



SIMATIC S7-400H, CPU 417-5H, central processing unit for S7-400H and S7-400F/FH, 5 interfaces: 1x MPI/DP, 1x DP, 1x PN and 2 for sync modules, 32 MB memory (16 MB data/16 MB program)

General information	
Product type designation	CPU 417-5H PN/DP
HW functional status	1
Firmware version	V6.0
Product function	
<ul style="list-style-type: none"> <li>• Isochronous mode</li> </ul>	No
Engineering with	
<ul style="list-style-type: none"> <li>• Programming package</li> </ul>	As of STEP 7 V5.5 SP2 with HF1
CiR - Configuration in RUN	
CiR synchronization time, basic load	60 ms
CiR synchronization time, time per I/O byte	0 µs
Supply voltage	
Rated value (DC)	Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.6 A
from backplane bus 5 V DC, max.	1.9 A
from backplane bus 24 V DC, max.	150 mA; 150 mA per DP interface
from interface 5 V DC, max.	90 mA; At each DP interface
Power loss	
Power loss, typ.	7.5 W
Memory	
Type of memory	RAM
Work memory	
<ul style="list-style-type: none"> <li>• integrated</li> </ul>	32 Mbyte
<ul style="list-style-type: none"> <li>• integrated (for program)</li> </ul>	16 Mbyte
<ul style="list-style-type: none"> <li>• integrated (for data)</li> </ul>	16 Mbyte
<ul style="list-style-type: none"> <li>• expandable</li> </ul>	No
Load memory	
<ul style="list-style-type: none"> <li>• expandable FEPRM</li> </ul>	Yes; with Memory Card (FLASH)
<ul style="list-style-type: none"> <li>• expandable FEPRM, max.</li> </ul>	64 Mbyte
<ul style="list-style-type: none"> <li>• integrated RAM, max.</li> </ul>	1 Mbyte
<ul style="list-style-type: none"> <li>• expandable RAM</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• expandable RAM, max.</li> </ul>	64 Mbyte
Backup	
<ul style="list-style-type: none"> <li>• present</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• with battery</li> </ul>	Yes; all data
<ul style="list-style-type: none"> <li>• without battery</li> </ul>	No
Battery	
Backup battery	
<ul style="list-style-type: none"> <li>• Backup current, typ.</li> </ul>	180 µA; Valid up to 40°C

<ul style="list-style-type: none"> <li>• Backup current, max.</li> <li>• Backup time, max.</li> </ul>	1 000 $\mu$ A Dealt with in the module data manual with the secondary conditions and the factors of influence
<ul style="list-style-type: none"> <li>• Feeding of external backup voltage to CPU</li> </ul>	5 V DC to 15 V DC

#### CPU processing times

for bit operations, typ.	7.5 ns
for word operations, typ.	7.5 ns
for fixed point arithmetic, typ.	7.5 ns
for floating point arithmetic, typ.	15 ns

#### CPU-blocks

DB	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	16 000; Number range: 1 to 16000 64 kbyte

FB	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	8 000; Number range: 0 to 7999 64 kbyte

FC	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	8 000; Number range: 0 to 7999 64 kbyte

OB	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> <li>• Number of free cycle OBs</li> <li>• Number of time alarm OBs</li> <li>• Number of delay alarm OBs</li> <li>• Number of cyclic interrupt OBs</li> <li>• Number of process alarm OBs</li> <li>• Number of DPV1 alarm OBs</li> <li>• Number of startup OBs</li> <li>• Number of asynchronous error OBs</li> <li>• Number of synchronous error OBs</li> </ul>	see instruction list 64 kbyte 1; OB 1 8; OB 10-17 4; OB 20-23 9; OB 30-38 8; OB 40-47 3; OB 55-57 2; OB 100, 102 9; OB 80-88 2; OB 121, 122

Nesting depth	
<ul style="list-style-type: none"> <li>• per priority class</li> <li>• additional within an error OB</li> </ul>	24 2

#### Counters, timers and their retentivity

S7 counter	
<ul style="list-style-type: none"> <li>• Number</li> </ul>	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"> <li>• present</li> <li>• Type</li> <li>• Number</li> </ul>	Yes SFB Unlimited (limited only by RAM capacity)

S7 times	
<ul style="list-style-type: none"> <li>• Number</li> </ul>	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"> <li>• present</li> <li>• Type</li> <li>• Number</li> </ul>	Yes SFB Unlimited (limited only by RAM capacity)

