

SIMATIC PCS 7, CPU 410-5H Process Automation, central processing unit for S7-400 and S7-400H/F/FH, 5 interfaces: 2x PN, 1x DP, 2x for sync modules for using as spare part, without System Expansion Card



General information	
Product type designation	CPU 410-5H
HW functional status	2
Firmware version	V8.2
Design of PLC basic unit	With Conformal Coating (ISA-S71.04 severity level G1; G2; G3) and operating temperature to 70 °C
Product function	
<ul style="list-style-type: none"> • SysLog 	Yes; via TCP; up to 4 receivers can be parameterized; buffer capacity max. 3 200 entries
<ul style="list-style-type: none"> • Field interface security 	Yes
Engineering with	
<ul style="list-style-type: none"> • Programming package 	SIMATIC PCS 7 V9.0 or higher
CiR - Configuration in RUN	
CiR synchronization time, basic load	60 ms
CiR synchronization time, time per I/O byte	0 µs
Input current	
from backplane bus 5 V DC, typ.	2 A
from backplane bus 5 V DC, max.	2.4 A

from backplane bus 24 V DC, max.	150 mA; DP interface
from interface 5 V DC, max.	90 mA; At the DP interface
Power loss	
Power loss, typ.	10 W
Processor	
CPU speed	450 MHz; Multi-processor system
Memory	
PCS 7 process objects	100 ... approx. 2 600, adjustable with System Expansion Card
Work memory	
<ul style="list-style-type: none"> • integrated • integrated (for program) • integrated (for data) • expandable 	<p>32 Mbyte; max., dependent on the System Expansion Card used</p> <p>Dependent on the System Expansion Card used</p> <p>Dependent on the System Expansion Card used</p> <p>Dependent on the System Expansion Card used</p>
Load memory	
<ul style="list-style-type: none"> • integrated RAM, max. • expandable RAM 	<p>48 Mbyte</p> <p>No</p>
Backup	
<ul style="list-style-type: none"> • present • with battery • without battery 	<p>Yes</p> <p>Yes; all data</p> <p>Yes; Program and data of the load memory</p>
Battery	
Backup battery	
<ul style="list-style-type: none"> • Backup current, typ. • Backup current, max. • Backup time, max. • Feeding of external backup voltage to CPU 	<p>370 μA; Valid up to 40°C</p> <p>2.1 mA</p> <p>Dealt with in the module data manual with the secondary conditions and the factors of influence</p> <p>No</p>
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
average processing time of PCS 7 typicals	110 μ s; with APL Typicals
Process tasks, max.	9; Individually adjustable from 10 ms to 5 s
CPU-blocks	
DB	
<ul style="list-style-type: none"> • Number, max. • Size, max. 	<p>16 000; Number range: 1 to 16 000 (= Instances)</p> <p>Dependent on the System Expansion Card used</p>
FB	
<ul style="list-style-type: none"> • Number, max. 	8 000; Number range: 0 to 7999

• Size, max.	64 kbyte
FC	
• Number, max.	8 000; Number range: 0 to 7999
• Size, max.	64 kbyte
OB	
• Number, max.	see instruction list
• Size, max.	64 kbyte
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	8; OB 10-17
• Number of delay alarm OBs	4; OB 20-23
• Number of cyclic interrupt OBs	9; OB 30-38 (= Process Tasks)
• Number of process alarm OBs	8; OB 40-47
• Number of DPV1 alarm OBs	3; OB 55-57
• Number of startup OBs	2; OB 100, 102
• Number of asynchronous error OBs	9; OB 80-88
• Number of synchronous error OBs	2; OB 121, 122
Nesting depth	
• per priority class	24
• additional within an error OB	2
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	
— adjustable	Yes
Counting range	
— lower limit	0
— upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB

- Number

Unlimited (limited only by RAM capacity)

Data areas and their retentivity

retentive data area in total	Total working and load memory (with backup battery)
Flag	
<ul style="list-style-type: none"> • Number, max. 	16 384 byte
<ul style="list-style-type: none"> • Retentivity available 	Yes
<ul style="list-style-type: none"> • Number of clock memories 	8; in 1 memory byte
Local data	
<ul style="list-style-type: none"> • adjustable, max. 	64 kbyte
<ul style="list-style-type: none"> • preset 	64 kbyte

