

Siemens 6ES7215-1AF40-0XB0 Manual

Brand	Siemens
Product Series	Siemens
Product Type	designation CPU 1215FC DC/DC/DC

Description

6ES7215-1AF40-0XB0

CPU 1215 FC, DC/DC/DC, 14DI/10DO/2AI/2AO

SIMATIC S7-1200F, CPU 1215 FC, compact CPU, DC/DC/DC, 2 PROFINET ports, onboard I/O: 14 DI 24 V DC; 10 DO 24 V DC; 0.5 A; 2 AI 0-10 V DC, 2 AO 0-20 mA DC, power supply: DC 20.4-28.8 V DC, program/data memory 250 KB

Packaging dimensions (L x W x H)

13.90 x 10.80 x 8.50 cm

Net weight

0.415 Kg

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General information

Product type designation CPU 1215FC 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) 500 mA; CPU only

Current consumption, max. 1 500 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. 1 600 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. 12 W

Memory**Work memory**

- integrated 250 kbyte

Load memory

- integrated 4 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

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. 8 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, 8 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 14; 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. 14

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 10

- 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 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) $\geq 100\text{k ohms}$

Cable length

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- shielded, max. 100 m; twisted and shielded

Analog outputs

Number of analog outputs 2

Output ranges, current

- 0 to 20 mA Yes

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 μ s

Analog value generation for the outputs

Integration and conversion time/resolution per channel

- Resolution with overrange (bit including sign), max. 10 bit

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 2
- integrated switch Yes

Protocols

- PROFINET IO Controller Yes
- PROFINET IO Device Yes
- SIMATIC communication Yes
- Open IE communication Yes; Optionally also encrypted
- Web server Yes
- Media redundancy Yes; as MRP client

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

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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 Yes

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 Yes; as MRP redundancy manager and/or MRP client
- MRPD No

SIMATIC communication

- S7 routing Yes

Open IE communication

- TCP/IP Yes
- Data length, max. 8 kbyte
- 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, bit memories, DBs, peripheral I/Os (without fail-safe), times,
counters

Forcing

- Forcing Yes; peripheral inputs/outputs (without fail-safe)

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

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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

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

Highest safety class achievable in safety mode

- Performance level according to ISO 13849-1 PLe
- SIL acc. to IEC 61508 SIL 3

Ambient conditions

Free fall

- Fall height, max. 0.3 m; five times, in product package

Ambient temperature during operation

- min. 0 °C
- max. 55 °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

vertical

- horizontal installation, min. 0 °C
- horizontal installation, max. 55 °C
- vertical installation, min. 0 °C

- vertical installation, max. 45 °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; incl. failsafe

— FBD Yes; incl. failsafe

— 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 130 mm

Height 100 mm

Depth 75 mm

Weights

Weight, approx. 500 g

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