



Figure similar

SIMATIC ET 200SP Open Controller, CPU 1515SP PC2 + HMI 128PT, 8 GB RAM, 128 GB CFast with Windows 10 IoT Enterprise 64-bit, S7-1500 Software Controller CPU 1505SP and WinCC Runtime Advanced pre-installed, with 128 PowerTags license; Interfaces: 1x Slot CFast, 1x slot SD/MMC, 1x connection for ET 200SP bus Adapter PROFINET, 1x 10/100/1000 Mbit/s Ethernet, 2x USB 3.0, 2x USB 2.0, 1x display port, Documentation on CFast Restore image on CFast

| General information                                      |                                                                  |
|----------------------------------------------------------|------------------------------------------------------------------|
| Product type designation                                 | CPU 1515SP PC2                                                   |
| HW functional status                                     | from FS04                                                        |
| Firmware version                                         | V21.9                                                            |
| Engineering with                                         |                                                                  |
| • STEP 7 TIA Portal configurable/integrated from version | V17                                                              |
| Installed software                                       |                                                                  |
| • Visualization                                          | WinCC Runtime Advanced V17                                       |
| • Control                                                | S7-1500 Software Controller CPU 1505SP                           |
| Configuration control                                    |                                                                  |
| via dataset                                              | Yes                                                              |
| Control elements                                         |                                                                  |
| Mode selector switch                                     | 1                                                                |
| 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                                          |                                                                  |
| • 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 <sub>pt</sub>                                          | 0.426 A <sup>2</sup> ·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.                                         | 15 W; without ET 200SP modules and without using USB             |
| 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; 128 GB flash memory                                         |
| SIMATIC memory card required                             | No                                                               |
| Work memory                                              |                                                                  |
| • integrated (for program)                               | 1 Mbyte                                                          |



|                                               |                                                                                    |
|-----------------------------------------------|------------------------------------------------------------------------------------|
| • Number of clock memories                    | 8; 8 clock memory bit, 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                                                     |
| <b>Address area</b>                           |                                                                                    |
| Number of IO modules                          | 8 192                                                                              |
| <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>Subprocess images</b>                      |                                                                                    |
| • Number of subprocess images, max.           | 32                                                                                 |
| <b>Hardware configuration</b>                 |                                                                                    |
| Integrated power supply                       | Yes                                                                                |
| Number of distributed IO systems              | 20                                                                                 |
| <b>Number of DP masters</b>                   |                                                                                    |
| • Via CM                                      | 1                                                                                  |
| <b>Number of IO Controllers</b>               |                                                                                    |
| • via PC interfaces                           | 1                                                                                  |
| <b>Rack</b>                                   |                                                                                    |
| • Modules per rack, max.                      | 64; CPU 1515SP PC + 64 modules + server module                                     |
| • Quantity of operable ET 200SP modules, max. | 64                                                                                 |
| • Quantity of operable ET 200AL modules, max. | 16                                                                                 |
| • 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                                                                     |
| • 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                                                                    |
| <b>Clock synchronization</b>                  |                                                                                    |
| • supported                                   | Yes                                                                                |
| • to DP, master                               | Yes                                                                                |
| • on Ethernet via NTP                         | Yes                                                                                |
| • on Windows clock, slave                     | Yes                                                                                |
| <b>Interfaces</b>                             |                                                                                    |
| Number of industrial Ethernet interfaces      | 2                                                                                  |
| Number of PROFINET interfaces                 | 1                                                                                  |
| Number of PROFIBUS interfaces                 | 1                                                                                  |
| 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                                                                                  |
| <b>Video interfaces</b>                       |                                                                                    |
| • Graphics interface                          | 1x DisplayPort                                                                     |
| <b>1. Interface</b>                           |                                                                                    |
| Interface type                                | PROFINET                                                                           |
| automatic detection of transmission rate      | Yes                                                                                |
| Autonegotiation                               | Yes                                                                                |
| Autocrossing                                  | Yes                                                                                |
| Number of connections                         | 88                                                                                 |
| <b>Interface types</b>                        |                                                                                    |
| • RJ 45 (Ethernet)                            | Yes; Via BusAdapter BA 2x RJ45                                                     |
| — Transmission rate, max.                     | 100 Mbit/s                                                                         |
| — Industrial Ethernet status LED              | Yes                                                                                |
| • Number of ports                             | 2                                                                                  |
| • integrated switch                           | Yes                                                                                |
| • BusAdapter (PROFINET)                       | Yes; compatible BusAdapters: BA 2x RJ45, BA 2x M12, BA 2x FC, BA 2x LC,            |

