

Siemens 6ES7212-1AE40-0XB0 Manual

Brand	Siemens
Product Series	Siemens
Product Type	designation CPU 1212C DC/DC/DC

Description

6ES7212-1AE40-0XB0

CPU 1212C ,DC/DC/DC, 8DI/6DO/2AI

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

Packaging dimensions (L x W x H)

11.00 x 10.10 x 8.50 cm

Net weight

0.294 Kg

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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

I²t 0.5 A²·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

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

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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

- 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 μ s
- "1" to "0", max. 5 μ s

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) ≥ 100 k ohms

Cable length

- shielded, max. 100 m; twisted and shielded

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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
- 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 www.AutoDCSTech.com

— 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

- 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

Counter

- Number of counters 6
- Counting frequency, max. 100 kHz

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

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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 www.AutoDCSTech.com

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 SO₂: < 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

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