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	V4.6
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
l²t	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

without battery	Yes
CPU processing times	100
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	2.0 po, / mod dodon
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	Voc
— parameterizable	Yes
for technological functions	Single phase: 3 @ 100 kHz 2 2 @ 20 kHz differential; 2 @ 20 kHz 2 2 @ 20
— 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. for signal "1", min. 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. Relay outputs Number of relay outputs Cable length 	
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 O 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. Relay outputs Number of relay outputs 0 Cable length 0.5 A 0.1 mA 0.1 mA 0.1 mA 0.1 mA 0.2 max.	
 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. Relay outputs Number of relay outputs 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. Relay outputs Number of relay outputs Cable length 	
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 "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 Cable length 	
 "1" to "0", max. Switching frequency of the pulse outputs, with resistive load, max. Relay outputs Number of relay outputs Cable length 5 μs 100 kHz 	
Switching frequency • of the pulse outputs, with resistive load, max. Relay outputs • Number of relay outputs Cable length	
 of the pulse outputs, with resistive load, max. Relay outputs Number of relay outputs Cable length 	
Relay outputs • Number of relay outputs 0 Cable length	
Number of relay outputs O Cable length	
Cable length	
• shielded, max. 500 m	
• unshielded, max. 150 m	
Analog inputs	
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	
5 1	
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	
automatic detection of transmission rate Yes	
Autonegotiation Yes	
Autocrossing Yes	
Interface types	
• RJ 45 (Ethernet)	
Number of ports	
• integrated switch No	
Protocols	
PROFINET IO Controller Yes	
PROFINET IO Device Yes	
SIMATIC communication Yes 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	
110	
PPOElongray No.	
— PROFlenergy No	
 — PROFlenergy — Prioritized startup — Number of IO devices with prioritized startup, max. 16 	

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 time	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	

