

SIPLUS ET 200SP CPU1515SP PC2 F -40...+60°C with Conformal Coating based on 6ES7677-2SB42-0GB0 . 8 GB RAM, 30 GB CFast with Windows 10 IoT Enterprise 64 bit and S7-1500 Failsafe Software Controller CPU 1505SP F pre-installed, Interfaces: 1x slot CFast, 1x slot SD/MMC, 1x connection for ET 200SP bus adapter PROFINET, 2x USB 3.0; 2x USB 2.0, 1x display port, documentation on USB stick, restore USB stick 1x 10/100/1000 Mbit/s Ethernet



Figure similar

| General information | |
|--|--|
| Product type designation | CPU 1515SP PC2 F |
| Installed software | |
| • Visualization | No |
| • Control | S7-1500 Software Controller CPU 1505SP F |
| Configuration control | |
| via dataset | Yes |
| Control elements | |
| 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) | 1.8 A; Full processor load, incl. ET 200SP modules and using USB |
| Current consumption (in no-load operation), typ. | 0.5 A |
| Current consumption, max. | 2.9 A |
| I^2t | 0.426 A ² ·s; with starting current inrush |
| Power | |
| Active power input, max. | 43 W; incl. ET 200SP modules and using USB |
| Infeed power to the backplane bus | 8.75 W |
| Power loss | |
| Power loss, typ. | 16 W |
| Processor | |
| Processor type | Intel Atom E3940, 1.6 GHz, 4 cores |
| Memory | |
| Type of memory | DDR3L |
| Main memory | 8 GB RAM |
| CFAST memory card | Yes; 30 GB flash memory |
| SIMATIC memory card required | No |
| Work memory | |
| <ul style="list-style-type: none"> integrated (for program) integrated (for data) integrated (for CPU function library of CPU Runtime) | 1.5 Mbyte 5 Mbyte 20 Mbyte |
| Load memory | |
| <ul style="list-style-type: none"> integrated (on PC mass storage) | 320 Mbyte |
| Backup | |
| <ul style="list-style-type: none"> with UPS with non-volatile memory | Yes; all memory areas declared retentive 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; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| DB | |
| <ul style="list-style-type: none"> Number, max. Size, max. | 5 999; Number range: 1 to 65535 5 Mbyte |
| FB | |
| <ul style="list-style-type: none"> Number, max. | 5 998; Number range: 1 to 65535 |

| | |
|---|--|
| • Size, max. | 1 024 kbyte |
| FC | |
| • Number, max. | 5 999; Number range: 1 to 65535 |
| • Size, max. | 1 024 kbyte |
| OB | |
| • Size, max. | 1 024 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 |
| Nesting depth | |
| • per priority class | 24; Up to 8 possible for F-blocks |
| 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. | 410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes |
| Flag | |

| | |
|--|--|
| • Number, max. | 16 kbyte |
| • Number of clock memories | 8; 8 clock memory bit, grouped into one clock memory byte |
| Data blocks | |
| • Retentivity adjustable | Yes |
| • Retentivity preset | No |
| 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 |
| Subprocess images | |
| • Number of subprocess images, max. | 32 |
| Hardware configuration | |
| Integrated power supply | Yes |
| Number of distributed IO systems | 20 |
| Number of DP masters | |
| • Via CM | 1 |
| Number of IO Controllers | |
| • via PC interfaces | 1 |
| Rack | |
| • Modules per rack, max. | 64; CPU 1515SP PC + 64 modules + server module |
| • 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 |
| • Hardware clock (real-time) | Yes; Resolution: 1 s |
| • Backup time | 6 wk; At 40 °C ambient temperature, typically |
| • Deviation per day, max. | 10 s; Typ.: 2 s |
| Clock synchronization | |
| • supported | Yes |
| • on Windows clock, slave | Yes |
| Interfaces | |
| Number of industrial Ethernet interfaces | 2 |
| Number of PROFINET interfaces | 1 |
| Number of PROFIBUS interfaces | 1; Via CM DP module |
| Number of RS 485 interfaces | 1; Via CM DP module |
| Number of USB interfaces | 4; 2x USB 2.0, 2x USB 3.0 on front side |
| Number of SD card slots | 1 |

| Video interfaces | |
|---|--|
| • Graphics interface | 1x DisplayPort |
| 1. Interface | |
| Interface type | PROFINET |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Number of connections | 88 |
| Interface types | |
| • Number of ports | 2 |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; Via BusAdapter BA 2x RJ45 |
| — Transmission rate, max. | 100 Mbit/s |
| — Industrial Ethernet status LED | Yes |
| • BusAdapter (PROFINET) | Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3) |
| Protocols | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| PROFINET IO Controller | |
| Services | |
| — Isochronous mode | Yes |
| — shortest clock pulse | 500 µs |
| — IRT | Yes |
| — MRP | Yes |
| — MRPD | Yes |
| — PROFIenergy | Yes |
| — Prioritized startup | Yes; Max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) |
| — Number of connectable IO Devices, max. | 128 |
| — Of which IO devices with IRT, max. | 64 |
| — of which in line, max. | 64 |
| — Number of connectable IO Devices for RT, max. | 128 |
| — of which in line, max. | 128 |

| | |
|---|--|
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| — IO Devices changing during operation (partner ports), supported | Yes |
| — 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 |

