SIEMENS

Data sheet

6ES7516-3AN00-0AB0



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
Engineering with	
 STEP 7 TIA Portal configurable/integrated as of 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	
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	
 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
I²t	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 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
Number range	0 65 535

Size, max. Size, max. Number of free cycle OBs Number of free cycle OBs Number of free cycle OBs Number of delay alarm OBs Number of delay alarm OBs Number of organization OBs Number of process alarm OBs Number of process alarm OBs Number of Isochronous mode OBs Number of Isochronous mode OBs Number of startup OBs Number of startup OBs Number of saynchronous error OBs Number of alaynchronous error OBs Number of alaynchronous error OBs Number of alaynchronous error OBs Number of diagnostic alarm OBs Number of alaynchronous error OBs Number of synchronous error OBs Number Per priority class Counters, timers and their retentivity Facetomitity - adjustable Yes Ficc counter Number Retentivity - adjustable Yes Fice timer Number Any (only limited by the main memory) Retentivity - adjustable Yes Fice timer Number Number Retentivity - adjustable Yes Fice timer Number Siz kbyte: In total: available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB	• Size, max.	512 kbyte
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Via CM 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. • Number of lines, max. 1 PtP CM • Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock • Type • Backup time • Deviation per day, max. 10 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 8	Number of IO Controllers	
Can be inserted in total Rack Modules per rack, max. Number of lines, max. Number of PtP CM Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock Type Backup time Backup time Deviation per day, max. Operating hours counter Number	• integrated	1
Modules per rack, max. Number of lines, max. Number of PtP CM Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock Type Backup time Deviation per day, max. Operating hours counter Number Number 32; CPU + 31 modules 1 Hardware clock of connectable PtP CMs is only limited by the number of available slots Time of day Clock 10 s; Type: 2 s	● Via CM	
Number of lines, max. PtP CM Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock Type Backup time Deviation per day, max. Operating hours counter Number Number	Rack	
PtP CM Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock Type Backup time Backup time Deviation per day, max. Operating hours counter Number Number	Modules per rack, max.	32; CPU + 31 modules
 Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock Type Backup time Deviation per day, max. Operating hours counter Number the number of connectable PtP CMs is only limited by the number of available slots 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Operating hours counter Number 16	Number of lines, max.	1
Time of day Clock Type Backup time Deviation per day, max. Operating hours counter Number Number	PtP CM	
Clock Type Backup time Operating hours counter Number Hardware clock wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s	Number of PtP CMs	
 Type Backup time Wk; At 40 °C ambient temperature, typically Deviation per day, max. Typ.: 2 s Operating hours counter Number 	Time of day	
 Backup time Deviation per day, max. Operating hours counter Number 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s 	Clock	
 Deviation per day, max. Operating hours counter Number 10 s; Typ.: 2 s 16 	• Type	Hardware clock
Operating hours counter • Number 16	Backup time	6 wk; At 40 °C ambient temperature, typically
• Number 16	 Deviation per day, max. 	10 s; Typ.: 2 s
	Operating hours counter	
Clock synchronization	Number	16
	Clock synchronization	

• aupported	Yes	
• supported	Yes	
• to DP, master		
• 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		
Number of ports	2	
integrated switch	Yes	
RJ 45 (Ethernet)	Yes; X1	
Functionality		
PROFINET IO Controller	Yes	
 PROFINET IO Device 	Yes	
 SIMATIC communication 	Yes	
Open IE communication	Yes	
Web server	Yes	
Media redundancy	Yes	
2. Interface		
Interface types		
Number of ports	1	
integrated switch	No	
RJ 45 (Ethernet)	Yes; X2	
Functionality		
PROFINET IO Controller	No	
 PROFINET IO Device 	No	
 SIMATIC communication 	Yes	
 Open IE communication 	Yes	
• Web server	Yes	
3. Interface		
Interface types		
Number of ports	1	
• RS 485	Yes	
* 110 1 00		
Functionality		
	Yes	
Functionality	Yes No	
Functionality ● PROFIBUS DP master		
Functionality● PROFIBUS DP master● PROFIBUS DP slave	No	

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

• Transmission rate, max.	12 INDIT/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. 	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 configured user data
Redundancy mode	
— MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
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 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 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
— PROFlenergy	Yes
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
Redundancy mode	
— MRP	Yes
SIMATIC communication	
 S7 communication, as server 	Yes
 S7 communication, as client 	Yes
User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
 several passive connections per port, supported 	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	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
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 768 distributed I/O devices can be connected via PROFIBUS or PROFINET
 Activation/deactivation of DP slaves 	Yes
Further protocols	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
Switchover time on line break, typ.	200 ms
 Number of stations in the ring, max. 	50
Isochronous mode	
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	
Number of program alarms	600
Number of alarms for system diagnostics	200
Number of alarms for motion technology	160
objects	
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Status/control	
Status/control variable	Yes

Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of variables, max.	ocumero
— of which status variables, max.	200; per job
of which status variables, max. — of which control variables, max.	200; per job
Forcing	200, per job
• Forcing, variables	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	200
• present	Yes
	3 200
Number of entries, max.	
— of which powerfail-proof	500
Traces	4. Up to E40 VD of data was tupon and possible
 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
 Connection display LINK TX/RX 	Yes
Supported technology objects	
Supported technology objects Motion Control	Yes
	Yes
Motion Control	Yes 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Motion Control • Speed-controlled axis	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis — Number of speed-controlled axes, max.	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis Number of speed-controlled axes, max. Positioning axis	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis Number of speed-controlled axes, max. Positioning axis Number of positioning axes, max. Synchronized axes (relative gear	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis Number of speed-controlled axes, max. Positioning axis Number of positioning axes, max. Synchronized axes (relative gear synchronization)	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 15; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis — Number of speed-controlled axes, max. Positioning axis — Number of positioning axes, max. Synchronized axes (relative gear synchronization) — Number of axes, max.	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 15; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis Number of speed-controlled axes, max. Positioning axis Number of positioning axes, max. Synchronized axes (relative gear synchronization) Number of axes, max.	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 15; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis Number of speed-controlled axes, max. Positioning axis Number of positioning axes, max. Synchronized axes (relative gear synchronization) Number of axes, max. External encoders Number of external encoders, max.	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 15; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time
Motion Control Speed-controlled axis Number of speed-controlled axes, max. Positioning axis Number of positioning axes, max. Synchronized axes (relative gear synchronization) Number of axes, max. External encoders Number of external encoders, max.	30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 15; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool

Counting and measuring	
High-speed counter	Yes
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	0 °C
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
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
 Protection level: Write protection 	Yes
 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	
\A/:\L	70

Dimensions	
Width	70 mm
Height	147 mm
Depth	129 mm

Weights	
Weight, approx.	845 g
last modified:	04/06/2018