



Figure similar

***** Replacement part ***** SIMATIC S7-400H, CPU 414H Central processing unit for S7-400H and S7-400F/FH, 4 interfaces: 1 MPI/DP, 1 DP and 2 for sync modules, 2.8 MB memory (1.4 MB data/1.4 MB program)

General information	
Product type designation	CPU 414-4H
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	100 ms
CiR synchronization time, time per I/O byte	25 µs
Supply voltage	
Rated value (DC)	Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.4 A
from backplane bus 5 V DC, max.	1.7 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.	6 W
Memory	
Type of memory	RAM
Work memory	
<ul style="list-style-type: none"> integrated 	2.8 Mbyte
<ul style="list-style-type: none"> integrated (for program) 	1.4 Mbyte
<ul style="list-style-type: none"> integrated (for data) 	1.4 Mbyte
<ul style="list-style-type: none"> expandable 	No
Load memory	
<ul style="list-style-type: none"> expandable FEPRM 	Yes
<ul style="list-style-type: none"> expandable FEPRM, max. 	64 Mbyte
<ul style="list-style-type: none"> integrated RAM, max. 	256 kbyte
<ul style="list-style-type: none"> expandable RAM 	Yes
<ul style="list-style-type: none"> expandable RAM, max. 	64 Mbyte
Backup	
<ul style="list-style-type: none"> present 	Yes
<ul style="list-style-type: none"> with battery 	Yes; all data
<ul style="list-style-type: none"> without battery 	No
Battery	
Backup battery	
<ul style="list-style-type: none"> Backup current, typ. 	190 µA; Valid up to 40°C

<ul style="list-style-type: none"> • Backup current, max. 	660 μ A
<ul style="list-style-type: none"> • Backup time, max. 	Dealt with in the module data manual with the secondary conditions and the factors of influence
<ul style="list-style-type: none"> • Feeding of external backup voltage to CPU 	5 V DC to 15 V DC

CPU processing times

for bit operations, typ.	0.045 μ s
for word operations, typ.	0.045 μ s
for fixed point arithmetic, typ.	0.045 μ s
for floating point arithmetic, typ.	0.135 μ s

CPU-blocks

DB	
<ul style="list-style-type: none"> • Number, max. 	4 095; Number range: 1 to 4095
<ul style="list-style-type: none"> • Size, max. 	64 kbyte

FB	
<ul style="list-style-type: none"> • Number, max. 	2 048; Number range: 0 to 2047
<ul style="list-style-type: none"> • Size, max. 	64 kbyte

FC	
<ul style="list-style-type: none"> • Number, max. 	2 048; Number range: 0 to 2047
<ul style="list-style-type: none"> • Size, max. 	64 kbyte

OB	
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
<ul style="list-style-type: none"> • Number of time alarm OBs 	4
<ul style="list-style-type: none"> • Number of delay alarm OBs 	4
<ul style="list-style-type: none"> • Number of cyclic interrupt OBs 	4
<ul style="list-style-type: none"> • Number of process alarm OBs 	4

Nesting depth	
<ul style="list-style-type: none"> • per priority class 	24
<ul style="list-style-type: none"> • additional within an error OB 	1

Counters, timers and their retentivity

S7 counter	
<ul style="list-style-type: none"> • 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

IEC counter	
<ul style="list-style-type: none"> • present 	Yes
<ul style="list-style-type: none"> • Type 	SFB

S7 times	
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • present 	Yes
<ul style="list-style-type: none"> • Type 	SFB

Data areas and their retentivity

Retentive data area (incl. timers, counters, flags), max.	Total working and load memory (with backup battery)
Flag	
<ul style="list-style-type: none"> • Size, max. 	8 kbyte
<ul style="list-style-type: none"> • Retentivity available 	Yes

<ul style="list-style-type: none"> • Retentivity preset • Number of clock memories 	MB 0 to MB 15 8; in 1 memory byte
Local data	
<ul style="list-style-type: none"> • adjustable, max. • preset 	16 kbyte 8 kbyte
Address area	
I/O address area	
<ul style="list-style-type: none"> • Inputs • Outputs 	8 kbyte 8 kbyte
Process image	
<ul style="list-style-type: none"> • Inputs, adjustable • Outputs, adjustable • Inputs, default • Outputs, default • consistent data, max. • Access to consistent data in process image 	8 kbyte 8 kbyte 256 byte 256 byte 244 byte Yes
Subprocess images	
<ul style="list-style-type: none"> • Number of subprocess images, max. 	15
Digital channels	
<ul style="list-style-type: none"> • Inputs <ul style="list-style-type: none"> — of which central • Outputs <ul style="list-style-type: none"> — of which central 	65 536 65 536 65 536 65 536
Analog channels	
<ul style="list-style-type: none"> • Inputs <ul style="list-style-type: none"> — of which central • Outputs <ul style="list-style-type: none"> — of which central 	4 096 4 096 4 096 4 096
Hardware configuration	
Number of expansion units, max.	21
connectable OPs	31 without message processing, 8 with message processing
Multicomputing	No
Interface modules	
<ul style="list-style-type: none"> • Number of connectable IMs (total), max. • Number of connectable IM 460s, max. • Number of connectable IM 463s, max. 	6 6 4; Single mode only
Number of DP masters	
<ul style="list-style-type: none"> • integrated • via CP • Mixed mode IM + CP permitted 	2 10 No
Number of operable FMs and CPs (recommended)	
<ul style="list-style-type: none"> • FM • CP, PtP • PROFIBUS and Ethernet CPs 	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections 14; Of which max. 10 CP as DP master
Slots	
<ul style="list-style-type: none"> • required slots 	2
Time of day	
Clock	
<ul style="list-style-type: none"> • Hardware clock (real-time) • retentive and synchronizable • Resolution • Deviation per day (buffered), max. • Deviation per day (unbuffered), max. 	Yes Yes 1 ms 1.7 s; Power off 8.6 s; Power on
Operating hours counter	
<ul style="list-style-type: none"> • Number • Number/Number range • Range of values • Granularity 	8 0 to 7 0 to 32767 hours 1 h