Update time for IRT

| | |
|--|--|
| — 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 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 |

Address area

| | |
|-----------------|---------|
| — Inputs, max. | 8 kbyte |
| — Outputs, max. | 8 kbyte |

PROFINET IO Device

Services

| | |
|---|--------|
| — Isochronous mode | No |
| — shortest clock pulse | 500 µs |
| — IRT | Yes |
| — MRP | Yes |
| — MRPD | Yes |
| — PROFIenergy | Yes |
| — Prioritized startup | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 4 |
| — Asset management record | Yes |

2. Interface

| | |
|--|-------------------------------|
| Interface type | Integrated Ethernet interface |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |

Interface types

| | |
|----------------------------------|-----------------|
| • Number of ports | 1 |
| • RJ 45 (Ethernet) | Yes; Integrated |
| — Transmission rate, max. | 1 000 Mbit/s |
| — Industrial Ethernet status LED | No |

3. Interface

| | |
|--|---------------------|
| Interface type | PROFIBUS with CM DP |
| Number of connections via this interface | 44 |
| Interface types | |
| • RS 485 | Yes |
| Protocols | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • SIMATIC communication | Yes |
| PROFIBUS DP master | |
| • Number of DP slaves, max. | 125 |
| Services | |
| — Equidistance | No |
| — Isochronous mode | No |
| Address area | |
| — Inputs, max. | 8 kbyte |
| — Outputs, max. | 8 kbyte |

Interface types

| | |
|---------------------------|-----------|
| RS 485 | |
| • Transmission rate, max. | 12 Mbit/s |

Protocols

| | |
|---|---|
| Number of connections | |
| • Number of connections, max. | 88 |
| • Number of connections reserved for ES/HMI/web | 10 |
| • Number of S7 routing paths | 16 |
| Redundancy mode | |
| Media redundancy | |
| — Switchover time on line break, typ. | 200 ms |
| — Number of stations in the ring, max. | 50 |
| SIMATIC communication | |
| • PG/OP communication | Yes |
| • S7 routing | Yes |
| • S7 communication, as server | Yes |
| • S7 communication, as client | Yes |
| • User data per job, max. | 64 kbyte; BSEND/BRCV: 64 KB; PUT/GET: 960 bytes |
| Open IE communication | |

| | |
|---|--|
| <ul style="list-style-type: none"> • TCP/IP <ul style="list-style-type: none"> — Data length, max. • ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> — Data length, max. • UDP <ul style="list-style-type: none"> — Data length, max. • SNMP • DCP • LLDP | <p>Yes</p> <p>64 kbyte</p> <p>Yes</p> <p>64 kbyte</p> <p>Yes</p> <p>1 472 kbyte</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> |
| Web server | |
| <ul style="list-style-type: none"> • HTTP • HTTPS | <p>Yes; Via Windows and PROFINET interface</p> <p>Yes; Via Windows and PROFINET interface</p> |
| OPC UA | |
| <ul style="list-style-type: none"> • Runtime license required • OPC UA Client • OPC UA Server <ul style="list-style-type: none"> — Application authentication — Security policies — User authentication | <p>Yes; "Small" license required</p> <p>Yes; From SW CPU 1505SP V2.6</p> <p>Yes; Data access (read, write, subscribe), runtime license required</p> <p>Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</p> <p>Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</p> <p>Yes; "anonymous" or by user name & password</p> |
| Further protocols | |
| <ul style="list-style-type: none"> • MODBUS | <p>Yes; MODBUS TCP</p> |
| 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 | 1 000 |
| <ul style="list-style-type: none"> • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects | <p>1 000</p> <p>200</p> <p>160</p> |
| 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 |
| Single step | No |
| Number of breakpoints | 8 |
| Status/control | |
| <ul style="list-style-type: none"> • Status/control variable • Variables | <p>Yes</p> <p>Inputs, outputs, memory bits, DB, times, counters</p> |