Size communication functions / header Size communication supported as server as client Ves as client Ves See online help (\$7 communication, user data size) PG Connections a reserved / 18 max, Web Connections 12 reserved / 18 max, Web Connections 2 reserved / 18 max, Web Connections 3 reserved / 18 max, Web Connections 2 reserved / 18 max, Web Connections 3 reserved / 18 max, Web Connections 2 reserved / 18 max, Web Connections 3 reserved / 18 max, Web Connections 2 reserved / 18 max, Web Connections 3 reserved / 18 max, Web Connections 3 reserved / 18 max, Web Connections 2 reserved / 18 max, Web Connections 3 reserved / 18 max, Web Connections 4 reserved / 18 max,	• MODBUS	Yes
S7 communication * supported * sa server * as client * User data per joh, max. * See online help (\$7 communication, user data size) Number of connections * overall * Overall * PG Connections - 4 reserved 1.4 max; PM Connections: 12 reserved 1.5 max; PG UA Connections: 19 reserved 1.5 max; PG UA Connections: 19 reserved 1.5 max; PG UA Connections: 19 reserved 1.6 max; PG UA Connections: 19 reser		
supported as server as clent yes as clent yes as clent yes se contine help (S7 communication, user data size) Number of connections overall S7 Connections: 4 reserved / 4 max; MMI Connections: 12 reserved / 18 S7 Connections: 4 reserved / 14 max; CMD Connections: 12 reserved / 18 S7 Connections: 2 reserved / 18 max; CMD LAM Connections: 0 reserved / 10 max; Total Connections: 2 reserved / 18 max CMD LAM Connections: 0 reserved / 10 max; Total Connections: 2 reserved / 18 max **Test commissioning functions** **Status/control variable** **Status/control variable** **Status/control variable** **Variables** **Variables** **Variables** **Proring **Forcing **Forcing **Forcing **Persong **Persong **Persong **Persong **Persong **Number of configurable Traces **Number of counters **Counting frequency, max.* **Number of position-controlled positioning axes, max.* **Number of positioning axes via pulse-direction interface **Yes **Number of position-controlled positioning axes, max.*		
as server as client Ves as client Ves As client Ves See online help (S7 communication, user data size) Number of connections • overall • Order data per job, max. See online help (S7 communication, user data size) Number of connections • overall • Order data per job, max. • overall • Order data per job, max. For Connections: A reserved / 4 max, HMI Connections: 12 reserved / 18 for S7 Connections: 2 reserved / 19 max, Total Connections: 3 max of PCU A Connections:		Yes
User data per job, max. Ves See online help (S7 communication, user data size) Number of connections: * Overall **PG Connections: 8 reserved / 4 max; HMI Connections: 12 reserved / 18 rs 7 Connections: 8 reserved / 18 max; CPC LM Connections: 9 reserved max; Web Connections: 9 reserved max; Web Connections: 9 reserved / 30 max; (OPC LM Connections: 0 reserved max; Web Connections: 34 reserved / 64 max **Test commissioning functions** **Status/control **Status/control variable	• • • • • • • • • • • • • • • • • • • •	
- User data per job, max. Number of connections - overall - ov		
Number of connections • overall • overall • overall PC Connections: 4 reserved / 4 max; HMI Connections: 9 reserved / 16 max; HMI Connections: 9 reserved / 16 max; Open User Connections: 9 reserved / 16 max; Open User Connections: 9 reserved / 16 max; Total Connections: 94 reserved / 64 max Test commissioning functions Sistus/control • Status/control variable • Variables Forcing • Forcing • Forcing • Forcing • Present Traces • Number of configurable Traces • Country State Process of the State Information Diagnostics indication LED • RENOR LED • PERROR LED • PERROR LED • State State State Information Countre • Number of counters • Counting frequency, max Frequency measurement Ves Countrolled positioning axes via pulse-direction interface PIC controller Ves Number of position-controlled positioning axes, max Number of positioning axes via pulse-direction interface PiC controller • Potential separation digital inputs • Potential separation digital inputs • Potential separation digital inputs • Potential separat		
P.G. Connections: 4 reserved / 4 max; rMt (Connections: 12 reserved / 18 reserved / 18 max; Open User Caccions 8 reserved reserved max; Web Connections: 24 reserved / 30 max; OPC UA Connections: 0 res / 10 max; Total Connections: 34 reserved / 30 max; OPC UA Connections: 0 res / 10 max; Total Connections: 34 reserved / 64 max Status/control variable Ves Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters Forcing		occ offiline help (or confinitionation, user data size)
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Forcing Yes Diagnostic buffer • present Yes • present Yes • Number of configurable Traces • REROR LED • RENNSTOP LED • RENNSTOP LED • REROR LED • Yes • MAINT LED Integrated Functions Counter • Number of counters • Counting frequency, max. 100 kHz Frequency measurement controlled positioning Yes Number of position-controlled positioning axes, max. Number of position-controlled positioning axes wia pulse-direction interface PID controller Pyes Number of palam inputs 4 Number of pulse outputs 4 Limit frequency (pulse) Potential separation digital inputs • Potential separation digital inputs • Detential separation digital inputs • Detential separation digital outputs • Deten	Status/control variable	Yes
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• RUN/STOP LED • ERROR LED • MAINT LED **Tes **MAINT LED **Number of counters • Number of counters • Counting frequency, max. **Frequency measurement **Controlled positioning yes Number of position-controlled positioning axes, max. **Number of position-controlled positioning axes, max. **Number of positioning axes via pulse-direction interface **PIC controller **Puc ontroller **Pus Number of pulse outputs **Init frequency (pulse) **Potential separation **Potential separation digital inputs • Potential separation digital inputs • Potential separation digital inputs • Potential separation digital outputs • Detween the channels, in groups of **Test voltage at contact discharge **AkV - Test voltage at contact discharge **8 kV - Test voltage at contact discharge **8 kV - Test voltage at contact discharge **8 kV		
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between the channels, in groups of EMC Interference immunity against discharge of static electricity Interference immunity against discharge of static electricity Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 — Test voltage at air discharge — Test voltage at contact discharge 6 kV		
Interference immunity against discharge of static electricity ● Interference immunity against discharge of static electricity ● Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 — Test voltage at air discharge 8 kV — Test voltage at contact discharge 6 kV		
Interference immunity against discharge of static electricity • Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 — Test voltage at air discharge 8 kV — Test voltage at contact discharge 6 kV		
● Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 — Test voltage at air discharge 8 kV — Test voltage at contact discharge 6 kV		
— Test voltage at contact discharge 6 kV	Interference immunity against discharge of static	Yes
— Test voltage at contact discharge 6 kV	•	8 kV
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interiored initiality to cable-borne interiored	Interference immunity to cable-borne interference	
Interference immunity on supply lines acc. to IEC 61000- 4-4 Yes	• Interference immunity on supply lines acc. to IEC 61000-	Yes
• Interference immunity on signal cables acc. to IEC 61000- 4-4		Yes
Interference immunity against voltage surge	Interference immunity against voltage surge	
• Interference immunity on supply lines acc. to IEC 61000- 4-5	• Interference immunity on supply lines acc. to IEC 61000-	Yes

Interference immunity against conducted variable disturbance indu	iced by high-frequency fields
Interference immunity against conducted variable disturbance indu Interference immunity against high-frequency radiation	Yes
acc. to IEC 61000-4-6	100
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
Ecological footprint	
environmental product declaration	Yes
Global warming potential	
— global warming potential, (total) [CO2 eq]	76.4 kg
— global warming potential, (during production) [CO2 eq]	13.8 kg
 — global warming potential, (during operation) [CO2 eq] 	63.4 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-0.885 kg
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 	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	

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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