

Siemens
EcoTech



SIMATIC S7-1500R, CPU 1513R-1PN, central processing unit with work memory 600 KB for program and 2.5 MB for data, 1st interface: PROFINET RT with 2-port switch, SIMATIC Memory Card required



| General information | |
|--|---|
| Product type designation | CPU 1513R-1 PN |
| HW functional status | from FS04 |
| Firmware version | V4.0 |
| <ul style="list-style-type: none"> FW update possible | Yes |
| Product function | |
| <ul style="list-style-type: none"> I&M data | Yes; I&M0 to I&M3 |
| <ul style="list-style-type: none"> Isochronous mode | No |
| <ul style="list-style-type: none"> SysLog | Yes |
| Engineering with | |
| <ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version | V20 (FW V4.0) / V18 (FW V3.0) or higher; configurable with older TIA Portal versions as 6ES7 513-1RL00-0AB0 |
| Redundancy | |
| <ul style="list-style-type: none"> stand-alone operation | Yes |
| Display | |
| Screen diagonal [cm] | 3.45 cm |
| Control elements | |
| Number of keys | 8 |
| Mode buttons | 2 |
| 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 | |
| <ul style="list-style-type: none"> Mains/voltage failure stored energy time | 5 ms |
| <ul style="list-style-type: none"> Repeat rate, min. | 1/s |
| Input current | |
| Current consumption (rated value) | 0.56 A |
| Current consumption, max. | 0.87 A |
| Inrush current, max. | 1.15 A; Rated value |
| I^2t | 0.6 A ² ·s |
| Power | |
| Infeed power to the backplane bus | 10 W |
| Power consumption from the backplane bus (balanced) | 5.5 W |
| Power loss | |
| Power loss, typ. | 3.4 W |

| Memory | |
|--|---|
| Number of slots for SIMATIC memory card | 1 |
| SIMATIC memory card required | Yes |
| Work memory | |
| • integrated (for program) | 600 kbyte |
| • integrated (for data) | 2.5 Mbyte |
| Load memory | |
| • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte |
| Backup | |
| • maintenance-free | Yes |
| CPU processing times | |
| for bit operations, typ. | 20 ns |
| for word operations, typ. | 24 ns |
| for fixed point arithmetic, typ. | 32 ns |
| for floating point arithmetic, typ. | 128 ns |
| CPU-blocks | |
| Number of elements (total) | 4 000; Blocks (OB, FB, FC, DB) and UDTs |
| DB | |
| • Number range | Number range: 1 to 59 999 |
| • Size, max. | 2.5 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB |
| FB | |
| • Number range | 0 ... 65 535 |
| • Size, max. | 600 kbyte |
| FC | |
| • Number range | 0 ... 65 535 |
| • Size, max. | 600 kbyte |
| OB | |
| • Size, max. | 600 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; with minimum OB 3x cycle of 10 ms |
| • Number of process alarm OBs | 50 |
| • Number of DPV1 alarm OBs | 3 |
| • 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. | 256 kbyte; in total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 216 KB |
| Extended retentive data area (incl. timers, counters, flags), max. | 2.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF |

| | |
|--|--|
| Flag | |
| • Size, 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 |
| Local data | |
| • per priority class, max. | 64 kbyte; max. 16 KB per block |
| Address area | |
| Number of IO modules | 2 048; 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 |
| Subprocess images | |
| • Number of subprocess images, max. | 31 |
| Hardware configuration | |
| Number of distributed IO systems | 16; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET, but also by the connection of I/O via IE/PB-Links. |
| Number of IO Controllers | |
| • integrated | 1 |
| Rack | |
| • Modules per rack, max. | 5; CPU + 2 PS + 2 CP |
| 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 |
| • on Ethernet via NTP | Yes |
| Interfaces | |
| Number of PROFINET interfaces | 1 |
| 1. Interface | |
| Interface types | |
| • RJ 45 (Ethernet) | Yes; X1 |
| • Number of ports | 2 |
| • integrated switch | Yes |
| Protocols | |
| • IP protocol | Yes; IPv4 |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | No |
| • SIMATIC communication | Yes; Only Server |
| • Open IE communication | Yes; Optionally also encrypted |
| • Web server | Yes |
| • Media redundancy | Yes |
| PROFINET IO Controller | |
| Services | |
| — Isochronous mode | No |
| — IRT | No |
| — PROFINergy | Yes; per user program |
| — Number of connectable IO Devices, max. | 64 |
| — 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 |
| — PROFINET Security Class | 1 |
| Update time for RT | |