## Data areas and their retentivity

Retentive data area (incl. timers, counters, flags), max.	Total working and load memory (with backup battery)
<b>Flag</b>	
• Size, max.	16 384 byte
• 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.	64 kbyte
• preset	32 kbyte
<b>Address area</b>	
<b>I/O address area</b>	
• Inputs	16 kbyte
• Outputs	16 kbyte
<b>Process image</b>	
• Inputs, adjustable	16 kbyte
• Outputs, adjustable	16 kbyte
• Inputs, default	1 024 byte
• Outputs, default	1 024 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	131 072
— of which central	131 072
• Outputs	131 072
— of which central	131 072
<b>Analog channels</b>	
• Inputs	8 192
— of which central	8 192
• Outputs	8 192
— of which central	8 192
<b>Hardware configuration</b>	
Number of expansion units, max.	21
connectable OPs	119
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; CP 443-5 Extended
• Mixed mode IM + CP permitted	No
• via interface module	0
<b>Number of IO Controllers</b>	
• integrated	1
• via CP	0
<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, PiP	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	16
• Number/Number range	0 to 15
• Range of values	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2 <sup>31</sup> - 1 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
• on Ethernet via NTP	Yes; As client
<b>Time difference in system when synchronizing via</b>	
• Ethernet, max.	10 ms; Via NTP
• MPI, max.	200 ms
<b>Interfaces</b>	
Number of RS 485 interfaces	2
Number of other interfaces	2; Fiber-optic interface
Optical interface	No
<b>1. Interface</b>	
Interface type	MPI/PROFIBUS DP
Isolated	Yes
<b>Interface types</b>	
• RS 485	Yes
• Output current of the interface, max.	150 mA
<b>Protocols</b>	
• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
<b>MPI</b>	
• Number of connections	44; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
• Transmission rate, max.	12 Mbit/s
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
— S7 communication, as client	Yes
— S7 communication, as server	Yes
<b>PROFIBUS DP master</b>	
• Number of connections, max.	32; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
— S7 communication, as client	Yes
— S7 communication, as server	Yes
— Equidistance	No
— Isochronous mode	No
— SYNC/FREEZE	No
— Activation/deactivation of DP slaves	No
— Direct data exchange (slave-to-slave communication)	No

— DPV1	Yes
<b>Address area</b>	
— Inputs, max.	2 kbyte
— Outputs, max.	2 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>PROFIBUS DP slave</b>	
• Number of connections	No configuration of CPU as DP slave
<b>2. Interface</b>	
Interface type	PROFINET
Isolated	Yes
automatic detection of transmission rate	Yes; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	No
Number of connection resources	120
<b>Interface types</b>	
• RJ 45 (Ethernet)	Yes
• Number of ports	2
• integrated switch	Yes
<b>Protocols</b>	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	No
• PROFIBUS DP master	No
• PROFIBUS DP slave	No
• Open IE communication	Yes
• Web server	No
• Point-to-point connection	No
• Media redundancy	Yes
<b>PROFINET IO Controller</b>	
• Transmission rate, max.	100 Mbit/s
<b>Services</b>	
— PG/OP communication	Yes
— S7 communication	Yes
— Isochronous mode	No
— Shared device	Yes; Single mode only
— Prioritized startup	No
— Number of connectable IO Devices, max.	256; In redundant mode via both interfaces
— Number of connectable IO Devices for RT, max.	256
— of which in line, max.	256
— Activation/deactivation of IO Devices	No
— IO Devices changing during operation (partner ports), supported	No
— Device replacement without swap medium	Yes
— Send cycles	250 μs, 500 μs, 1 ms, 2 ms, 4 ms
— Updating time	250 μs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant mode
<b>Address area</b>	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
— User data consistency, max.	1 024 byte
<b>Open IE communication</b>	
• Number of connections, max.	118
• Local port numbers used at the system end	0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
<b>3. Interface</b>	
Interface type	PROFIBUS DP

Number of connection resources	32
<b>Interface types</b>	
<ul style="list-style-type: none"> <li>● RS 485</li> <li>● Output current of the interface, max.</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>150 mA</li> </ul>
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>● PROFIBUS DP master</li> <li>● PROFIBUS DP slave</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>No</li> </ul>
<b>PROFIBUS DP master</b>	
<ul style="list-style-type: none"> <li>● Number of connections, max.</li> <li>● Transmission rate, max.</li> <li>● Number of DP slaves, max.</li> </ul>	<ul style="list-style-type: none"> <li>32</li> <li>12 Mbit/s</li> <li>125</li> </ul>
<b>Services</b>	
<ul style="list-style-type: none"> <li>— PG/OP communication</li> <li>— Routing</li> <li>— Global data communication</li> <li>— S7 basic communication</li> <li>— S7 communication</li> <li>— S7 communication, as client</li> <li>— S7 communication, as server</li> <li>— Equidistance</li> <li>— Isochronous mode</li> <li>— SYNC/FREEZE</li> <li>— Activation/deactivation of DP slaves</li> <li>— Direct data exchange (slave-to-slave communication)</li> <li>— DPV0</li> <li>— DPV1</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> <li>Yes</li> <li>No</li> <li>No</li> <li>Yes</li> <li>Yes</li> <li>Yes</li> <li>No</li> <li>No</li> <li>No</li> <li>No</li> <li>No</li> <li>No</li> <li>Yes</li> <li>Yes</li> </ul>
<b>Address area</b>	
<ul style="list-style-type: none"> <li>— Inputs, max.</li> <li>— Outputs, max.</li> </ul>	<ul style="list-style-type: none"> <li>8 kbyte</li> <li>8 kbyte</li> </ul>
<b>User data per DP slave</b>	
<ul style="list-style-type: none"> <li>— User data per DP slave, max.</li> <li>— Inputs, max.</li> <li>— Outputs, max.</li> <li>— Slots, max.</li> <li>— per slot, max.</li> </ul>	<ul style="list-style-type: none"> <li>244 byte</li> <li>244 byte</li> <li>244 byte</li> <li>244</li> <li>128 byte</li> </ul>
<b>4. Interface</b>	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
<b>5. Interface</b>	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
<b>Protocols</b>	
<b>Redundancy mode</b>	
<b>Media redundancy</b>	
<ul style="list-style-type: none"> <li>— Switchover time on line break, typ.</li> <li>— Number of stations in the ring, max.</li> </ul>	<ul style="list-style-type: none"> <li>200 ms</li> <li>50</li> </ul>
<b>SIMATIC communication</b>	
<ul style="list-style-type: none"> <li>● S7 routing</li> </ul>	Yes
<b>Open IE communication</b>	
<ul style="list-style-type: none"> <li>● TCP/IP <ul style="list-style-type: none"> <li>— Number of connections, max.</li> <li>— Data length, max.</li> <li>— several passive connections per port, supported</li> </ul> </li> <li>● ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> <li>— Number of connections, max.</li> <li>— Data length, max.</li> </ul> </li> <li>● UDP <ul style="list-style-type: none"> <li>— Number of connections, max.</li> <li>— Data length, max.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <li>118</li> <li>32 kbyte</li> <li>Yes</li> <li>Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs</li> <li>118</li> <li>32 kbyte; 1 452 bytes via CP 443-1 Adv.</li> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <li>118</li> <li>1 472 byte</li> </ul>
<b>Web server</b>	

