SIEMENS

Data sheet 6ES7412-3HJ14-0AB0

********** Replacement part ********* SIMATIC S7-400H, CPU 412-3H Central processing unit for S7-400H and S7-400F/FH, 3 interfaces: 1 MPI/DP and 2 for sync modules, 768 KB memory (256 KB data/512 KB program)

General information	
Product type designation	CPU 412-3H PN/DP
HW functional status	1
Firmware version	V4.5
Product function	
● Isochronous mode	No
Engineering with	
● 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)	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
Memory	
Type of memory	RAM
Work memory	
● integrated	768 kbyte
● integrated (for program)	512 kbyte
● integrated (for data)	256 kbyte
● expandable	No
Load memory	
● expandable FEPROM	Yes
● expandable FEPROM, 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 µA; Valid up to 40°C

● Backup current, max.	660 µA
● 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 µs
for word operations, typ.	0.075 µs
for fixed point arithmetic, typ.	0.075 µs
for floating point arithmetic, typ.	0.225 µs
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
● 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
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
IEC counter	
● present	Yes
● Type	SFB
S7 times	
● Number	2 048
Retentivity	
— adjustable	Yes
— 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 (incl. timers, counters, flags), max.	Total working and load memory (with backup battery)
Flag	
● Size, 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
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 s; Power off
● Deviation per day (unbuffered), max.	8.6 s; Power on
Operating hours counter	
● Number	8
● Number/Number range	0 to 7
● Range of values	0 to 32767 hours
● Granularity	1 h
● retentive	Yes
Clock synchronization	
● supported	Yes
● to MPI, master	Yes
● on MPI, device	Yes

● to DP, master	Yes
● on DP, device	Yes
● in AS, master	Yes
● in AS, device	Yes
Time difference in system when synchronizing via	
● MPI, max.	200 ms
Interfaces	
Number of RS 485 interfaces	2
Number of other interfaces	0
Optical interface	No
1. Interface	
Interface type	MPI/PROFIBUS DP
Isolated	Yes
Interface types	
● RS 485	Yes
● Output current of the interface, max.	150 mA
Protocols	
● MPI	Yes
● PROFIBUS DP master	Yes
● PROFIBUS DP device	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
PROFIBUS DP master	
● Number of connections, max.	16
● Transmission rate, max.	12 Mbit/s
● max. number of DP devices	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 devices	No
— Direct data exchange (slave-to-slave communication)	No
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP device	
— user data per DP device, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
1st interface / PROFIBUS DP device / header	
● 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 6ES7960-1AA04-0XA0
4. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7960-1AA04-0XA0

Protocols	
SIMATIC communication	
● S7 routing	Yes
Isochronous mode	
Equidistance	No
communication functions / header	
PG/OP communication	Yes
● Number of connectable OPs with message processing	8
● Number of connectable OPs without message processing	15
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	Yes
● 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	

● Status/control variable	Yes
● Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
● Number of variables, max.	70
Forcing	
● Forcing	Yes
● Forcing, variables	Inputs/outputs, bit memories, distributed I/Os
● Number of variables, max.	256
Diagnostic buffer	
● present	Yes
● Number of entries, max.	3 200
— adjustable	Yes
— preset	120
configuration / header	
Configuration software	
● STEP 7	Yes
configuration / programming / header	
● 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
configuration / programming / number of simultaneously active SFC / header	
— RD_REC	8
— WR_REC	8
— WR_PARM	8
— PARM_MOD	1
— WR_DPARM	2
— DPNRM_DG	8
— RDSYSST	8
— DP_TOPOL	1
configuration / programming / number of simultaneously active SFB / header	
— 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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