFINET IO Controller	No
PROFINET IO Device	No
SIMATIC communication	Yes
Open IE communication	Yes
Web server	Yes
3. Interface	1.00
Interface types	· ·
• RS 485	Yes
Number of ports	1
Protocols	
 PROFIBUS DP master 	Yes
 PROFIBUS DP slave 	No
SIMATIC communication	Yes
PROFIBUS DP master	
Number of connections, max.	48; for the integrated PROFIBUS DP interface
Number of DP slaves, max.	125; In total, up to 768 distributed I/O devices can be connected via PROFIBUS
	or PROFINET
Services	or PROFINET
Services — PG/OP communication	
Services — PG/OP communication — Equidistance	or PROFINET Yes Yes

— Isochronous mode	Yes
Activation/deactivation of DP slaves	Yes
Interface types	
RJ 45 (Ethernet)	V
• 100 Mbps	Yes
Autonegotiation	Yes
Autocrossing	Yes
Industrial Ethernet status LED	Yes
RS 485	40 ML W-
• Transmission rate, max.	12 Mbit/s
Protocols	N-
PROFIsafe Number of connections	No
Number of connections	255: via integrated interfaces of the CDU and connected CDs / CMs
 Number of connections, max. Number of connections reserved for ES/HMI/web 	256; via integrated interfaces of the CPU and connected CPs / CMs 10
	128
Number of connections via integrated interfaces Number of S7 routing poths	16
Number of S7 routing paths Padundanay mode.	10
Redundancy mode Media redundancy	
— MRP	Yes; as MRP redundancy manager and/or MRP client; max. number of devices
— IVII XI	in the ring: 50
 Switchover time on line break, typ. 	200 ms
Number of stations in the ring, max.	50
SIMATIC communication	
S7 routing	Yes
Data record routing	Yes
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.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined pages
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
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 objects	160
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
Status/control	

Status-control variable Number of variables, max. — of which between variables, max. — of which control variables, max. — of which control variables, max. Persong. Forcing. Forcing. Forcing. Forcing variables Number of variables Number of variables Number of variables, max. 200 per job Peripheral inputs/outputs Number of variables, max. 200 Diagnosate buffer Present Number of configurable Traces Number of positioning axis Number of positioning axis Number of positioning axis, max. Number of positioning axis, max. So Requirement There must be no other motion schoology objects created; note: The number of axis affects the cycle time of the PLC program; selection guide via the TTA Selection Tool Synchronized axis (relative gear synchronization) Number of exists affects the cycle time of the PLC program; selection guide via the TTA Selection Tool Synchronized axis (relative goar synchronization) Number of exists affects the cycle time of the PLC program; selection guide via the TTA Selection Tool So PLD-Time Countralies New PLD Compact New PLD-Time Countralies New PLD Compact New PLD Controller with integrated optimization for valves New PLD-Time Countriling and measuring New PLD-Time New PLD Compact		
Number of variables, max. - of which control variables, max. 200, per job Foreing, variables Number of variables, max. 200 Peripheral injutis/outputs Peripheral i	 Status/control variable 	Yes
- of which status variables, max.	 Variables 	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
- of which control variables, max. Forcing, variables Forcing, v	 Number of variables, max. 	
Forcing	of which status variables, max.	200; per job
Forcing variables Peripheral inputs/outputs	of which control variables, max.	200; per job
Number of variables, max. 200	Forcing	
Diagnostic buffer • present • Number of entries, max. — of which powerfal-proof Fraces • Number of configurable Traces • Number of the Number of the Number of September o	 Forcing, variables 	Peripheral inputs/outputs
Present Number of entries, max. — of which powerfail-proof 500 Traces Number of configurable Traces At Up to 512 KB of data per trace are possible Interrupts/diagnostics/status information Bagnostics indication LED PRUNISTOP LED PRESENT LED	 Number of variables, max. 	200
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Number of configurable Traces	— of which powerfail-proof	500
Diagnostics indication LED Property Pr	Traces	
Disgnostics indication LED	Number of configurable Traces	4; Up to 512 KB of data per trace are possible
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• Sopy protocuon	Know-how protection • User program protection/password protection	Yes

Block protection	Yes
Access protection	
 Password for display 	Yes
 Protection level: Write protection 	Yes
 Protection level: Read/write protection 	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
 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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