

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)



Figure similar

General information	
Product type designation	CPU 414-4H
HW functional status	1
Firmware version	V4.5
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	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 $\mu$ s
Supply voltage	
Rated value (DC)	
<ul style="list-style-type: none"> <li>24 V DC</li> </ul>	No; 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
<b>Power loss</b>	
Power loss, typ.	6 W
<b>Memory</b>	
Type of memory	other
<b>Work memory</b>	
<ul style="list-style-type: none"> <li>• integrated</li> <li>• integrated (for program)</li> <li>• integrated (for data)</li> <li>• expandable</li> </ul>	<ul style="list-style-type: none"> <li>2.8 Mbyte</li> <li>1.4 Mbyte</li> <li>1.4 Mbyte</li> <li>No</li> </ul>
<b>Load memory</b>	
<ul style="list-style-type: none"> <li>• expandable FEPRM</li> <li>• expandable FEPRM, max.</li> <li>• integrated RAM, max.</li> <li>• expandable RAM</li> <li>• expandable RAM, max.</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>64 Mbyte</li> <li>256 kbyte</li> <li>Yes</li> <li>64 Mbyte</li> </ul>
<b>Backup</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• with battery</li> <li>• without battery</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>Yes; all data</li> <li>No</li> </ul>
<b>Battery</b>	
<b>Backup battery</b>	
<ul style="list-style-type: none"> <li>• Backup current, typ.</li> <li>• Backup current, max.</li> <li>• Backup time, max.</li> <li>• Feeding of external backup voltage to CPU</li> </ul>	<ul style="list-style-type: none"> <li>190 <math>\mu</math>A; Valid up to 40°C</li> <li>660 <math>\mu</math>A</li> <li>Dealt with in the module data manual with the secondary conditions and the factors of influence</li> <li>5 V DC to 15 V DC</li> </ul>
<b>CPU processing times</b>	
for bit operations, typ.	0.045 $\mu$ s
for word operations, typ.	0.045 $\mu$ s
for fixed point arithmetic, typ.	0.045 $\mu$ s
for floating point arithmetic, typ.	0.135 $\mu$ s
<b>CPU-blocks</b>	
<b>DB</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	<ul style="list-style-type: none"> <li>4 095; Number range: 1 to 4095</li> <li>64 kbyte</li> </ul>
<b>FB</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	<ul style="list-style-type: none"> <li>2 048; Number range: 0 to 2047</li> <li>64 kbyte</li> </ul>
<b>FC</b>	

• Number, max.	2 048; Number range: 0 to 2047
• Size, max.	64 kbyte
<b>OB</b>	
• 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
<b>Nesting depth</b>	
• per priority class	24
• additional within an error OB	1
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
• Number	2 048
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	Z 0 to Z 7
<b>Counting range</b>	
— lower limit	0
— upper limit	999
<b>IEC counter</b>	
• present	Yes
• Type	SFB
<b>S7 times</b>	
• Number	2 048
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	No times retentive
<b>Time range</b>	
— lower limit	10 ms
— upper limit	9 990 s
<b>IEC timer</b>	
• present	Yes
• Type	SFB
<b>Data areas and their retentivity</b>	
retentive data area in total	Total working and load memory (with backup battery)
<b>Flag</b>	

• Number, max.	8 kbyte
• Retentivity available	Yes
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; in 1 memory byte
<b>Local data</b>	
• adjustable, max.	16 kbyte
• preset	8 kbyte
<b>Address area</b>	
<b>I/O address area</b>	
• Inputs	8 kbyte
• Outputs	8 kbyte
<b>Process image</b>	
• 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
<b>Subprocess images</b>	
• Number of subprocess images, max.	15
<b>Digital channels</b>	
• Inputs	65 536
— of which central	65 536
• Outputs	65 536
— of which central	65 536
<b>Analog channels</b>	
• Inputs	4 096
— of which central	4 096
• Outputs	4 096
— of which central	4 096
<b>Hardware configuration</b>	
Number of expansion units, max.	21
connectable OPs	31 without message processing, 8 with message processing
Multicomputing	No
<b>Interface modules</b>	
• Number of connectable IMs (total), max.	6
• Number of connectable IM 460s, max.	6
• Number of connectable IM 463s, max.	4; Single mode only
<b>Number of DP masters</b>	
• integrated	2
• via CP	10

