SIEMENS

## Data sheet 6ES7212-1AE40-0XB0


Figure similar

SIMATIC S7-1200, CPU 1212C, compact CPU, DC/DC/DC, onboard I/O: 8 DI 24 V DC; 6 DO 24 V DC; 2 AI 0-10 V DC, power supply: DC 20.4-28.8 V DC, program/data memory 100 KB

| | |
|---|---|
| **General information** | |
| Product type designation | CPU 1212C DC/DC/DC |
| Firmware version | V4.6 |
| Engineering with | |
| ● Programming package | STEP 7 V18 or higher |
| **Supply voltage** | |
| Rated value (DC) | |
| ● 24 V DC | Yes |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| Reverse polarity protection | Yes |
| Load voltage L+ | |
| ● Rated value (DC) | 24 V |
| ● permissible range, lower limit (DC) | 20.4 V |
| ● permissible range, upper limit (DC) | 28.8 V |
| **Input current** | |
| Current consumption (rated value) | 400 mA; CPU only |
| Current consumption, max. | 1 200 mA; CPU with all expansion modules |
| Inrush current, max. | 12 A; at 28.8 V DC |
| $I^2t$ | 0.5 $A^2 \cdot s$ |
| **Output current** | |
| for backplane bus (5 V DC), max. | 1 000 mA; Max. 5 V DC for SM and CM |
| **Encoder supply** | |
| 24 V encoder supply | |
| ● 24 V | L+ minus 4 V DC min. |
| **Power loss** | |
| Power loss, typ. | 9 W |
| **Memory** | |
| Work memory | |
| ● integrated | 100 kbyte |
| Load memory | |
| ● integrated | 2 Mbyte |
| ● Plug-in (SIMATIC Memory Card), max. | with SIMATIC memory card |
| Backup | |
| ● present | Yes |
| ● maintenance-free | Yes |
| ● without battery | Yes |
| **CPU processing times** | |
| for bit operations, typ. | 0.08 µs; / instruction |

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| for word operations, typ. | 1.7 µs; / instruction |
| for floating point arithmetic, typ. | 2.3 µs; / instruction |
| **CPU-blocks** | |
| Number of blocks (total) | DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used |
| OB | |
| ● Number, max. | Limited only by RAM for code |
| **Data areas and their retentivity** | |
| Retentive data area (incl. timers, counters, flags), max. | 14 kbyte |
| Flag | |
| ● Size, max. | 4 kbyte; Size of bit memory address area |
| Local data | |
| ● per priority class, max. | 16 kbyte; Priority class 1 (program cycle): 16 KB, priority class 2 to 26: 6 KB |
| **Address area** | |
| Process image | |
| ● Inputs, adjustable | 1 kbyte |
| ● Outputs, adjustable | 1 kbyte |
| **Hardware configuration** | |
| Number of modules per system, max. | 3 comm. modules, 1 signal board, 2 signal modules |
| **Time of day** | |
| Clock | |
| ● Hardware clock (real-time) | Yes |
| ● Backup time | 480 h; Typical |
| ● Deviation per day, max. | ±60 s/month at 25 °C |
| **Digital inputs** | |
| Number of digital inputs | 8; Integrated |
| ● of which inputs usable for technological functions | 6; HSC (High Speed Counting) |
| Source/sink input | Yes |
| Number of simultaneously controllable inputs | |
| all mounting positions | |
| — up to 40 °C, max. | 8 |
| Input voltage | |
| ● Rated value (DC) | 24 V |
| ● for signal "0" | 5 V DC at 1 mA |
| ● for signal "1" | 15 V DC at 2.5 mA |
| Input delay (for rated value of input voltage) | |
| for standard inputs | |
| — parameterizable | 0.2 ms, 0.4 ms, 0.8 ms, 1.6 ms, 3.2 ms, 6.4 ms and 12.8 ms, selectable in groups of four |
| — at "0" to "1", min. | 0.2 ms |
| — at "0" to "1", max. | 12.8 ms |
| for interrupt inputs | |
| — parameterizable | Yes |
| for technological functions | |
| — parameterizable | Single phase: 3 @ 100 kHz & 3 @ 30 kHz, differential: 3 @ 80 kHz & 3 @ 30 kHz |
| Cable length | |
| ● shielded, max. | 500 m; 50 m for technological functions |
| ● unshielded, max. | 300 m; for technological functions: No |
| **Digital outputs** | |
| Number of digital outputs | 6 |
| ● of which high-speed outputs | 4; 100 kHz Pulse Train Output |
| Limitation of inductive shutdown voltage to | L+ (-48 V) |
| Switching capacity of the outputs | |
| ● with resistive load, max. | 0.5 A |
| ● on lamp load, max. | 5 W |
| Output voltage | |
| ● for signal "0", max. | 0.1 V; with 10 kOhm load |
| ● for signal "1", min. | 20 V |
| Output current | |

