## **SIEMENS**

## Data sheet

## 6ES7410-5HX08-0AB0

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	
• SysLog	Yes; via TCP; up to 4 receivers can be parameterized; buffer capacity max. 3 200 entries
<ul> <li>Field interface security</li> </ul>	Yes
Engineering with	
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.	450 mA, DD interface
from interface 5 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	100 approx. 2 000, adjustable with System Expansion Card
• integrated	32 Mbyte; max., dependent on the System Expansion Card used
	Dependent on the System Expansion Card used
• integrated (for program)	Dependent on the System Expansion Card used
• integrated (for data)	
• expandable	Dependent on the System Expansion Card used
Load memory	60.11
• integrated RAM, max.	48 Mbyte
expandable RAM	No
Backup	
• present	Yes
• with battery	Yes; all data
<ul><li>without battery</li></ul>	Yes; Program and data of the load memory
Battery	
Backup battery	
Backup current, typ.	370 μA; Valid up to 40°C
Backup current, max.	2.1 mA
<ul> <li>Backup time, max.</li> </ul>	Dealt with in the module data manual with the secondary
Backup time, max.	Dealt with in the module data manual with the secondary conditions and the factors of influence
<ul><li>Backup time, max.</li><li>Feeding of external backup voltage to CPU</li></ul>	
● Feeding of external backup voltage to CPU	conditions and the factors of influence
,	conditions and the factors of influence
Feeding of external backup voltage to CPU  CPU processing times	conditions and the factors of influence  No
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.	No 7.5 ns
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.	7.5 ns 7.5 ns
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.	7.5 ns 7.5 ns 7.5 ns
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.	7.5 ns 7.5 ns 7.5 ns 15 ns
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  average processing time of PCS 7 typicals  Process tasks, max.	conditions and the factors of influence No  7.5 ns 7.5 ns 7.5 ns 15 ns 110 μs; with APL Typicals
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  average processing time of PCS 7 typicals	conditions and the factors of influence No  7.5 ns 7.5 ns 7.5 ns 15 ns 110 μs; with APL Typicals
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  average processing time of PCS 7 typicals  Process tasks, max.  CPU-blocks	conditions and the factors of influence No  7.5 ns 7.5 ns 7.5 ns 15 ns 110 μs; with APL Typicals
• Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  average processing time of PCS 7 typicals  Process tasks, max.  CPU-blocks  DB	7.5 ns 7.5 ns 7.5 ns 15 ns 110 µs; with APL Typicals 9; Individually adjustable from 10 ms to 5 s
● Feeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  average processing time of PCS 7 typicals  Process tasks, max.  CPU-blocks  DB  ● Number, max.	conditions and the factors of influence No  7.5 ns 7.5 ns 7.5 ns 15 ns 110 μs; with APL Typicals 9; Individually adjustable from 10 ms to 5 s
Peeding of external backup voltage to CPU  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  average processing time of PCS 7 typicals  Process tasks, max.  CPU-blocks  DB  Number, max.  Size, max.	conditions and the factors of influence No  7.5 ns 7.5 ns 7.5 ns 15 ns 110 μs; with APL Typicals 9; Individually adjustable from 10 ms to 5 s

• Size, max.	64 kbyte
FC	
Number, max.	8 000; Number range: 0 to 7999
• Size, max.	64 kbyte
ОВ	
Number, max.	see instruction list
• Size, max.	64 kbyte
<ul> <li>Number of free cycle OBs</li> </ul>	1; OB 1
<ul> <li>Number of time alarm OBs</li> </ul>	8; OB 10-17
<ul> <li>Number of delay alarm OBs</li> </ul>	4; OB 20-23
<ul> <li>Number of cyclic interrupt OBs</li> </ul>	9; OB 30-38 (= Process Tasks)
<ul> <li>Number of process alarm OBs</li> </ul>	8; OB 40-47
<ul> <li>Number of DPV1 alarm OBs</li> </ul>	3; OB 55-57
<ul> <li>Number of startup OBs</li> </ul>	2; OB 100, 102
<ul> <li>Number of asynchronous error OBs</li> </ul>	9; OB 80-88
<ul> <li>Number of synchronous error OBs</li> </ul>	2; OB 121, 122
Nesting depth	
per priority class	24
<ul> <li>additional within an error OB</li> </ul>	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	
- NI I	
Number	2 048
• Number Retentivity	
	2 048 Yes
Retentivity	
Retentivity — adjustable	
Retentivity — adjustable Time range	Yes
Retentivity  — adjustable  Time range  — lower limit	Yes 10 ms
Retentivity  — adjustable Time range  — lower limit — upper limit	Yes 10 ms

Unlimited (	(limited or	nly by	RAM ca	pacity)