| Protocols                                                                     |                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • IP protocol                                                                 | Yes; IPv4                                                                                                                                                                                                                     |
| • PROFINET IO Controller                                                      | Yes                                                                                                                                                                                                                           |
| • PROFINET IO Device                                                          | Yes                                                                                                                                                                                                                           |
| • SIMATIC communication                                                       | Yes                                                                                                                                                                                                                           |
| • Open IE communication                                                       | Yes; Optionally also encrypted                                                                                                                                                                                                |
| • Web server                                                                  | Yes                                                                                                                                                                                                                           |
| PROFINET IO Controller                                                        |                                                                                                                                                                                                                               |
| Services                                                                      |                                                                                                                                                                                                                               |
| — Isochronous mode                                                            | Yes                                                                                                                                                                                                                           |
| — shortest clock pulse                                                        | 500 µs                                                                                                                                                                                                                        |
| — IRT                                                                         | Yes                                                                                                                                                                                                                           |
| — PROFINergy                                                                  | 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: 625 µs ... 3 875 µs)<br>minimum cycle time start from 500 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                                                                                                                                                                                                                           |
| — PROFINergy                                                                  | 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                                                               |                                                                                                                                                                                                                               |
| • RJ 45 (Ethernet)                                                            | Yes; Integrated                                                                                                                                                                                                               |
| — Transmission rate, max.                                                     | 1 000 Mbit/s                                                                                                                                                                                                                  |

|                                                 |                                                                                      |
|-------------------------------------------------|--------------------------------------------------------------------------------------|
| — Industrial Ethernet status LED                | No                                                                                   |
| • Number of ports                               | 1                                                                                    |
| <b>3. Interface</b>                             |                                                                                      |
| Interface type                                  | PROFIBUS with CM DP                                                                  |
| Number of connections                           | 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                                                                              |
| <b>Interface types</b>                          |                                                                                      |
| RS 485                                          |                                                                                      |
| • Transmission rate, max.                       | 12 Mbit/s                                                                            |
| <b>Protocols</b>                                |                                                                                      |
| PROFIsafe                                       | No                                                                                   |
| 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                                |                                                                                      |
| — MRP                                           | Yes                                                                                  |
| — MRPD                                          | Yes                                                                                  |
| — 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                           |                                                                                      |
| • TCP/IP                                        | Yes                                                                                  |
| — Data length, max.                             | 64 kbyte                                                                             |
| • ISO-on-TCP (RFC1006)                          | Yes                                                                                  |
| — Data length, max.                             | 64 kbyte                                                                             |
| • UDP                                           | Yes                                                                                  |
| — Data length, max.                             | 2 048 byte                                                                           |
| • SNMP                                          | Yes                                                                                  |
| • DCP                                           | Yes                                                                                  |
| • LLDP                                          | Yes                                                                                  |
| Web server                                      |                                                                                      |
| • HTTP                                          | Yes; Via Windows and PROFINET interface                                              |
| • HTTPS                                         | Yes; Via Windows and PROFINET interface                                              |
| OPC UA                                          |                                                                                      |
| • Runtime license required                      | Yes; "Small" license required                                                        |
| • OPC UA Client                                 | Yes; From SW CPU 1505SP V2.6                                                         |
| • OPC UA Server                                 | Yes; Data access (read, write, subscribe), runtime license required                  |
| — Application authentication                    | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — Security policies                             | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |