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| ● for signal "1" rated value | 0.5 A |
| ● for signal "0" residual current, max. | 0.1 mA |
| Output delay with resistive load | |
| ● "0" to "1", max. | 1 µs |
| ● "1" to "0", max. | 5 µs |
| Switching frequency | |
| ● of the pulse outputs, with resistive load, max. | 100 kHz |
| Relay outputs | |
| ● Number of relay outputs | 0 |
| Cable length | |
| ● shielded, max. | 500 m |
| ● unshielded, max. | 150 m |
| **Analog inputs** | |
| Number of analog inputs | 2 |
| Input ranges | |
| ● Voltage | Yes |
| Input ranges (rated values), voltages | |
| ● 0 to +10 V | Yes |
| — Input resistance (0 to 10 V) | ≥100k ohms |
| Cable length | |
| ● shielded, max. | 100 m; twisted and shielded |
| **Analog outputs** | |
| Number of analog outputs | 0 |
| **Analog value generation for the inputs** | |
| Integration and conversion time/resolution per channel | |
| ● Resolution with overrange (bit including sign), max. | 10 bit |
| ● Integration time, parameterizable | Yes |
| ● Conversion time (per channel) | 625 µs |
| **Encoder** | |
| Connectable encoders | |
| ● 2-wire sensor | Yes |
| **1. Interface** | |
| Interface type | PROFINET |
| Isolated | Yes |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Interface types | |
| ● RJ 45 (Ethernet) | Yes |
| ● Number of ports | 1 |
| ● integrated switch | No |
| Protocols | |
| ● PROFINET IO Controller | Yes |
| ● PROFINET IO Device | Yes |
| ● SIMATIC communication | Yes |
| ● Open IE communication | Yes; Optionally also encrypted |
| ● Web server | Yes |
| ● Media redundancy | No |
| PROFINET IO Controller | |
| ● Transmission rate, max. | 100 Mbit/s |
| Services | |
| — PG/OP communication | Yes; encryption with TLS V1.3 pre-selected |
| — Isochronous mode | No |
| — IRT | No |
| — PROFIenergy | No |
| — Prioritized startup | Yes |
| — Number of IO devices with prioritized startup, max. | 16 |
| — Number of connectable IO Devices, max. | 16 |
| — Number of connectable IO Devices for RT, max. | 16 |
| — of which in line, max. | 16 |

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| — Activation/deactivation of IO Devices | Yes |
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| — Updating time | The minimum value of the update time also depends on the communication component set for PROFINET IO, on the number of IO devices and the quantity of configured user data. |
| PROFINET IO Device | |
| Services | |
| — PG/OP communication | Yes; encryption with TLS V1.3 pre-selected |
| — Isochronous mode | No |
| — IRT | No |
| — PROFIenergy | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 2 |
| **Protocols** | |
| Supports protocol for PROFINET IO | Yes |
| PROFIsafe | No |
| PROFIBUS | Yes; CM 1243-5 (master) or CM 1242-5 (slave) required |
| OPC UA | Yes; OPC UA Server |
| AS-Interface | Yes; CM 1243-2 required |
| Protocols (Ethernet) | |
| ● TCP/IP | Yes |
| ● DHCP | No |
| ● SNMP | Yes |
| ● DCP | Yes |
| ● LLDP | Yes |
| Redundancy mode | |
| Media redundancy | |
| — MRP | No |
| — MRPD | No |
| SIMATIC communication | |
| ● S7 routing | Yes |
| Open IE communication | |
| ● TCP/IP | Yes |
| — Data length, max. | 8 kbyte |
| — several passive connections per port, supported | Yes |
| ● ISO-on-TCP (RFC1006) | Yes |
| — Data length, max. | 8 kbyte |
| ● UDP | Yes |
| — Data length, max. | 1 472 byte |
| Web server | |
| ● supported | Yes |
| ● User-defined websites | Yes |
| OPC UA | |
| ● Runtime license required | Yes; "Basic" license required |
| ● OPC UA Server | Yes; data access (read, write, subscribe), method call, runtime license required |
| — Application authentication | Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — User authentication | "anonymous" or by user name & password |
| — Number of sessions, max. | 10 |
| — Number of subscriptions per session, max. | 5 |
| — Sampling interval, min. | 100 ms |
| — Publishing interval, min. | 200 ms |
| — Number of server methods, max. | 20 |
| — Number of monitored items, recommended max. | 1 000 |
| — Number of server interfaces, max. | 2 |
| — Number of nodes for user-defined server interfaces, max. | 2 000 |
| Further protocols | |
| ● MODBUS | Yes |
| **communication functions / header** | |
| S7 communication | |