| | |
|---|--|
| <ul style="list-style-type: none"> • Number of variables, max. <ul style="list-style-type: none"> — of which status variables, max. 200 — of which control variables, max. 200 | |
| Forcing | |
| <ul style="list-style-type: none"> • Forcing Yes • Forcing, variables Inputs, outputs • Number of variables, max. 200 | |
| Diagnostic buffer | |
| <ul style="list-style-type: none"> • present Yes • Number of entries, max. 1 000 <ul style="list-style-type: none"> — of which powerfail-proof 300 | |
| Traces | |
| <ul style="list-style-type: none"> • Number of configurable Traces 4 • Memory size per trace, max. 512 kbyte | |
| Interrupts/diagnostics/status information | |
| Diagnostics indication LED | |
| <ul style="list-style-type: none"> • RUN/STOP LED Yes • ERROR LED Yes • MAINT LED Yes | |
| Supported technology objects | |
| Motion Control | |
| <ul style="list-style-type: none"> • Number of available Motion Control resources for technology objects 2 400 • Required Motion Control resources <ul style="list-style-type: none"> — per speed-controlled axis 40; per axis — per positioning axis 80; per axis — per synchronous axis 160; per axis — per external encoder 80; per external encoder — per output cam 20; per cam — per cam track 160; per cam track — per probe 40; per probe • Positioning axis <ul style="list-style-type: none"> — Number of positioning axes at motion control cycle of 4 ms (typical value) 15 — Number of positioning axes at motion control cycle of 8 ms (typical value) 30 | |
| Controller | |
| <ul style="list-style-type: none"> • 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

Standards, approvals, certificates

Highest safety class achievable in safety mode

- Performance level according to ISO 13849-1 PLe
- SIL acc. to IEC 61508 SIL 3

Probability of failure (for service life of 20 years and repair time of 100 hours)

- Low demand mode: PFDavg in accordance with SIL3 < 2.00E-05
- High demand/continuous mode: PFH in accordance with SIL3 < 1.00E-09 1/h

Ambient conditions

Ambient temperature during operation

- min. -40 °C; = Tmin (incl. condensation/frost)
- max. 60 °C; Up to 60 °C with max. 32 ET 200SP modules; up to 55 °C with max. 64 ET 200SP modules
- horizontal installation, min. -40 °C; = Tmin (incl. condensation/frost)
- horizontal installation, max. 60 °C; = Tmax
- vertical installation, min. -40 °C; = Tmin (incl. condensation/frost)
- vertical installation, max. 50 °C; With max. 32 ET 200SP modules

Ambient temperature during storage/transportation

- min. -40 °C
- max. 70 °C

Altitude during operation relating to sea level

- Installation altitude above sea level, max. 2 000 m
- Ambient air temperature-barometric pressure-altitude Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 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

Vibrations

- Operation, tested according to IEC 60068-2-6 Yes
- Transport, tested acc. to IEC 60068-2-6 Yes

Shock testing

- tested according to IEC 60068-2-6 Yes
- tested according to IEC 60068-2-27 Yes
- tested according to IEC 60068-2-29 Yes
- Storage/transport, tested acc. to IEC 60068-2-27 Yes

Resistance

Coolants and lubricants

- Resistant to commercially available coolants and lubricants Yes; Incl. diesel and oil droplets in the air

| | |
|---|---|
| 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, * |
| — Against mechanical environmental conditions acc. to EN 60721-3-3 | Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0) |
| Use on ships/at sea | |
| — to biologically active substances according to EN 60721-3-6 | Yes; Class 6B2 mold, fungal and dry rot spores (excluding fauna) |
| — 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; * |
| — Against mechanical environmental conditions acc. to EN 60721-3-6 | Yes; Class 6M4 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0) |
| Usage in industrial process technology | |
| — Against chemically active substances acc. to EN 60654-4 | Yes; Class 3 (excluding trichlorethylene) |
| — Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04 | Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil) |
| Remark | |
| — Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04 | * The supplied plug covers must remain in place over the unused interfaces during operation! |
| Conformal coating | |
| • Coatings for printed circuit board assemblies acc. to EN 61086 | Yes |
| • Protection against fouling acc. to EN 60664-3 | Yes; Type 1 protection |
| • Military testing according to MIL-I-46058C, Amendment 7 | Yes; Discoloration of coating possible during service life |
| • Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A | Yes; Conformal coating, Class A |
| Operating systems | |
| pre-installed operating system | Windows 10 IoT Enterprise 2016 LTSP, 64bit, MUI |
| Configuration | |
| Programming | |
| Programming language | |
| — LAD | Yes; incl. failsafe |
| — FBD | Yes; incl. failsafe |

| | |
|---|--|
| — STL | Yes |
| — SCL | Yes |
| — CFC | No |
| — GRAPH | Yes |
| Know-how protection | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| Access protection | |
| • 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 |
| Open Development interfaces | |
| • Size of ODK SO file, max. | 5.8 Mbyte |
| Peripherals/Options | |
| SD card | Optionally for additional mass storage |
| Dimensions | |
| Width | 160 mm |
| Height | 117 mm |
| Depth | 75 mm |
| Weights | |
| Weight, approx. | 0.83 kg |
| last modified: | 05/28/2020 |