



SIMATIC PCS 7, CPU 410-5H PROCESS AUTOMATION, CENTRAL UNIT FOR S7-400 AND S7-400H/F/FH, 5 INTERFACES: 2X PN, 1X DP, 2X FOR SYNC-MODULE FOR SPARE PART USAGE, WITHOUT SYSTEM EXPANSION CARD

## Product type designation

## General information

Hardware product version	1
Firmware version	V8.1
Version of the PLC basic device	with Conformal Coating (ISA-S71.04 severity level G1; G2; G3)
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	SIMATIC PCS 7 V8.1 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 losses

Power loss, typ.	10 W
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## Memory

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	
• expandable FEPR0M	No
• integrated RAM, max.	48 Mbyte
• expandable RAM	No
Backup	
• present	Yes
• with battery	Yes; all data
• without battery	No
Battery	
Backup battery	
• Backup current, typ.	370 $\mu$ A; Valid up to 40°C
• Backup current, max.	2.1 mA
• 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	No
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 speed	450 MHz; Multi-processor system
PCS 7 process objects	100 ... approx. 2 600, adjustable with system expansion card
Average processing time of PCS 7 typicals	110 $\mu$ s; with APL Typicals
Process tasks, max.	9; Individually adjustable from 10 ms to 5 s
CPU-blocks	
DB	
• Number, max.	16 000; Number range: 1 to 16 000 (= Instances)
• Size, max.	64 kbyte
FB	
• 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 time 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
<b>Nesting depth</b>	
• per priority class	24
• additional within an error OB	2
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
• Number	2 048
<b>Retentivity</b>	
— can be set	Yes
<b>Counting range</b>	
— lower limit	0
— upper limit	999
<b>IEC counter</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
• Number	2 048
<b>Retentivity</b>	
— can be set	Yes
<b>Time range</b>	
— lower limit	10 ms
— upper limit	9 990 s
<b>IEC timer</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
Total retentive data area	Total working and load memory (with backup battery)
<b>Flag</b>	
• Number, max.	16 384 byte
• Retentivity available	Yes
• Number of clock memories	8; in 1 memory byte
<b>Data blocks</b>	
• Number, max.	16 000; Number range: 1 to 16000
• Size, max.	64 kbyte
<b>Local data</b>	

- adjustable, max. 64 kbyte
- preset 64 kbyte

## Address area

<b>I/O address area</b>	
• Inputs	16 kbyte; up to 7500 IOs
• Outputs	16 kbyte; up to 7500 IOs
of which, distributed	
— DP interface, inputs	6 kbyte; up to 2 800 IOs (channels)
— DP interface, outputs	6 kbyte; up to 2 800 IOs (channels)
— PN interface, inputs	8 kbyte; up to 3 800 IOs (channels)
— PN interface, outputs	8 kbyte; up to 3 800 IOs (channels)
<b>Process image</b>	
• Inputs, adjustable	16 kbyte
• Outputs, adjustable	16 kbyte
• Inputs, default	16 kbyte
• Outputs, default	16 kbyte
• 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; max.
— Inputs, of which central	131 072; max.
• Outputs	131 072; max.
— Outputs, of which central	131 072; max.
• Number of addressable digital I/Os, max.	131 072
<b>Analog channels</b>	
• Inputs	8 192; max.
— Inputs, of which central	8 192; max.
• Outputs	8 192; max.
— Outputs, of which central	8 192; max.
• Number of addressable analog I/Os, max.	8 192
<b>Hardware configuration</b>	
Expansion devices, max.	21; S7-400 expansion devices
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	1
• Via CP	10; CP 443-5 Extended
<b>Number of IO Controllers</b>	
• Integrated	2
• Via CP	0
<b>Number of operable FMs and CPs (recommended)</b>	
• PROFIBUS and Ethernet CPs	11; Of which max. 10 CP as DP master
<b>Slots</b>	
• Required slots	2

## Time of day

### Clock

- |                                       |                  |
|---------------------------------------|------------------|
| • Hardware clock (real-time clock)    | Yes              |
| • battery-backed 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 <sup>31</sup> - 1 hours |
| • Granularity         | 1 hour  |
| • 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 | Yes; As client |