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| ● supported | Yes |
| ● as server | Yes |
| ● as client | Yes |
| ● User data per job, max. | See online help (S7 communication, user data size) |
| Number of connections | |
| ● overall | PG Connections: 4 reserved / 4 max; HMI Connections: 12 reserved / 18 max; S7 Connections: 8 reserved / 14 max; Open User Connections: 8 reserved / 14 max; Web Connections: 2 reserved / 30 max; OPC UA Connections: 0 reserved / 10 max; Total Connections: 34 reserved / 64 max |
| **Test commissioning functions** | |
| Status/control | |
| ● Status/control variable | Yes |
| ● Variables | Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters |
| Forcing | |
| ● Forcing | Yes |
| Diagnostic buffer | |
| ● present | Yes |
| Traces | |
| ● Number of configurable Traces | 2 |
| ● Memory size per trace, max. | 512 kbyte |
| **Interrupts/diagnostics/status information** | |
| Diagnostics indication LED | |
| ● RUN/STOP LED | Yes |
| ● ERROR LED | Yes |
| ● MAINT LED | Yes |
| **Integrated Functions** | |
| Frequency measurement | Yes |
| controlled positioning | Yes |
| Number of position-controlled positioning axes, max. | 8 |
| Number of positioning axes via pulse-direction interface | 4; With integrated outputs |
| PID controller | Yes |
| Number of alarm inputs | 4 |
| Number of pulse outputs | 4 |
| Limit frequency (pulse) | 100 kHz |
| **Potential separation** | |
| Potential separation digital inputs | |
| ● Potential separation digital inputs | No |
| ● between the channels, in groups of | 1 |
| Potential separation digital outputs | |
| ● Potential separation digital outputs | Yes |
| ● between the channels | No |
| ● between the channels, in groups of | 1 |
| **EMC** | |
| Interference immunity against discharge of static electricity | |
| ● Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 | Yes |
| — Test voltage at air discharge | 8 kV |
| — Test voltage at contact discharge | 6 kV |
| Interference immunity to cable-borne interference | |
| ● Interference immunity on supply lines acc. to IEC 61000-4-4 | Yes |
| ● Interference immunity on signal cables acc. to IEC 61000-4-4 | Yes |
| Interference immunity against voltage surge | |
| ● Interference immunity on supply lines acc. to IEC 61000-4-5 | Yes |
| Interference immunity against conducted variable disturbance induced by high-frequency fields | |
| ● Interference immunity against high-frequency radiation acc. to IEC 61000-4-6 | Yes |
| Emission of radio interference acc. to EN 55 011 | |
| ● Limit class A, for use in industrial areas | Yes; Group 1 |
| ● Limit class B, for use in residential areas | Yes; When appropriate measures are used to ensure compliance with the limits for Class B according to EN 55011 |

| | |
|---|---|
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **Standards, approvals, certificates** | |
| CE mark | Yes |
| UL approval | Yes |
| cULus | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| KC approval | Yes |
| Marine approval | Yes |
| **Ambient conditions** | |
| Free fall | |
| ● Fall height, max. | 0.3 m; five times, in product package |
| Ambient temperature during operation | |
| ● min. | -20 °C |
| ● max. | 60 °C; Number of simultaneously activated inputs or outputs 4 or 3 (no adjacent points) at 60 °C horizontal or 50 °C vertical, 8 or 6 at 55 °C horizontal or 45 °C vertical |
| ● horizontal installation, min. | -20 °C |
| ● horizontal installation, max. | 60 °C |
| ● vertical installation, min. | -20 °C |
| ● vertical installation, max. | 50 °C |
| Ambient temperature during storage/transportation | |
| ● min. | -40 °C |
| ● max. | 70 °C |
| Air pressure acc. to IEC 60068-2-13 | |
| ● Operation, min. | 795 hPa |
| ● Operation, max. | 1 080 hPa |
| ● Storage/transport, min. | 660 hPa |
| ● Storage/transport, max. | 1 080 hPa |
| Altitude during operation relating to sea level | |
| ● Installation altitude, min. | -1 000 m |
| ● Installation altitude, max. | 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual |
| Relative humidity | |
| ● Operation, max. | 95 %; no condensation |
| Vibrations | |
| ● Vibration resistance during operation acc. to IEC 60068-2-6 | 2 g (m/s²) wall mounting, 1 g (m/s²) DIN rail |
| ● Operation, tested according to IEC 60068-2-6 | Yes |
| Shock testing | |
| ● tested according to IEC 60068-2-27 | Yes; IEC 68, Part 2-27 half-sine: strength of the shock 15 g (peak value), duration 11 ms |
| Pollutant concentrations | |
| ● SO2 at RH < 60% without condensation | S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| **configuration / header** | |
| configuration / programming / header | |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — SCL | 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 | |
| ● adjustable | Yes |
| **Dimensions** | |

| | |
|---|---|
| Width | 90 mm |
| Height | 100 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 370 g |

**last modified:** 3/12/2024