• supported	No
<b>Isochronous mode</b>	
Equidistance	No
<b>communication functions / header</b>	
PG/OP communication	Yes
• Number of connectable OPs without message processing	119
• Number of connectable OPs with message processing	119; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
<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.	64/64
<b>Standard communication (FMS)</b>	
• supported	Yes; Via CP and loadable FB
<b>Number of connections</b>	
• overall	120
• 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.	119; max. 119 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 16 with Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	No
SCAN procedure	No
Program alarms	Yes
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	1 000; Simultaneously active alarm_S/SQ blocks or alarm_D/DQ blocks
Alarm 8-blocks	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	10 000
• preset, max.	1 200
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	64
<b>Test commissioning functions</b>	
Status block	Yes
Single step	Yes
Number of breakpoints	16

<b>Status/control</b>	
<ul style="list-style-type: none"> <li>• Status/control variable</li> <li>• Variables</li> <li>• Number of variables, max.</li> </ul>	Yes; Up to 16 variable tables Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 70
<b>Forcing</b>	
<ul style="list-style-type: none"> <li>• Forcing</li> <li>• Forcing, variables</li> <li>• Number of variables, max.</li> </ul>	Yes Inputs/outputs, bit memories, distributed I/Os 512
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• Number of entries, max.               <ul style="list-style-type: none"> <li>— adjustable</li> <li>— preset</li> </ul> </li> </ul>	Yes 3 200 Yes 120
<b>Service data</b>	
<ul style="list-style-type: none"> <li>• can be read out</li> </ul>	Yes
<b>EMC</b>	
Emission of radio interference acc. to EN 55 011	
<ul style="list-style-type: none"> <li>• Limit class A, for use in industrial areas</li> <li>• Limit class B, for use in residential areas</li> </ul>	Yes No
<b>configuration / header</b>	
Configuration software	
<ul style="list-style-type: none"> <li>• STEP 7</li> </ul>	Yes
configuration / programming / header	
<ul style="list-style-type: none"> <li>• Command set</li> <li>• Nesting levels</li> <li>• Access to consistent data in process image</li> <li>• System functions (SFC)</li> <li>• System function blocks (SFB)</li> </ul>	see instruction list 7 Yes see instruction list see instruction list
Programming language	
<ul style="list-style-type: none"> <li>— LAD</li> <li>— FBD</li> <li>— STL</li> <li>— SCL</li> <li>— CFC</li> <li>— GRAPH</li> <li>— HiGraph®</li> </ul>	Yes Yes Yes Yes Yes Yes Yes
configuration / programming / number of simultaneously active SFC / header	
<ul style="list-style-type: none"> <li>— RD_REC</li> <li>— WR_REC</li> <li>— WR_PARM</li> <li>— PARM_MOD</li> <li>— WR_DPARM</li> <li>— DPNRM_DG</li> <li>— RDSYSST</li> <li>— DP_TOPOL</li> </ul>	8 8 8 1 2 8 8 1
configuration / programming / number of simultaneously active SFB / header	
<ul style="list-style-type: none"> <li>— RDREC</li> <li>— WRREC</li> </ul>	8 8
<b>Know-how protection</b>	
<ul style="list-style-type: none"> <li>• User program protection/password protection</li> <li>• Block encryption</li> </ul>	Yes Yes; With S7 block Privacy
<b>Dimensions</b>	
Width	50 mm
Height	290 mm
Depth	219 mm
<b>Weights</b>	
Weight, approx.	995 g
<b>last modified:</b>	4/1/2022 