SIEMENS

## Data sheet 6ES7212-1BG50-0XB0



SIMATIC S7-1200 G2: compact CPU 1212C AC/DC/RLY; power supply: AC 85-264 V AC at 47-63 Hz; onboard I/O: 8x DI 24 V DC; 6 DO relay 2 A; memory: program 150 KB data: 500 KB, retentivity: 20 KB

| | |
|---|---|
| **General information** | |
| Product type designation | CPU 1212C AC/DC/relay |
| Firmware version | V4.1 |
| ● FW update possible | Yes |
| Product function | |
| ● I&M data | Yes; I&M0 to I&M3 |
| ● Isochronous mode | Yes; For PROFINET only |
| ● SysLog | Yes |
| Engineering with | |
| ● Programming package | STEP 7 V21 or higher |
| **Supply voltage** | |
| Rated value (AC) | |
| ● 120 V AC | Yes |
| ● 230 V AC | Yes |
| permissible range, lower limit (AC) | 85 V |
| permissible range, upper limit (AC) | 264 V |
| Line frequency | |
| ● permissible range, lower limit | 47 Hz |
| ● permissible range, upper limit | 63 Hz |
| **Input current** | |
| Current consumption (rated value) | 70 mA at 120 V AC; 38 mA at 240 V AC |
| Current consumption, max. | 330 mA at 120 V AC; 200 mA at 240 V AC |
| Inrush current, max. | 20 A; at 264 V |
| $I^2t$ | 0.8 $A^2 \cdot s$ |
| **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 | Yes; 20.4 to 28.8V |
| ● Short-circuit protection | Yes |
| ● Output current, max. | 300 mA |
| **Power loss** | |
| Power loss, typ. | 4 W |
| **Storage** | |
| Work memory | |
| ● integrated | 650 kbyte |


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| | |
|---|---|
| ● integrated (for program) | 150 kbyte |
| ● integrated (for data) | 500 kbyte |
| Load memory | |
| ● integrated | 8 Mbyte |
| ● Plug-in (SIMATIC Memory Card), max. | 32 Gbyte; with SIMATIC memory card |
| Backup | |
| ● present | Yes |
| ● maintenance-free | Yes |
| ● without battery | Yes |
| **CPU processing times** | |
| for bit operations, typ. | 37 ns; / instruction |
| for word operations, typ. | 30 ns; / instruction |
| for floating point arithmetic, typ. | 74 ns; / instruction |
| **CPU-blocks** | |
| Number of elements (total) | 4 000; Blocks (OB, FB, FC, DB) and UDTs |
| OB | |
| ● 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 1 ms |
| ● Number of process alarm OBs | 50 |
| ● Number of DPV1 alarm OBs | 3 |
| ● Number of isochronous mode OBs | 1 |
| ● Number of startup OBs | 100 |
| ● Number of asynchronous error OBs | 4 |
| ● Number of synchronous error OBs | 2 |
| ● Number of diagnostic alarm OBs | 1 |
| **Data areas and their retentivity** | |
| Retentive data area (incl. timers, counters, flags), max. | 20 kbyte |
| Flag | |
| ● Size, max. | 8 kbyte; Size of bit memory address area |
| Local data | |
| ● per priority class, max. | 64 kbyte; max. 16 KB per block |
| **Address area** | |
| I/O address area | |
| ● Inputs | 1 kbyte; All inputs are in the process image |
| ● Outputs | 1 kbyte; All outputs are in the process image |
| Process image | |
| ● Inputs, adjustable | 1 kbyte |
| ● Outputs, adjustable | 1 kbyte |
| **Hardware configuration** | |
| Number of modules per system, max. | 6 |
| ● number of expansion boards (SB, CB, BB) | 1 |
| ● number of signal modules (SM) | 6; depends on the number of CMs |
| ● number of communications modules (CM) | 3 |
| **Time of day** | |
| Clock | |
| ● Hardware clock (real-time) | Yes |
| ● Backup time | 480 h; Typical |
| ● Deviation per day, max. | 2 s; at 25 °C |
| Clock synchronization | |
| ● on Ethernet via NTP | Yes |
| **Digital inputs** | |
| Number of digital inputs | 8; Integrated |
| ● of which inputs usable for technological functions | 8; HSC (High Speed Counting) |
| Sourcing/sinking input | Yes |
| Number of simultaneously controllable inputs | |
| all mounting positions | |