— for send cycle of 1 ms

1 ms to 512 ms

Interface types

| RJ 45 (Ethernet) | |
|----------------------------------|-----|
| • 100 Mbps | Yes |
| • Autonegotiation | Yes |
| • Autocrossing | Yes |
| • Industrial Ethernet status LED | Yes |

Protocols

| | |
|-----------|----|
| PROFIsafe | No |
|-----------|----|

Number of connections

| | |
|---|---|
| • Number of connections, max. | 128; via integrated interfaces of the CPU and connected CPs |
| • Number of connections reserved for ES/HMI/web | 10 |
| • Number of connections via integrated interfaces | 88 |
| • Number of S7 routing paths | 16 |

Redundancy mode

| | |
|-----------------------------------|-----|
| • PROFINET system redundancy (S2) | Yes |
| • PROFINET system redundancy (R1) | No |

Media redundancy

| | |
|--|--|
| — Media redundancy | Yes; only via 1st interface (X1) |
| — MRP | Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 |
| — MRP interconnection, supported | Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 |
| — MRPD | No |
| — Switchover time on line break, typ. | 200 ms; PROFINET MRP |
| — Number of stations in the ring, max. | 50; Only 16 are recommended, however |

SIMATIC communication

| | |
|-------------------------------|--|
| • PG/OP communication | Yes; encryption with TLS V1.3 pre-selected |
| • S7 routing | Yes |
| • S7 communication, as server | Yes |
| • S7 communication, as client | No |

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. | 2 kbyte; 1 472 bytes for UDP broadcast |
| — UDP multicast | Yes; max. 78 multicast circuits |
| • DHCP | No |
| • DNS | Yes |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • Encryption | Yes; Optional |

Web server

| | |
|---|-----------------------|
| • HTTP | No |
| • HTTPS | Yes; only via Web API |
| • web API | Yes |
| — Number of sessions, max. | 50 |
| — number of simultaneous HTTP calls, max. | 4 |
| — HTTP request body, max. | 131 072 byte |

OPC UA

| | |
|--|--|
| • Runtime license required | Yes; "Small" license required per CPU |
| • OPC UA Client | No |
| • OPC UA Server | Yes; data access (read, write, subscribe), method call, custom address space, role-based access control |
| — Application authentication | Yes |
| — Security policies | available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss |
| — User authentication | "anonymous" or by user name & password |
| — GDS support (certificate management) | No |

