

SIPLUS S7-1500 CPU 1513-1 PN -40 ... +60 GRAD C STARTUP -20 GRAD C MIT CONFORMAL COATING BASED ON 6ES7513-1AL01-0AB0 . CENTRAL PROCESSING UNIT WITH WORKING MEMORY 300 KB FOR PROGRAM AND 1.5 MB FOR DATA, 1. INTERFACE: PROFINET IRT WITH 2 PORT SWITCH, 40 NS BIT-PERFORMANCE, SIMATIC MEMORY CARD NECESSARY



General information	
Product type designation	CPU 1513-1 PN
Display	
Screen diagonal [cm]	3.45 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)	0.7 A
Inrush current, max.	1.9 A; Rated value
I <sup>2</sup> t	0.34 A <sup>2</sup> ·s
Power	
Infeed power to the backplane bus	10 W

Power consumption from the backplane bus (balanced)	5.5 W
<b>Power loss</b>	
Power loss, typ.	5.7 W
<b>Memory</b>	
SIMATIC memory card required	Yes
<b>Work memory</b>	
• integrated (for program)	300 kbyte
• integrated (for data)	1.5 Mbyte
<b>Load memory</b>	
• Plug-in (SIMATIC Memory Card), max.	2 Gbyte
<b>Backup</b>	
• maintenance-free	Yes
<b>CPU processing times</b>	
for bit operations, typ.	40 ns
for word operations, typ.	48 ns
for fixed point arithmetic, typ.	64 ns
for floating point arithmetic, typ.	256 ns
<b>CPU-blocks</b>	
Number of blocks (total)	2 000
<b>DB</b>	
• Number, max.	2 000; Number range: 1 to 65535
• Size, max.	1.5 Mbyte
<b>FB</b>	
• Number, max.	1 998; Number range: 1 to 65535
• Size, max.	300 kbyte
<b>FC</b>	
• Number, max.	1 999; Number range: 1 to 65535
• Size, max.	300 kbyte
<b>OB</b>	
• Size, max.	300 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	1
• 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
<b>Nesting depth</b>	
• per priority class	24

### Counters, timers and their retentivity

<b>S7 counter</b>	
• Number	2 048
<b>Retentivity</b>	
— adjustable	Yes
<b>IEC counter</b>	
• Number	Any (only limited by the main memory)
<b>Retentivity</b>	
— adjustable	Yes
<b>S7 times</b>	
• Number	2 048
<b>Retentivity</b>	
— adjustable	Yes
<b>IEC timer</b>	
• Number	Any (only limited by the main memory)
<b>Retentivity</b>	
— adjustable	Yes

### Data areas and their retentivity

Retentive data area (incl. timers, counters, flags), max.	128 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB
<b>Flag</b>	
• Number, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bits, grouped into one clock memory byte
<b>Data blocks</b>	
• Retentivity adjustable	Yes
• Retentivity preset	No
<b>Local data</b>	
• per priority class, max.	64 kbyte; max. 16 KB per block

### Address area

Number of IO modules	2 048
<b>I/O address area</b>	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
<b>per integrated IO subsystem</b>	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
<b>per CM/CP</b>	

— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
<b>Subprocess images</b>	
• Number of subprocess images, max.	32
<b>Hardware configuration</b>	
Number of distributed IO systems	7
<b>Number of DP masters</b>	
• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total
<b>Number of IO Controllers</b>	
• integrated	1
<b>Rack</b>	
• Modules per rack, max.	32; CPU + 31 modules
• Number of lines, max.	1
<b>PtP CM</b>	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
<b>Time of day</b>	
<b>Clock</b>	
• Type	Hardware clock
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
<b>Clock synchronization</b>	
• supported	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
<b>Interfaces</b>	
Number of PROFINET interfaces	1
<b>1. Interface</b>	
<b>Interface types</b>	
• Number of ports	2
• integrated switch	Yes
• RJ 45 (Ethernet)	Yes
<b>Functionality</b>	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
• Media redundancy	Yes

Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
Protocols	
Number of connections	
• Number of connections, max.	128
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	88
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	256; a maximum of 256 (PROFIBUS slaves + PROFINET devices) can be connected in total
— Of which IO devices with IRT, max.	64
— Number of connectable IO Devices for RT, max.	256
— of which in line, max.	128
— 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 $\mu$ s	250 $\mu$ s to 4 ms
— for send cycle of 500 $\mu$ s	500 $\mu$ s 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)
<b>Update time for RT</b>	
— 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
<b>PROFINET IO Device</b>	
<b>Services</b>	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— PROFINergy	Yes
<b>Redundancy mode</b>	
— MRP	Yes
<b>SIMATIC communication</b>	
• S7 communication, as server	Yes
• S7 communication, as client	Yes
• User data per job, max.	BSEND/BRCV: 64 KB; PUT/GET: 960 bytes
<b>Open IE communication</b>	
• TCP/IP	Yes
— Data length, max.	8 kbyte
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	8 kbyte
• UDP	Yes
— Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
<b>Web server</b>	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined pages
<b>Further protocols</b>	
• MODBUS	Yes; MODBUS TCP
<b>Media redundancy</b>	
• 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	5 000
Number of simultaneously active program alarms	500
Test commissioning functions	
Status block	Yes; Up to 16 simultaneously
Single step	No
Status/control	
<ul style="list-style-type: none"> <li>• Status/control variable</li> <li>• Variables</li> <li>• Number of variables, max. <ul style="list-style-type: none"> <li>— of which status variables, max.</li> <li>— of which control variables, max.</li> </ul> </li> </ul>	<p>Yes</p> <p>Inputs, outputs, memory bits, DB, times, counters</p> <p>200</p> <p>200</p>
Forcing	
<ul style="list-style-type: none"> <li>• Forcing, variables</li> <li>• Number of variables, max.</li> </ul>	<p>Inputs, outputs</p> <p>1 000</p>
Diagnostic buffer	
<ul style="list-style-type: none"> <li>• present</li> <li>• Number of entries, max. <ul style="list-style-type: none"> <li>— of which powerfail-proof</li> </ul> </li> </ul>	<p>Yes</p> <p>250</p>
Interrupts/diagnostics/status information	
Diagnostics indication LED	
<ul style="list-style-type: none"> <li>• RUN/STOP LED</li> <li>• ERROR LED</li> <li>• MAINT LED</li> <li>• Connection display LINK TX/RX</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Supported technology objects	
<p>Motion Control</p> <ul style="list-style-type: none"> <li>• Speed-controlled axis <ul style="list-style-type: none"> <li>— Number of speed-controlled axes, max.</li> </ul> </li> <li>• Positioning axis <ul style="list-style-type: none"> <li>— Number of positioning axes, max.</li> </ul> </li> <li>• External encoders</li> </ul>	<p>Yes</p> <p>6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported</p> <p>6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported</p>

— Number of external encoders, max.	6; Up to 6 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
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
• 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
<b>Ambient temperature during storage/transportation</b>	
• min.	-40 °C
• max.	70 °C
<b>Altitude during operation relating to sea level</b>	
• 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)
<b>Relative humidity</b>	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
<b>Resistance</b>	
<b>Coolants and lubricants</b>	
— Resistant to commercially available coolants and lubricants	Yes
<b>Use in stationary industrial systems</b>	
— 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, *
<b>Use on ships/at sea</b>	
— 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

35 mm

Height

147 mm

Depth

129 mm

## Weights

Weight, approx.

430 g

## Other

Note:

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

**last modified:**

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