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|---|---|
| — up to 40 °C, max. | 8 |
| Input voltage | |
| ● Rated value (DC) | 24 V |
| ● for signal "0" | 5 V DC or 0.5 mA |
| ● for signal "1" | 15 V DC at 2.5 mA |
| Input delay (for rated value of input voltage) | |
| for standard inputs | |
| — parameterizable | 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 µs; 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 ms |
| — at "0" to "1", min. | 0.1 µs |
| — at "0" to "1", max. | 20 µs |
| for interrupt inputs | |
| — Parameterizable | Yes |
| for technological functions | |
| — parameterizable | single phase: 6 HSCs @ 100 kHz & 2 standard @ 30 kHz, quadrature phase: 6 HSCs @ 80 kHz & 2 standard @ 20 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; Relays |
| Switching capacity of the outputs | |
| ● with resistive load, max. | 2 A |
| ● on lamp load, max. | 30 W with DC, 200 W with AC |
| Output delay with resistive load | |
| ● "0" to "1", max. | 10 ms; max. |
| ● "1" to "0", max. | 10 ms; max. |
| Switching frequency | |
| ● of the pulse outputs, with resistive load, max. | Not recommended |
| Relay outputs | |
| ● Number of relay outputs | 6 |
| ● Number of operating cycles, max. | mechanically 10 million, at rated load voltage 100 000 |
| Cable length | |
| ● shielded, max. | 500 m |
| ● unshielded, max. | 150 m |
| **Analog inputs** | |
| Number of analog inputs | 0 |
| **Analog outputs** | |
| Number of analog outputs | 0 |
| **Encoder** | |
| Connectable encoders | |
| ● 2-wire sensor | Yes |
| **Interfaces** | |
| Number of PROFINET interfaces | 1 |
| **1. Interface** | |
| Interface type | PROFINET |
| Isolated | Yes |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Interface types | |
| ● RJ 45 (Ethernet) | Yes; X1 |
| — Transmission rate, max. | 100 Mbit/s |
| ● Number of ports | 2 |
| ● integrated switch | Yes |
| Protocols | |
| ● IP protocol | Yes; IPv4 |
| ● PROFINET IO Controller | Yes |
| ● PROFINET IO Device | Yes |


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|---|---|
| ● SIMATIC communication | Yes |
| ● Open IE communication | Yes; Optionally also encrypted |
| ● Web server | Yes |
| ● Media redundancy | Yes |
| PROFINET IO Controller | |
| ● Transmission rate, max. | 100 Mbit/s |
| Services | |
| — PG/OP communication | Yes; encryption with TLS V1.3 pre-selected |
| — Isochronous mode | Yes |
| — IRT | Yes |
| — Dynamic Frame Packing (DFP) | Yes |
| — PROFIenergy | Yes; per user program |
| — Prioritized startup | Yes |
| — Number of IO devices with prioritized startup, max. | 16 |
| — Number of connectable IO Devices, max. | 31 |
| — Of which IO devices with IRT, max. | 31 |
| — Number of connectable IO Devices for RT, max. | 31 |
| — of which in line, max. | 31 |
| — 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. |
| Update time for IRT | |
| — 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 |
| Update time for RT | |
| — 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 |
| PROFINET IO Device | |
| Services | |
| — PG/OP communication | Yes; encryption with TLS V1.3 pre-selected |
| — Isochronous mode | No |
| — IRT | Yes |
| — Dynamic Frame Packing (DFP) | No |
| — PROFIenergy | Yes; per user program |
| — Prioritized startup | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 2 |
| — Asset management record | Yes |
| **Protocols** | |
| Supports protocol for PROFINET IO | Yes |
| PROFIsafe | No |
| PROFIBUS | No |
| OPC UA | Yes; OPC UA Server |
| AS-Interface | No |
| Protocols (Ethernet) | |
| ● TCP/IP | Yes |
| ● DHCP | Yes |
| ● SNMP | Yes |
| ● DCP | Yes |
| ● LLDP | Yes |
| Number of connections | |
| ● Number of connections, max. | 128; via integrated interfaces of the CPU and connected CPs / CMs |
| ● Number of connections reserved for ES/HMI/web | 10 |
| ● Number of connections via integrated interfaces | 88 |
| ● Number of S7 routing paths | 16 |
| Redundancy mode | |


