SIEMENS

Data sheet 6AG1516-3AN01-2AB0

SIPLUS S7-1500 CPU 1516-3 PN/DP -40 ... +60 GRAD C STARTUP -20 GRAD C WITH CONFORMAL COATING BASED ON 6ES7516-3AN01-0AB0 . CENTRAL PROCESSING UNIT WITH WORKING MEMORY 1 MB FOR PROGRAM AND 5 MB FOR DATA, 1. INTERFACE: PROFINET IRT WITH 2 PORT SWITCH, 2. INTERFACE: ETHERNET, 3. INTERFACE: PROFIBUS, 10 NS BIT-PERFORMANCE, SIMATIC MEMORY CARD NECESSARY

General information	
Product type designation	CPU 1516-3 PN/DP
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
Input current	
Current consumption (rated value)	0.85 A
Inrush current, max.	2.4 A; Rated value
I^2t	0.39 $A^2 \cdot s$
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.	2 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 blocks (total)	6 000
DB	
• Number, max.	6 000; Number range: 1 to 65535
• Size, max.	5 Mbyte
FB	
• Number, max.	5 998; Number range: 1 to 65535
• Size, max.	512 kbyte
FC	
• Number, max.	5 999; Number range: 1 to 65535
• 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	20
• 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
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), max.	512 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Flag	
• Number, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bits, grouped into one clock memory byte
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block

Address area	
Number of IO modules	8 192
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	10
Number of DP masters	
• integrated	1
• Via CM	8; A maximum of 8 CMs (PROFINET + PROFIBUS) can be inserted in total
Number of IO Controllers	
• integrated	1
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	
• Type	Hardware clock
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
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	
• Number of ports	2
• integrated switch	Yes
• RJ 45 (Ethernet)	Yes
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
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
Functionality	
• 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
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	128
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— PROFIenergy	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 CPs/CMs 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 µs to 4 ms
— 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 µs: 375 µs, 625 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
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— PROFIenergy	Yes
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
• 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	
Services	
— PG/OP communication	Yes
— S7 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 CPs/CMs 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 operation (application synchronized up to terminal)	Yes
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	1 000

Test commissioning functions	
Status block	Yes; up to 8 simultaneously
Single step	No
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• Number of variables, max.	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
• Forcing, variables	Inputs, outputs
• Number of variables, max.	200

Diagnostic buffer	
• present	Yes
• Number of entries, max.	
— of which powerfail-proof	500
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	
Motion Control	Yes
• Speed-controlled axis	
— Number of speed-controlled axes, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
• Positioning axis	
— Number of positioning axes, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
• External encoders	
— Number of external encoders, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
Counting and measuring	
• High-speed counter	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C; = Tmin; Startup @ -20 °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.	-40 °C; = Tmin; Startup @ -20 °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
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m

• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and lubricants	Yes
Use in stationary industrial systems	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea	
— to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
— to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *
from supply voltage 1L+	
— Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!
Configuration	
Programming	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes; As of STEP 7 V12 SP1
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	
Width	70 mm
Height	147 mm
Depth	129 mm

Weights	
Weight, approx.	845 g

Other	
Note:	At temperatures below 0 °C legibility may be restricted and representation of dynamic contents may be slower

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