

Spare part SIPLUS S7-400 CPU 412-3H for medial exposure with conformal coating based on 6ES7412-3HJ14-0AB0 . not permitted for safety-oriented applications!



General information	
Product type designation	CPU 412-3H
HW functional status	1
Firmware version	V4.5
Engineering with	
<ul style="list-style-type: none"> Programming package 	STEP 7 V5.3 SP2 or higher with HW update
CiR – Configuration in RUN	
CiR synchronization time, basic load	150 ms
CiR synchronization time, time per I/O byte	40 µs
Supply voltage	
Rated value (DC)	
<ul style="list-style-type: none"> 24 V DC 	No; Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.2 A
from backplane bus 5 V DC, max.	1.5 A
from backplane bus 24 V DC, max.	150 mA; Per DP interface
from interface 5 V DC, max.	90 mA; At each DP interface

Power loss

Power loss, typ.	5.5 W
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Memory

Type of memory	other
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Work memory

• integrated	768 kbyte
• integrated (for program)	512 kbyte
• integrated (for data)	256 kbyte
• expandable	No

Load memory

• expandable FEPRM	Yes
• expandable FEPRM, max.	64 Mbyte
• integrated RAM, max.	256 kbyte
• expandable RAM	Yes
• expandable RAM, max.	64 Mbyte

Backup

• present	Yes
• with battery	Yes; all data
• without battery	No

Battery

Backup battery

• Backup current, typ.	190 μ A; Valid up to 40°C
• Backup current, max.	660 μ A
• Backup time, max.	Dealt with in the module data manual with the secondary conditions and the factors of influence
• Feeding of external backup voltage to CPU	5 V DC to 15 V DC

CPU processing times

for bit operations, typ.	0.075 μ s
for word operations, typ.	0.075 μ s
for fixed point arithmetic, typ.	0.075 μ s
for floating point arithmetic, typ.	0.225 μ s

CPU-blocks

DB

• Number, max.	4 095; Number range: 1 to 4095
• Size, max.	64 kbyte

FB

• Number, max.	2 048; Number range: 0 to 2047
• Size, max.	64 kbyte

FC

• Number, max.	2 048; Number range: 0 to 2047
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• Size, max.	64 kbyte
OB	
• Size, max.	64 kbyte
• Number of time alarm OBs	4
• Number of delay alarm OBs	4
• Number of cyclic interrupt OBs	4
• Number of process alarm OBs	4
Nesting depth	
• per priority class	24
• additional within an error OB	1

Counters, timers and their retentivity

S7 counter	
• Number	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	No times retentive
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB

Data areas and their retentivity

retentive data area in total	Total working and load memory (with backup battery)
Flag	
• Number, max.	8 kbyte
• Retentivity available	Yes
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; in 1 memory byte

Local data	
• adjustable, max.	16 kbyte
• preset	8 kbyte
Address area	
I/O address area	
• Inputs	8 kbyte
• Outputs	8 kbyte
of which distributed	
— MPI/DP interface, inputs	2 kbyte
— MPI/DP interface, outputs	2 kbyte
Process image	
• Inputs, adjustable	8 kbyte
• Outputs, adjustable	8 kbyte
• Inputs, default	256 byte
• Outputs, default	256 byte
• consistent data, max.	244 byte
• Access to consistent data in process image	Yes
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	65 536
— of which central	65 536
• Outputs	65 536
— of which central	65 536
Analog channels	
• Inputs	4 096
— of which central	4 096
• Outputs	4 096
— of which central	4 096
Hardware configuration	
Number of expansion units, max.	21
connectable OPs	15 without message processing, 8 with message processing
Multicomputing	No
Interface modules	
• Number of connectable IMs (total), max.	6
• Number of connectable IM 460s, max.	6
• Number of connectable IM 463s, max.	4; Single mode only
Number of DP masters	
• integrated	1
• via CP	10
• Mixed mode IM + CP permitted	No