| | |
|--|---|
| — Number of sessions, max. | 16 |
| — Number of subscriptions per session, max. | 25 |
| — Sampling interval, min. | 250 ms |
| — Publishing interval, min. | 500 ms |
| — Number of server methods, max. | 20; max. 20 concurrently running jobs each for asynchronous instructions OPC-UA_ServerMethodPre (V1.1) and OPC-UA_ServerMethodPost (V1.1) |
| — Number of inputs/outputs per server method, max. | 20 |
| — Number of monitored items, recommended max. | 2 000; for 1 s sampling interval and 1 s send interval |
| — Number of server interfaces, max. | 10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace" |
| — Number of nodes for user-defined server interfaces, max. | 15 000 |
| • Alarms and Conditions | No |
| Further protocols | |
| • MODBUS | Yes; MODBUS TCP |
| S7 message functions | |
| Number of login stations for message functions, max. | 32 |
| number of subscriptions, max. | 250 |
| number of tags/attributes for subscriptions, max. | 2 000 |
| Program alarms | Yes |
| Number of configurable program messages, max. | 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH |
| Number of loadable program messages in RUN, max. | 5 000 |
| Number of simultaneously active program alarms | |
| • Number of program alarms | 600 |
| • Number of alarms for system diagnostics | 100 |
| Test commissioning functions | |
| Joint commission (Team Engineering) | Yes |
| Status block | Yes; up to 8 simultaneously |
| Single step | No |
| Number of breakpoints | 8; Breakpoints are only supported in RUN-Solo status |
| Profiling | Yes |
| Status/control | |
| • Status/control variable | Yes |
| • Variables | Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters |
| • Number of variables, max. | |
| — of which status variables, max. | 200; per job |
| — of which control variables, max. | 200; per job |
| Forcing | |
| • Forcing | Yes |
| • Forcing, variables | Peripheral inputs/outputs |
| • Number of variables, max. | 200 |
| Diagnostic buffer | |
| • present | Yes |
| • Number of entries, max. | 1 000 |
| — of which powerfail-proof | 500 |
| Traces | |
| • Number of configurable Traces | 4 |
| • Memory size per trace, max. | 512 kbyte |
| Interrupts/diagnostics/status information | |
| Diagnostics indication LED | |
| • RUN/STOP LED | Yes |
| • ERROR LED | Yes |
| • MAINT LED | Yes |
| • STOP ACTIVE LED | Yes |
| • Connection display LINK TX/RX | Yes |
| Supported technology objects | |
| Motion Control | No |
| Controller | |
| • 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 | Yes |
| Standards, approvals, certificates | |
| Siemens Eco Profile (SEP) | Siemens EcoTech |
| Ecological footprint | |
| <ul style="list-style-type: none"> environmental product declaration | Yes |
| Global warming potential | |
| — global warming potential, (total) [CO2 eq] | 80.1 kg |
| — global warming potential, (during production) [CO2 eq] | 23.8 kg |
| — global warming potential, (during operation) [CO2 eq] | 57.4 kg |
| — global warming potential, (after end of life cycle) [CO2 eq] | -1.29 kg |
| product functions / security / header | |
| PROFINET Security Class | 1 |
| signed firmware update | Yes |
| Secure Boot | Yes |
| safely removing data | Yes |
| Ambient conditions | |
| Ambient temperature during operation | |
| <ul style="list-style-type: none"> horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max. | <p>-30 °C; No condensation</p> <p>60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off</p> <p>-30 °C; No condensation</p> <p>40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off</p> |
| Ambient temperature during storage/transportation | |
| <ul style="list-style-type: none"> min. max. | <p>-40 °C</p> <p>70 °C</p> |
| Altitude during operation relating to sea level | |
| <ul style="list-style-type: none"> Installation altitude above sea level, max. | 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual |
| configuration / header | |
| configuration / programming / header | |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — STL | Yes |
| — SCL | Yes |
| — CFC | Yes |
| — GRAPH | Yes |
| Know-how protection | |
| <ul style="list-style-type: none"> User program protection/password protection Copy protection Block protection | <p>Yes</p> <p>No</p> <p>Yes</p> |
| Access protection | |
| <ul style="list-style-type: none"> protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Write protection for Failsafe Protection level: Complete protection User administration Number of users Number of groups Number of roles | <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>No</p> <p>Yes</p> <p>Yes; device-wide and centralized</p> <p>100</p> <p>100</p> <p>50</p> |
| programming / cycle time monitoring / header | |
| <ul style="list-style-type: none"> lower limit upper limit | <p>adjustable minimum cycle time</p> <p>adjustable maximum cycle time</p> |
| Dimensions | |
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |

Weights

Weight, approx. 336 g

Classifications

| | Version | Classification |
|--------|---------|----------------|
| eClass | 14 | 27-24-22-07 |
| eClass | 12 | 27-24-22-07 |
| eClass | 9.1 | 27-24-22-07 |
| eClass | 9 | 27-24-22-07 |
| eClass | 8 | 27-24-22-07 |
| eClass | 7.1 | 27-24-22-07 |
| eClass | 6 | 27-24-22-07 |
| ETIM | 9 | EC000236 |
| ETIM | 8 | EC000236 |
| ETIM | 7 | EC000236 |
| IDEA | 4 | 3565 |
| UNSPSC | 15 | 32-15-17-05 |

Approvals / Certificates

General Product Approval



Miscellaneous



Miscellaneous



General Product Approval

EMV

For use in hazardous locations

KC



EM



EM

For use in hazardous locations

Marine / Shipping

Miscellaneous



Type Examination Certificate



Marine / Shipping



NK / Nippon Kaiji Kyokai



CCS (China Classification Society)



Environment



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