• 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
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 slave	No
MPI	
• Number of connections	32
• 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
• 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
2. Interface	
Interface type	PROFIBUS DP

Isolated	Yes
Number of connection resources	16
Interface types	
<ul style="list-style-type: none"> • RS 485 • Output current of the interface, max. 	<ul style="list-style-type: none"> Yes 150 mA
Protocols	
<ul style="list-style-type: none"> • PROFIBUS DP master • PROFIBUS DP slave 	<ul style="list-style-type: none"> Yes No
PROFIBUS DP master	
<ul style="list-style-type: none"> • Number of connections, max. • Transmission rate, max. • Number of DP slaves, max. 	<ul style="list-style-type: none"> 16 12 Mbit/s 96
Services	
<ul style="list-style-type: none"> — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication — Equidistance — SYNC/FREEZE — Activation/deactivation of DP slaves — Direct data exchange (slave-to-slave communication) 	<ul style="list-style-type: none"> Yes Yes No No Yes No No No No
Address area	
<ul style="list-style-type: none"> — Inputs, max. — Outputs, max. 	<ul style="list-style-type: none"> 6 kbyte 6 kbyte
User data per DP slave	
<ul style="list-style-type: none"> — User data per DP slave, max. — Inputs, max. — Outputs, max. — Slots, max. — per slot, max. 	<ul style="list-style-type: none"> 244 byte 244 byte 244 byte 244 128 byte

3. Interface

Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7960-1AA04-0XA0 or 6ES7960-1AB04-0XA0

4. Interface

Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7960-1AA04-0XA0 or 6ES7960-1AB04-0XA0

Protocols

SIMATIC communication	
<ul style="list-style-type: none"> • S7 routing 	Yes

communication functions / header

PG/OP communication	Yes
<ul style="list-style-type: none"> • Number of connectable OPs without message processing • Number of connectable OPs with message processing 	<ul style="list-style-type: none"> 31 8
Global data communication	
<ul style="list-style-type: none"> • supported 	No
S7 basic communication	
<ul style="list-style-type: none"> • supported 	No
S7 communication	
<ul style="list-style-type: none"> • supported • as server • as client • User data per job, max. • User data per job (of which consistent), max. 	<ul style="list-style-type: none"> Yes Yes Yes 64 kbyte 462 byte; 1 variable
S5 compatible communication	
<ul style="list-style-type: none"> • supported 	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)

<ul style="list-style-type: none"> • User data per job, max. 	8 kbyte
<ul style="list-style-type: none"> • User data per job (of which consistent), max. 	240 byte
<ul style="list-style-type: none"> • Number of simultaneous AG-SEND/AG-RECV orders per CPU, max. 	24/24
Standard communication (FMS)	
<ul style="list-style-type: none"> • supported 	Yes; Via CP and loadable FB
Number of connections	
<ul style="list-style-type: none"> • overall 	32
<ul style="list-style-type: none"> • usable for PG communication <ul style="list-style-type: none"> — reserved for PG communication — adjustable for PG communication, max. 	1 0
<ul style="list-style-type: none"> • usable for OP communication <ul style="list-style-type: none"> — reserved for OP communication — adjustable for OP communication, max. 	1 0
<ul style="list-style-type: none"> • usable for S7 basic communication <ul style="list-style-type: none"> — reserved for S7 basic communication — adjustable for S7 basic communication, max. 	0 0
<ul style="list-style-type: none"> • usable for S7 communication <ul style="list-style-type: none"> — reserved for S7 communication — adjustable for S7 communication, max. 	0 0
<ul style="list-style-type: none"> • usable for routing <ul style="list-style-type: none"> — reserved for routing — adjustable for routing, max. 	0 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
<ul style="list-style-type: none"> • Number of instances for alarm 8 and S7 communication blocks, max. 	1 200
<ul style="list-style-type: none"> • preset, max. 	900
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
<ul style="list-style-type: none"> • Variables 	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
<ul style="list-style-type: none"> • Number of variables, max. 	70
Forcing	
<ul style="list-style-type: none"> • Forcing 	Yes
<ul style="list-style-type: none"> • Forcing, variables 	Inputs/outputs, bit memories, distributed I/Os
<ul style="list-style-type: none"> • Number of variables, max. 	256
Diagnostic buffer	
<ul style="list-style-type: none"> • present 	Yes
<ul style="list-style-type: none"> • Number of entries, max. 	3 200
<ul style="list-style-type: none"> — adjustable 	Yes
<ul style="list-style-type: none"> — preset 	120
configuration / header	
Configuration software	
<ul style="list-style-type: none"> • STEP 7 	Yes
configuration / programming / header	
<ul style="list-style-type: none"> • Command set 	see instruction list
<ul style="list-style-type: none"> • Nesting levels 	8
<ul style="list-style-type: none"> • Access to consistent data in process image 	Yes
<ul style="list-style-type: none"> • 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.	995 g
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