Data sheet

6ES7212-1AE40-0XB0





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



Figure similar

General information	
Product type designation	CPU 1212C DC/DC/DC
Firmware version	V4.7
Engineering with	
 Programming package 	STEP 7 V20 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 ² t	0.5 A ² ·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

OB Number, max. Limited only by Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Flag Size, max. Local data per priority class, max. Address area Process image Inputs, adjustable Outputs, adjustable Outputs, adjustable Hardware configuration Number of modules per system, max. Time of day Clock Hardware clock (real-time) Backup time Deviation per day, max. Digital inputs Number of digital inputs of which inputs usable for technological functions Source/sink input Number of simultaneously controllable inputs all mounting positions — up to 40 °C, max. Input voltage Rated value (DC) for signal "0" for signal "1" Input delay (for rated value of input voltage) for standard inputs — parameterizable D.1/0.2/0.4/4	con counters and timers. The maximum number of addressable m 1 to 65535. There is no restriction, the entire working ised
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— parameterizable 0.1 / 0.2 / 0.4 / 0 0.8 / 1.6 / 3.2 / 0	
0.8 / 1.6 / 3.2 / 0	8 / 1.6 / 3.2 / 6.4 / 10.0 / 12.8 / 20.0 µs; 0.05 / 0.1 / 0.2 / 0.4 /
— at "0" to "1", min. 0.2 ms	4 / 10.0 / 12.8 / 20.0 ms
— at "0" to "1", max.	
for interrupt inputs	
— parameterizable Yes	
for technological functions	
	2) 100 kHz & 3 @ 30 kHz, differential: 3 @ 80 kHz & 3 @ 30
Cable length	
• shielded, max. 500 m; 50 m for	
• unshielded, max. 300 m; for techn	echnological functions
Digital outputs	echnological functions ological functions: No
Number of digital outputs 6	
• of which high-speed outputs 4; 100 kHz Puls	
Limitation of inductive shutdown voltage to L+ (-48 V)	ological functions: No
Switching capacity of the outputs	ological functions: No
with resistive load, max.	ological functions: No
• on lamp load, max. 5 W	ological functions: No
Output voltage	ological functions: No

 for signal "0", max. for signal "1", min. 20 V Output current for signal "1" rated value for signal "0" residual current, max. 0.1 mA Output delay with resistive load "0" to "1", max. "1" to "0", max. 5 μs Switching frequency of the pulse outputs, with resistive load, max. Relay outputs Number of relay outputs shielded, max. unshielded, max. unshielded, max. to m Analog inputs Voltage Yes Input ranges (rated values), voltages 0 to +10 V — Input resistance (0 to 10 V) Cable length shielded, max. 100 m; twisted and shielded 	
Output current • for signal "1" rated value • for signal "0" residual current, max. Output delay with resistive load • "0" to "1", max. • "1" to "0", max. Switching frequency • of the pulse outputs, with resistive load, max. • Number of relay outputs • shielded, max. • unshielded, max. • unshielded, max. Number of analog inputs Number of analog inputs • Voltage Input ranges • Voltage Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) Cable length	
 for signal "1" rated value for signal "0" residual current, max. 0.1 mA Output delay with resistive load • "0" to "1", max. • "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. • unshielded, max. • unshielded, max. 150 m Analog inputs Number of analog inputs 2 Input ranges • Voltage • Voltage Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) ≥ 200 kohms 	
 for signal "0" residual current, max. Output delay with resistive load • "0" to "1", max. • "1" to "0", max. 5 μs Switching frequency • of the pulse outputs, with resistive load, max. 100 kHz Relay outputs • Number of relay outputs • Shielded, max. • shielded, max. • unshielded, max. • unshielded, max. • Unturanges • Voltage Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) Cable length 	
 for signal "0" residual current, max. Output delay with resistive load • "0" to "1", max. • "1" to "0", max. 5 μs Switching frequency • of the pulse outputs, with resistive load, max. 100 kHz Relay outputs • Number of relay outputs • Shielded, max. • shielded, max. • unshielded, max. • unshielded, max. • Unique outputs • Voltage • Voltage Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) Cable length 	
Output delay with resistive load • "0" to "1", max. • "1" to "0", max. Switching frequency • of the pulse outputs, with resistive load, max. Relay outputs • Number of relay outputs • shielded, max. • unshielded, max. Iton Analog inputs Number of analog inputs • Voltage • Voltage Input ranges • O to +10 V — Input resistance (0 to 10 V) Cable length 1 µs 1 µs 1 µs 1 µs 5 µs 5 µs S µs S µs 100 kHz Relay outputs 0 Cable length 2 Fyes Input ranges • Voltage • O to +10 V — Input resistance (0 to 10 V) Cable length	
 "0" to "1", max. "1" to "0", max. 5 µs Switching frequency of the pulse outputs, with resistive load, max. Number of relay outputs Number of relay outputs shielded, max. unshielded, max. unshielded, max. 150 m Analog inputs Voltage Voltage Yes Input ranges (rated values), voltages 0 Yes Input resistance (0 to 10 V) Cable length 	
• "1" to "0", max. Switching frequency • of the pulse outputs, with resistive load, max. Relay outputs • Number of relay outputs 0 Cable length • shielded, max. • unshielded, max. 150 m Analog inputs Number of analog inputs 2 Input ranges • Voltage Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) Cable length 5 μs 6	
Switching frequency of the pulse outputs, with resistive load, max. Relay outputs Number of relay outputs shielded, max. unshielded, max. Input ranges Voltage Input ranges (rated values), voltages of to +10 V Input resistance (0 to 10 V) Cable length 100 kHz 100 kHz 100 kHz 100 kHz 100 kHz 100 kHz 2 2 4 500 m 150 m 22 4 7 8 9 150 m 15	
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Cable length	
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Input ranges Voltage Input ranges (rated values), voltages 0 to +10 V — Input resistance (0 to 10 V) Cable length Yes ≥100k ohms	
Input ranges	
Voltage Yes Input ranges (rated values), voltages 0 to +10 V	
Input ranges (rated values), voltages	
— Input resistance (0 to 10 V) ≥100k ohms Cable length	
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.	
• Integration time, parameterizable Yes	
• Conversion time (per channel) 625 μs	
Encoder	
Connectable encoders	
• 2-wire sensor Yes	
1. Interface	
Interface type PROFINET	
<u>Isolated</u> 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 Ven	
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	
— PROFlenergy No	
— Prioritized startup Yes	
— Number of IO devices with prioritized startup, max.	