### Time difference in system when synchronizing via

- |                  |       |
|------------------|-------|
| • Ethernet, max. | 10 ms |
|------------------|-------|

## Interfaces

- |                             |                       |
|-----------------------------|-----------------------|
| Number of RS 485 interfaces | 1; PROFIBUS DP        |
| Number of other interfaces  | 2; 2x synchronization |

### PROFINET IO

- |                                 |   |
|---------------------------------|---|
| • Number of PROFINET interfaces | 2 |
|---------------------------------|---|

## 1st 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
<b>Functionality</b>	
• DP master	Yes
• DP slave	No
<b>DP master</b>	
• 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
<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 mode support	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.	6 kbyte; up to 2 800 IOs (channels)
— Outputs, max.	6 kbyte; up to 2 800 IOs (channels)
<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>2nd interface</b>	
Interface type	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic detection of transmission speed	Yes; Autosensing
Autonegotiation	Yes

Autocrossing	Yes
Change of IP address at runtime, supported	No
Number of connection resources	120
<b>Media redundancy</b>	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
<b>Functionality</b>	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	No
• Open IE communication	Yes
• Web server	No
<b>PROFINET IO Controller</b>	
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	250
• Max. number of connectable IO devices for RT	250
— of which in line, max.	250
• Shared device	No; however, usable as part of S7
• Prioritized startup	No
• 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>Services</b>	
— PG/OP communication	Yes
— S7 routing	Yes
— S7 communication	Yes
— Open IE communication	Yes
<b>Address area</b>	
— 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
<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>3rd interface</b>	

Interface type	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic detection of transmission speed	Yes; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
Number of connection resources	120
<b>Functionality</b>	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	No
• Open IE communication	Yes
• Web server	No
<b>PROFINET IO Controller</b>	
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	250
• Max. number of connectable IO devices for RT	250
— of which in line, max.	250
• Shared device	No; however, usable as part of S7
• Prioritized startup	No
• 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>Services</b>	
— PG/OP communication	Yes
— S7 routing	Yes
— S7 communication	Yes
— Open IE communication	Yes
<b>Address area</b>	
— 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
<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

#### 4th interface

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

#### 5. Interface

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

#### Protocols

PROFINET IO	Yes
PROFINET CBA	No
Supports protocol for PROFI-safe	Yes
PROFIBUS	Yes
AS-Interface	Yes; Via add-on
<b>Protocols (Ethernet)</b>	
• TCP/IP	Yes
<b>Further protocols</b>	
• MODBUS	Yes; Via add-on
• Foundation Fieldbus	Yes; via DP/FF Link

#### Communication functions

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
S7 routing	Yes
<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>Open IE communication</b>	
• 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; 1452 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
<b>Number of connections</b>	
• overall	120
• usable for PG communication	
— reserved for PG communication	1
• usable for OP communication	
— reserved for OP communication	1
<b>S7 message functions</b>	
Number of login stations for message functions, max.	119; Max. 119 with Alarm_S and Alarm_D (OPs); max. 12 with Alarm_8 and Alarm_P (e.g. WinCC)
Symbol-related messages	No
SCAN procedure	No
Block related messages	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.	10 000
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	4
<b>Status/control</b>	
• Status/control variable	Yes

• Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
• Number of variables, max.	70
<b>Diagnostic buffer</b>	
• present	Yes
<b>Service data</b>	
• Can be read out	Yes
<b>EMC</b>	
<b>Emission of radio interference acc. to EN 55 011</b>	
• Limit class A, for use in industrial areas	Yes
• Limit class B, for use in residential areas	No
<b>programming</b>	
• 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
<b>Programming language</b>	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	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_TOPOLOG	1
<b>Number of simultaneously active SFBs</b>	
— RDREC	8
— WRREC	8
<b>Know-how protection</b>	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
<b>Dimensions</b>	

Width	50 mm
Height	290 mm
Depth	219 mm

#### Weights

Weight, approx.	1.1 kg
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**last modified:** 12.03.2015