|                                                                              |                                                                                                                                   |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| — User authentication                                                        | Yes; "anonymous" or by user name & password                                                                                       |
| <b>Further protocols</b>                                                     |                                                                                                                                   |
| • MODBUS                                                                     | Yes; MODBUS TCP                                                                                                                   |
| <b>S7 message functions</b>                                                  |                                                                                                                                   |
| 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                                                                                                                             |
| • Number of program alarms                                                   | 1 000                                                                                                                             |
| • Number of alarms for system diagnostics                                    | 200                                                                                                                               |
| • Number of alarms for motion technology objects                             | 160                                                                                                                               |
| <b>Test commissioning functions</b>                                          |                                                                                                                                   |
| 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                                                                                                                                 |
| <b>Status/control</b>                                                        |                                                                                                                                   |
| • Status/control variable                                                    | Yes                                                                                                                               |
| • Variables                                                                  | Inputs, outputs, memory bits, DB, times, counters                                                                                 |
| • Number of variables, max.                                                  |                                                                                                                                   |
| — of which status variables, max.                                            | 200                                                                                                                               |
| — of which control variables, max.                                           | 200                                                                                                                               |
| <b>Forcing</b>                                                               |                                                                                                                                   |
| • Forcing                                                                    | Yes                                                                                                                               |
| • Forcing, variables                                                         | Inputs, outputs                                                                                                                   |
| • Number of variables, max.                                                  | 200                                                                                                                               |
| <b>Diagnostic buffer</b>                                                     |                                                                                                                                   |
| • present                                                                    | Yes                                                                                                                               |
| • Number of entries, max.                                                    | 1 000                                                                                                                             |
| — of which powerfail-proof                                                   | 300                                                                                                                               |
| <b>Traces</b>                                                                |                                                                                                                                   |
| • Number of configurable Traces                                              | 4                                                                                                                                 |
| • Memory size per trace, max.                                                | 512 kbyte                                                                                                                         |
| <b>Interrupts/diagnostics/status information</b>                             |                                                                                                                                   |
| <b>Diagnostics indication LED</b>                                            |                                                                                                                                   |
| • RUN/STOP LED                                                               | Yes                                                                                                                               |
| • ERROR LED                                                                  | Yes                                                                                                                               |
| • MAINT LED                                                                  | Yes                                                                                                                               |
| <b>Supported technology objects</b>                                          |                                                                                                                                   |
| Motion Control                                                               | Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool |
| • Number of available Motion Control resources for technology objects        | 2 400                                                                                                                             |
| • Required Motion Control resources                                          |                                                                                                                                   |
| — 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                                                           |                                                                                                                                   |
| — 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                                                                                                                                |
| <b>Controller</b>                                                            |                                                                                                                                   |
| • 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                                                                  |
| <b>Counting and measuring</b>                                                |                                                                                                                                   |
| • High-speed counter                                                         | Yes                                                                                                                               |

| Standards, approvals, certificates                 |                                                                                                                       |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| CE mark                                            | Yes                                                                                                                   |
| CSA approval                                       | Yes                                                                                                                   |
| cULus                                              | Yes                                                                                                                   |
| FM approval                                        | Yes                                                                                                                   |
| RCM (formerly C-TICK)                              | Yes                                                                                                                   |
| Ambient conditions                                 |                                                                                                                       |
| Ambient temperature during operation               |                                                                                                                       |
| • min.                                             | -20 °C                                                                                                                |
| • horizontal installation, min.                    | -20 °C                                                                                                                |
| • horizontal installation, max.                    | 60 °C; from 55°C: with max. 32 ET 200SP modules; 4x 0.3 A USB load; CFast memory card max. 10% load; SD card not used |
| • vertical installation, min.                      | -20 °C                                                                                                                |
| • vertical installation, max.                      | 50 °C; from 45°C: with max. 32 ET 200SP modules; 4x 0.3 A USB load; CFast memory card and SD card; max. 10% load      |
| Ambient temperature during storage/transportation  |                                                                                                                       |
| • min.                                             | -40 °C                                                                                                                |
| • max.                                             | 70 °C                                                                                                                 |
| 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                                                                                                                   |
| Operating systems                                  |                                                                                                                       |
| pre-installed operating system                     | Windows 10 IoT Enterprise 2019 LTSC, 64 bit, MUI                                                                      |
| configuration / header                             |                                                                                                                       |
| configuration / programming / header               |                                                                                                                       |
| Programming language                               |                                                                                                                       |
| — LAD                                              | Yes                                                                                                                   |
| — FBD                                              | Yes                                                                                                                   |
| — 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 of confidential configuration data    | Yes                                                                                                                   |
| • Protection level: Write protection               | Yes                                                                                                                   |
| • Protection level: Read/write protection          | Yes                                                                                                                   |
| • Protection level: Complete protection            | Yes                                                                                                                   |
| programming / cycle time monitoring / header       |                                                                                                                       |
| • 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                                                                                                               |

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