Address area

I/O address area	
<ul style="list-style-type: none"> • Inputs 	16 kbyte; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> • Outputs 	16 kbyte; max., dependent on the System Expansion Card used
Process image	
<ul style="list-style-type: none"> • Inputs, adjustable 	16 kbyte
<ul style="list-style-type: none"> • Outputs, adjustable 	16 kbyte
<ul style="list-style-type: none"> • Inputs, default 	16 kbyte; Total peripheral address range, cannot be changed
<ul style="list-style-type: none"> • Outputs, default 	16 kbyte; Total peripheral address range, cannot be changed
<ul style="list-style-type: none"> • consistent data, max. 	244 byte
<ul style="list-style-type: none"> • Access to consistent data in process image 	Yes
Subprocess images	
<ul style="list-style-type: none"> • Number of subprocess images, max. 	15
Digital channels	
<ul style="list-style-type: none"> • Inputs 	131 072; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> — of which central 	131 072; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> • Outputs 	131 072; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> — of which central 	131 072; max., dependent on the System Expansion Card used
Analog channels	
<ul style="list-style-type: none"> • Inputs 	8 192; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> — of which central 	8 192; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> • Outputs 	8 192; max., dependent on the System Expansion Card used
<ul style="list-style-type: none"> — of which central 	8 192; max., dependent on the System Expansion Card used

Hardware configuration

Number of expansion units, max.	21; S7-400 expansion devices
connectable OPs	119
Multicomputing	No
Interface modules	
<ul style="list-style-type: none"> • Number of connectable IMs (total), max. 	6
<ul style="list-style-type: none"> • Number of connectable IM 460s, max. 	6
<ul style="list-style-type: none"> • Number of connectable IM 463s, max. 	4; Single mode only

Number of DP masters	
• integrated	1
• via CP	10; CP 443-5 Extended
Number of IO Controllers	
• integrated	2
• via CP	0
Number of operable FMs and CPs (recommended)	
• PROFIBUS and Ethernet CPs	11; 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	16
• Number/Number range	0 to 15
• Range of values	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2 ³¹ - 1 hours
• Granularity	1 h
• retentive	Yes
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• to DP, slave	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Possible as client and master/slave via SIMATIC process
Interfaces	
Number of PROFINET interfaces	2
Number of RS 485 interfaces	1; PROFIBUS DP
Number of other interfaces	2; 2x synchronization
1. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	16
Protocols	

• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
PROFIBUS DP master	
• Number of connections, max.	16
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	96
• Number of slots per interface, max.	1 632
Services	
— PG/OP communication	Yes
— Routing	Yes; S7 routing
— 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	Yes; Approved for stand-alone operation only, not in conjunction with CiR (Configuration in Run)
— Direct data exchange (slave-to-slave communication)	No
— DPV1	Yes
Address area	
— Inputs, max.	6 kbyte; up to 2 800 IOs (channels)
— Outputs, max.	6 kbyte; up to 2 800 IOs (channels)
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	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
automatic detection of transmission rate	Yes; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
System redundancy	Yes
Redundant subnetworks	Yes
Change of IP address at runtime, supported	No

Number of connection resources	120
Interface types	
• Number of ports	2
• integrated switch	Yes
Protocols	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	No
• Open IE communication	Yes
• Web server	No
• Media redundancy	Yes
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— S7 communication	Yes
— Shared device	No; however, usable as part of S7
— Prioritized startup	No
— Number of connectable IO Devices, max.	250
— Number of connectable IO Devices for RT, max.	250
— of which in line, max.	250
— Activation/deactivation of IO Devices	Yes; Approved for stand-alone operation only, not in conjunction with CiR (Configuration in Run)
— 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
Address area	
— Inputs, max.	8 kbyte; up to 3 800 IOs (channels)
— Outputs, max.	8 kbyte; up to 3 800 IOs (channels)
— User data consistency, max.	1 024 byte
Open IE communication	
• 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
3. Interface	
Interface type	PROFINET