• via interface module	0
Number of operable FMs and CPs (recommended)	
• FM	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections
• CP, PtP	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which max. 10 CP as DP master
Slots	
• required slots	2
Time of day	
Clock	
• Hardware clock (real-time)	Yes
• retentive and synchronizable	Yes
• Resolution	1 ms
• Deviation per day (buffered), max.	1.7 ms; Power off
• Deviation per day (unbuffered), max.	8.6 ms; Power on
Operating hours counter	
• Number	8
• Number/Number range	0 to 7
• Range of values	0 to 32767 hours
• retentive	Yes
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, master	Yes
• to DP, slave	Yes
• in AS, master	Yes
• in AS, slave	Yes
Time difference in system when synchronizing via	
• MPI, max.	200 ms
Interfaces	
Number of RS 485 interfaces	2
Number of other interfaces	0
1. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS + MPI
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	MPI: 16, DP: 16
Functionality	

• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
MPI	
• Number of connections	16
• Transmission rate, max.	12 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
DP master	
• Number of connections, max.	16
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
— Equidistance	No
— SYNC/FREEZE	No
— Activation/deactivation of DP slaves	No
— Direct data exchange (slave-to-slave communication)	No
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP slave	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
DP slave	
• Number of connections	No configuration of CPU as DP slave
3. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0

4. Interface

Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0

Isochronous mode

Isochronous operation (application synchronized up to terminal)	No
Equidistance	No

Communication functions

PG/OP communication	Yes
• Number of connectable OPs without message processing	15
• Number of connectable OPs with message processing	8
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• User data per job, max.	64 kbyte
• User data per job (of which consistent), max.	462 byte; 1 variable
S5 compatible communication	
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• User data per job, max.	8 kbyte
• User data per job (of which consistent), max.	240 byte
• Number of simultaneous AG-SEND/AG-RECV orders per CPU, max.	24/24
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
Number of connections	
• overall	16
• usable for PG communication	
— reserved for PG communication	1
— adjustable for PG communication, max.	0
• usable for OP communication	
— reserved for OP communication	1
— adjustable for OP communication, max.	0
• usable for S7 basic communication	
— reserved for S7 basic communication	0

- adjustable for S7 basic communication, max. 0
- usable for S7 communication
 - reserved for S7 communication 0
 - adjustable for S7 communication, max. 0
- usable for routing
 - reserved for routing 0
 - adjustable for routing, max. 0

S7 message functions

Number of login stations for message functions, max.	8
Symbol-related messages	No
Program alarms	Yes
simultaneously active Alarm-S blocks, max.	100
Alarm 8-blocks <ul style="list-style-type: none"> • Number of instances for alarm 8 and S7 communication blocks, max. 600 • preset, max. 300 	
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	16

Test commissioning functions

Status block	Yes
Single step	Yes
Number of breakpoints	4
Status/control	
<ul style="list-style-type: none"> • Status/control variable Yes • Variables Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters • Number of variables, max. 70 	
Forcing	
<ul style="list-style-type: none"> • Forcing Yes • Forcing, variables Inputs/outputs, bit memories, distributed I/Os • Number of variables, max. 256 	
Diagnostic buffer	
<ul style="list-style-type: none"> • present Yes • Number of entries, max. 3 200 <ul style="list-style-type: none"> — adjustable Yes — preset 120 	

Standards, approvals, certificates

CE mark	Yes
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Ambient conditions

Ambient temperature during operation	
• min.	0 °C; = Tmin
• max.	60 °C; = Tmax
Altitude during operation relating to sea level	
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax - 20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost permitted (no commissioning in bedewed state)
Resistance	
Use in stationary industrial systems	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Configuration	
Configuration software	
• STEP 7	Yes
Programming	
• Command set	see instruction list
• Nesting levels	8
• Access to consistent data in process image	Yes
• System functions (SFC)	see instruction list
• System function blocks (SFB)	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
Number of simultaneously active SFCs	
— RD_REC	8
— WR_REC	8
— WR_PARM	8
— PARM_MOD	1
— WR_DPARM	2

— DPNRM_DG	8
— RDSYSST	8
— DP_TOPOL	1

Number of simultaneously active SFBs

— RDREC	8
— WRREC	8

Know-how protection

- User program protection/password protection Yes

Dimensions

Width	50 mm
Height	290 mm
Depth	219 mm

Weights

Weight, approx.	990 g
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last modified: 05/18/2018