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|---|---|
| ● PROFINET system redundancy (S2) | No |
| ● PROFINET system redundancy (R1) | No |
| Media redundancy | |
| — MRP | Yes; as MRP redundancy manager and/or MRP client |
| — MRP interconnection, supported | Yes |
| — MRPD | Yes; Requirement: IRT |
| — Number of stations in the ring, max. | 50 |
| 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 | Yes; only PUT/GET |
| ● User data per job, max. | See online help (S7 communication, user data size) |
| 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 |
| ● DHCP | Yes |
| ● DNS | Yes |
| ● SNMP | Yes |
| ● DCP | Yes |
| ● LLDP | Yes |
| ● Encryption | Yes; Optional |
| Web server | |
| ● supported | Yes |
| ● HTTPS | Yes |
| ● web API | Yes |
| — Number of sessions, max. | 30 |
| — HTTP request body, max. | 131 072 byte |
| ● 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 | Yes |
| — Security policies | available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss |
| — 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; MODBUS RTU/TCP |
| **Communication functions** | |
| S7 communication | |
| ● supported | Yes |
| ● as server | Yes |
| ● as client | Yes |
| ● User data per job, max. | See online help (S7 communication, user data size) |
| Number of connections | |


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| | |
|---|---|
| ● overall | PG Connections: 4 reserved; HMI Connections: 4 reserved / 82 max; S7 Connections: 78 max; Open User Connections: 78 max; Web Connections: 2 reserved / 80 max; Total Connections: 10 reserved / 88 max |
| **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 |
| Number of loadable program messages in RUN, max. | 2 500 |
| Number of simultaneously active program alarms | |
| ● Number of program alarms | 600 |
| ● Number of alarms for system diagnostics | 100 |
| ● Number of alarms for motion technology objects | 160 |
| **Test commissioning functions** | |
| Status block | Yes; Up to 8 simultaneously (in total across all ES clients) |
| Single step | No |
| 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. | 500 |
| — of which powerfail-proof | 100 |
| 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 |
| **Supported technology objects** | |
| Motion Control | Yes |
| ● Number of available Motion Control resources for technology objects | 800 |
| ● Required Motion Control resources | |
| — per speed-controlled axis | 40 |
| — per positioning axis | 80 |
| — per synchronous axis | 160 |
| — per external encoder | 80 |
| — per output cam | 20 |
| — per cam track | 160 |
| — per probe | 40 |
| ● Number of available Extended Motion Control resources for technology objects | 40 |
| ● Required Extended Motion Control resources | |
| — per cam (1 000 points and 50 segments) | 2 |
| — for each set of kinematics | 30 |
| ● kinematics functions | |
| — kinematics with up to 4 interpolating axes | Yes |
| — kinematics with 5 or more interpolating axes | No |


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| | |
|---|---|
| — user-defined kinematics | No |
| — SIMATIC Safe Kinematics | No |
| ● Positioning axis | |
| — Number of positioning axes at motion control cycle of 4 ms (typical value) | 10 |
| — Number of positioning axes at motion control cycle of 8 ms (typical value) | 10 |
| **Integrated Functions** | |
| Counter | Yes |
| ● Number of counters | 8 |
| ● Counting frequency, max. | 100 kHz; Ia.0 to Ia.5: 100 kHz (80 kHz in quadrature mode), Ia.6 to Ia.7: 30 kHz (20 kHz in quadrature mode) |
| Frequency measurement | Yes |
| controlled positioning | Yes |
| Number of position-controlled positioning axes, max. | 8 |
| Number of positioning axes via pulse-direction interface | Up to 4 with SB 1222 |
| PID controller | Yes |
| Number of pulse outputs | 8; individually assigned to CPU and Signal Board |
| Limit frequency (pulse) | 100 kHz |
| **Potential separation** | |
| Potential separation digital inputs | |
| ● Potential separation digital inputs | Yes; field side to logic: 707 V DC (type test) |
| ● between the channels | No |
| ● Number of potential groups | 1 |
| Potential separation digital outputs | |
| ● Potential separation digital outputs | Relays |
| ● between the channels | No |
| ● Number of potential groups | 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** | |
| Siemens Eco Profile (SEP) | Siemens EcoTech |
| CE mark | Yes |
| UL approval | Yes |
| cULus | Yes |
| FM approval | No |
| RCM (formerly C-TICK) | Yes |
| KC approval | Yes |
| Marine approval | Yes |
| Ecological footprint | |