Number of connectable IO Devices, may	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
opading line	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
— PROFlenergy	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
	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
Application authentication	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, 	2 000
max. Further protocols	
i uriner protocois	

• 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	See Offiline help (37 Confinitionication, user data size)
overall	PG Connections: 4 reserved / 4 max; HMI Connections: 12 reserved / 18 max;
• Overall	7 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 / 68 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	
<u> </u>	Yes
RUN/STOP LED EDBOR LED	Yes
• ERROR LED	
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 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-	V
4-4	Yes
	Yes

Interference immunity against conducted variable disturbance indu	iced by high-frequency fields
Interference immunity against high-frequency radiation	Yes
acc. to IEC 61000-4-6	
Emission of radio interference acc. to EN 55 011	V 0 4
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	IDOO
IP degree of protection	IP20
Standards, approvals, certificates	
Siemens Eco Profile (SEP)	Siemens EcoTech
CE mark	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
Marine approval	Yes
Ecological footprint	Vocatives II and to ISO 44004
environmental product declaration Clabel warming potential	Yes; type II acc. to ISO 14021
Global warming potential	76.4 kg
 — global warming potential, (total) [CO2 eq] — global warming potential, (during production) [CO2 	76.4 kg
— global warming potential, (during production) [CO2 eq] — global warming potential, (during operation) [CO2	13.8 kg 63.4 kg
eq] — global warming potential, (dafter end of life cycle)	-0.89 kg
[CO2 eq]	
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 adjacen 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 Shock testing	Yes
• 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
• tested according to IEC 60068-2-27	

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		
 User administration 	Yes; device-wide		
 Number of users 	42		
 Number of groups 	14		
Number of roles	20		
programming / cycle time monitoring / header			
 adjustable 	Yes		
Dimensions			
Width	90 mm		
Height	100 mm		
Depth	75 mm		
Weights			
Weight, approx.	370 g		
Classifications			
<u> </u>		Manaian.	01:6:4:

	Version	Classification
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	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 Miscellaneous



Metrological Approval

General Product Approval

KC





EMV



For use in hazardous locations



For use in hazardous locations

Marine / Shipping

<u>FM</u>





CCC-Ex





Marine / Shipping

Environment







CCS (China Classification Society)





Environment

Industrial Communication



PROFINET

last modified:

5/16/2025