Physics	Ethernet RJ45
Isolated	Yes
automatic detection of transmission rate	Yes; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
System redundancy	Yes
Redundant subnetworks	Yes
Number of connection resources	120
Interface types	
• Number of ports	2
• integrated switch	Yes
Protocols	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	No
• Open IE communication	Yes
• Web server	No
• Media redundancy	Yes
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— S7 communication	Yes
— Shared device	No; however, usable as part of S7
— Prioritized startup	No
— Number of connectable IO Devices, max.	250
— Number of connectable IO Devices for RT, max.	250
— of which in line, max.	250
— Activation/deactivation of IO Devices	Yes; Approved for stand-alone operation only, not in conjunction with CiR (Configuration in Run)
— 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
Address area	
— Inputs, max.	8 kbyte; up to 3 800 IOs (channels)
— Outputs, max.	8 kbyte; up to 3 800 IOs (channels)
— User data consistency, max.	1 024 byte
Open IE communication	

• 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

4. Interface

Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0

5. Interface

Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0

Protocols

Supports protocol for PROFINET IO	Yes
PROFINET CBA	No
PROFIsafe	Yes
PROFIBUS	Yes
AS-Interface	Yes; Via add-on

Redundancy mode

Media redundancy	
— Switchover time on line break, typ.	< 200 ms
— Number of stations in the ring, max.	50

SIMATIC communication

• S7 routing	Yes
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Open IE communication

• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	118
— Data length, max.	32 kbyte
— several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
— Number of connections, max.	118
— Data length, max.	32 kbyte; 1 452 bytes via CP 443-1 Adv.
• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	118
— Data length, max.	1 472 byte

Further protocols

• Foundation Fieldbus	Yes; via DP/FF Link
• MODBUS	Yes; Via add-on

Communication functions

PG/OP communication	Yes
<ul style="list-style-type: none"> • Number of connectable OPs without message processing • Number of connectable OPs with message processing 	119 119; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
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. 	Yes Yes Yes 64 kbyte 462 byte; 1 variable
S5 compatible communication	
<ul style="list-style-type: none"> • supported • User data per job, max. • User data per job (of which consistent), max. • Number of simultaneous AG-SEND/AG-RECV orders per CPU, max. 	Yes; via CP and FC AG_SEND and FC AG_RECV 8 kbyte 240 byte 64/64
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 • usable for PG communication <ul style="list-style-type: none"> — reserved for PG communication • usable for OP communication <ul style="list-style-type: none"> — reserved for OP communication 	120 1 1
S7 message functions	
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)
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
<ul style="list-style-type: none"> • Number of instances for alarm 8 and S7 communication blocks, max. • preset, max. 	10 000 10 000
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	64
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
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
Service data	
• can be read out	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	70 °C
Configuration	
Programming	
• Command set	see instruction list
• Nesting levels	7
• Access to consistent data in process image	Yes
• System functions (SFC)	see instruction list
• System function blocks (SFB)	see instruction list
Programming language	
— SCL	Yes
— CFC	Yes
Number of simultaneously active SFCs	
— RD_REC	8; SFC 59; per interface
— WR_REC	8; SFC 58; per interface
— WR_PARM	8; SFC 55; per interface
— PARM_MOD	1; SFC 57; per interface
— WR_DPARM	2; SFC 56; per interface

— DPNRM_DG	8; SFC 13; per interface
— RDSYSST	8; SFC 51
— DP_TOPOL	1; SFC 103; per interface

Number of simultaneously active SFBs

— RDREC	8; SFB 52; per interface, but not more than 32 across all external interfaces
— WRREC	8; SFB 53; per interface, but not more than 32 across all external interfaces

Know-how protection

- User program protection/password protection Yes
- Block encryption Yes; With S7 block Privacy

Dimensions

Width	50 mm
Height	290 mm
Depth	219 mm

Weights

Weight, approx.	1.1 kg
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last modified: 10/27/2020