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| | |
|---|---|
| ● environmental product declaration | Yes; type 2 acc. to ISO 14021 |
| Global warming potential | |
| — global warming potential, (total) [CO2 eq] | 61.1 kg |
| — global warming potential, (during production) [CO2 eq] | 12.4 kg |
| — global warming potential, (during operation) [CO2 eq] | 49.2 kg |
| — global warming potential, (after end of life cycle) [CO2 eq] | -0.63 kg |
| **Security** | |
| PROFINET Security Class | 1 |
| signed firmware update | Yes |
| Secure Boot | Yes |
| **Ambient conditions** | |
| Free fall | |
| ● Fall height, max. | 0.3 m; five times, in product package |
| Ambient temperature during operation | |
| ● min. | -20 °C; No condensation |
| ● max. | 40 °C; 40 °C horizontal or 30 °C vertical at max. voltages and max. specifications |
| ● horizontal installation, min. | -20 °C; No condensation |
| ● horizontal installation, max. | 60 °C; at rated voltages, 50 % of max. specification and alternate IO active |
| ● vertical installation, min. | -20 °C; No condensation |
| ● vertical installation, max. | 50 °C; at rated voltages, 50 % of max. specification and alternate IO active |
| Ambient temperature during storage/transportation | |
| ● min. | -40 °C |
| ● max. | 70 °C |
| Air pressure acc. to IEC 60068-2-13 | |
| ● Operation, min. | 540 hPa |
| ● Operation, max. | 1 140 hPa |
| ● Storage/transport, min. | 540 hPa |
| ● Storage/transport, max. | 1 140 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 | 3.5 mm from 5 - 8.4 Hz, 1g from 8.4 - 150 Hz |
| ● 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** | |
| Programming | |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — SCL | Yes |
| Know-how protection | |
| ● User program protection/password protection | Yes |
| ● Copy protection | No |
| ● Block protection | Yes |
| Access protection | |
| ● protection of confidential configuration data | Yes |
| ● Protection level: Write protection | Yes |
| ● Protection level: Read/write protection | Yes |


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|---|---|
| ● Protection level: Complete protection | Yes |
| ● User administration | Yes; device-wide and centralized |
| ● Number of users | 100 |
| ● Number of groups | 100 |
| ● Number of roles | 50 |
| Cycle time monitoring | |
| ● adjustable | Yes |
| **Dimensions** | |
| Width | 70 mm |
| Height | 125 mm |
| Depth | 100 mm |
| **Weights** | |
| Weight, approx. | 373 g |

**Classifications**

| | Version | Classification |
|---|---|---|
| eClass | 16 | 27-24-22-07 |
| 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 | 10 | EC000236 |
| ETIM | 9 | EC000236 |
| ETIM | 8 | EC000236 |
| ETIM | 7 | EC000236 |
| IDEA | 4 | 3565 |
| UNSPSC | 15 | 32-15-17-05 |

**Approvals / Certificates**

**General Product Approval**

Miscellaneous | Manufacturer Declaration

**General Product Approval**

TUEV | China RoHS

| General Product Approval | EMV | For use in hazardous locations | | | |
|---|---|---|---|---|---|
| Manufacturer Declaration | | Miscellaneous | | | CCC-Ex |

| For use in hazardous locations | Test Certificates | Maritime application |
|---|---|---|


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| | | | | | |
|---|---|---|---|---|---|
| CCC-Ex | Type Test Certificates/Test Report | ABS | BUREAU VERITAS | DNV | LRS |

| Maritime application | | | Environment | | Industrial Communication |
|---|---|---|---|---|---|
| NK / Nippon Kaiji Kyokai | RINA | KR (Korean Register of Shipping) | EPD | Siemens EcoTech | PROFINET |

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