• Mixed mode IM + CP permitted	No
<b>Number of operable FMs and CPs (recommended)</b>	
• 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
<b>Slots</b>	
• required slots	2
<b>Time of day</b>	
<b>Clock</b>	
• 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
<b>Operating hours counter</b>	
• Number	8
• Number/Number range	0 to 7
• Range of values	0 to 32767 hours
• Granularity	1 h
• retentive	Yes
<b>Clock synchronization</b>	
• 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
<b>Time difference in system when synchronizing via</b>	
• MPI, max.	200 ms
<b>Interfaces</b>	
Number of RS 485 interfaces	2
Number of other interfaces	0
<b>1. Interface</b>	
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: 32, DP: 32

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	Integrated
Physics	RS 485 / PROFIBUS + MPI
Isolated	Yes

Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	16
<b>Protocols</b>	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
<b>PROFIBUS DP master</b>	
• Number of connections, max.	16
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	96
<b>Services</b>	
— 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
<b>Address area</b>	
— Inputs, max.	6 kbyte
— Outputs, max.	6 kbyte
<b>User data per DP slave</b>	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
<b>3. Interface</b>	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7960-1AA04-0XA0 or 6ES7960-1AB04-0XA0
<b>4. Interface</b>	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization submodule IF 960 6ES7960-1AA04-0XA0 or 6ES7960-1AB04-0XA0
<b>Communication functions</b>	
PG/OP communication	Yes
• Number of connectable OPs without message processing	31

• Number of connectable OPs with message processing	8
<b>Global data communication</b>	
• supported	No
<b>S7 basic communication</b>	
• supported	No
<b>S7 communication</b>	
• 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
<b>S5 compatible communication</b>	
• 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
<b>Standard communication (FMS)</b>	
• supported	Yes; Via CP and loadable FB
<b>Number of connections</b>	
• overall	32
• 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
<b>S7 message functions</b>	
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"> <li>• Number of instances for alarm 8 and S7 communication blocks, max.</li> </ul>	1 200
<ul style="list-style-type: none"> <li>• preset, max.</li> </ul>	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
<b>Status/control</b>	
<ul style="list-style-type: none"> <li>• Status/control variable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Variables</li> </ul>	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
<ul style="list-style-type: none"> <li>• Number of variables, max.</li> </ul>	70
<b>Forcing</b>	
<ul style="list-style-type: none"> <li>• Forcing</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Forcing, variables</li> </ul>	Inputs/outputs, bit memories, distributed I/Os
<ul style="list-style-type: none"> <li>• Number of variables, max.</li> </ul>	256
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>• present</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Number of entries, max.</li> </ul>	3 200
<ul style="list-style-type: none"> <li>— adjustable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— preset</li> </ul>	120

### Configuration

<b>Configuration software</b>	
<ul style="list-style-type: none"> <li>• STEP 7</li> </ul>	Yes
<b>Programming</b>	
<ul style="list-style-type: none"> <li>• Command set</li> </ul>	see instruction list
<ul style="list-style-type: none"> <li>• Nesting levels</li> </ul>	8
<ul style="list-style-type: none"> <li>• Access to consistent data in process image</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• System functions (SFC)</li> </ul>	see instruction list
<ul style="list-style-type: none"> <li>• System function blocks (SFB)</li> </ul>	see instruction list
<b>Programming language</b>	
<ul style="list-style-type: none"> <li>— LAD</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— FBD</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— STL</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— SCL</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— CFC</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— GRAPH</li> </ul>	Yes

— HiGraph®	Yes
<b>Number of simultaneously active SFCs</b>	
— RD_REC	8
— WR_REC	8
— WR_PARM	8
— PARM_MOD	1
— WR_DPARM	2
— DPNRM_DG	8
— RDSYSST	8
— DP_TOPOL	1
<b>Number of simultaneously active SFBs</b>	
— RDREC	8
— WRREC	8
<b>Know-how protection</b>	
• User program protection/password protection	Yes
<b>Dimensions</b>	
Width	50 mm
Height	290 mm
Depth	219 mm
<b>Weights</b>	
Weight, approx.	995 g
<b>last modified:</b>	08/15/2019