<ul> <li>N</li> </ul>	um	ber
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Data areas and their retentivity	
retentive data area in total	Total working and load memory (with backup battery)
Flag	
Number, max.	16 384 byte
Retentivity available	Yes
<ul> <li>Number of clock memories</li> </ul>	8; in 1 memory byte
Local data	
adjustable, max.	64 kbyte
• preset	64 kbyte
address area	
I/O address area	
• Inputs	16 kbyte; max., dependent on the System Expansion Card used
Outputs	16 kbyte; max., dependent on the System Expansion Card used
Process image	
<ul><li>Inputs, adjustable</li></ul>	16 kbyte
<ul> <li>Outputs, adjustable</li> </ul>	16 kbyte
• Inputs, default	16 kbyte; Total peripheral address range, cannot be changed
Outputs, default	16 kbyte; Total peripheral address range, cannot be changed
• consistent data, max.	244 byte
<ul> <li>Access to consistent data in process image</li> </ul>	Yes
Subprocess images	
<ul> <li>Number of subprocess images, max.</li> </ul>	15
Digital channels	
• Inputs	131 072; max., dependent on the System Expansion Card used
— of which central	131 072; max., dependent on the System Expansion Card used
Outputs	131 072; max., dependent on the System Expansion Card used
— of which central	131 072; max., dependent on the System Expansion Card used
Analog channels	
• Inputs	8 192; max., dependent on the System Expansion Card used
— of which central	8 192; max., dependent on the System Expansion Card used
Outputs	8 192; max., dependent on the System Expansion Card used
— 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> <li>Number of connectable IMs (total), max.</li> </ul>	6
<ul> <li>Number of connectable IM 460s, max.</li> </ul>	6
<ul> <li>Number of connectable IM 463s, max.</li> </ul>	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	

	N.
PROFIBUS DP master	Yes
PROFIBUS DP slave	No
PROFIBUS DP master	
<ul> <li>Number of connections, max.</li> </ul>	16
Transmission rate, max.	12 Mbit/s
<ul><li>Number of DP slaves, max.</li></ul>	96
<ul> <li>Number of slots per interface, max.</li> </ul>	1 632
Services	
<ul><li>— PG/OP communication</li></ul>	Yes
— Routing	Yes; S7 routing
<ul> <li>Global data communication</li> </ul>	No
<ul> <li>S7 basic communication</li> </ul>	No
— S7 communication	Yes
<ul> <li>S7 communication, as client</li> </ul>	Yes
<ul> <li>S7 communication, as server</li> </ul>	Yes
— Equidistance	No
— Isochronous mode	No
— SYNC/FREEZE	No
<ul> <li>Activation/deactivation of DP slaves</li> </ul>	Yes; Approved for stand-alone operation only, not in conjunction with CiR (Configuration in Run)
<ul> <li>— Direct data exchange (slave-to-slave communication)</li> </ul>	No
— DPV1	Yes
— DFV I	165
	165
Address area	
Address area — Inputs, max.	6 kbyte; up to 2 800 IOs (channels)
Address area  — Inputs, max.  — Outputs, max.	
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels) 244 byte
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte 244
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte 244
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.  — per slot, max.	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte 244
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.  — per slot, max.  2. Interface Interface type Physics	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte 244 128 byte  PROFINET Ethernet RJ45
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.  — per slot, max.  2. Interface Interface type Physics Isolated	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte 244 128 byte  PROFINET Ethernet RJ45 Yes
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.  — per slot, max.  2. Interface Interface type Physics Isolated automatic detection of transmission rate	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 128 byte  PROFINET Ethernet RJ45 Yes Yes; Autosensing
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.  — per slot, max.  2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 byte 244 128 byte  PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes
Address area  — Inputs, max.  — Outputs, max.  User data per DP slave  — User data per DP slave, max.  — Inputs, max.  — Outputs, max.  — Slots, max.  — per slot, max.  2. Interface Interface type Physics Isolated automatic detection of transmission rate	6 kbyte; up to 2 800 IOs (channels) 6 kbyte; up to 2 800 IOs (channels)  244 byte 244 byte 244 128 byte  PROFINET Ethernet RJ45 Yes Yes; Autosensing

Redundant subnetworks

Change of IP address at runtime, supported

Yes

No

Number of connection resources	120
Interface types	<del></del>
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,	250
max.	
— of which in line, max.	250
<ul> <li>Activation/deactivation of IO Devices</li> </ul>	Yes; Approved for stand-alone operation only, not in conjunction with CiR (Configuration in Run)
<ul> <li>IO Devices changing during operation (partner ports), supported</li> </ul>	No
<ul> <li>Device replacement without swap medium</li> </ul>	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
<ul> <li>Local port numbers used at the system end</li> </ul>	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	
<ul><li>Number of ports</li></ul>	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,	250
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)
<ul> <li>IO Devices changing during operation (partner ports), supported</li> </ul>	No
— Device replacement without swap medium	Yes
— Send cycles	250 μs, 500 μs, 1 ms, 2 ms, 4 ms
— Updating time	$250~\mu s$ 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	

O. 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535     Keep-alive function, supported     Yes  Interface type Plug-in interface modules Plug-in interface type Plug-in interface type Plug-in interface modules Profice Interface type Plug-in interface modules Profice Supports protocol for PROFINET IO PROFINET CBA PROFIBUS AS-Interface Redundancy mode Media redundancy Switchower time on line break, typ. Number of stations in the ring, max.  SIMATIC communication  TCP/IP Nesseveral passive connections, max. Data length,	Number of connections, max.	118
Neep-alive function, supported   Yes		
Interface type Plug-in interface modules Synchronization submodule (FO) Plug-in interface modules Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA06-0XA0  5. Interface Interface Unterface Modules Plug-in interface modules 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 PROFINET CBA No PROFISES 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 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  • 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. 1472 byte	Keep-alive function, supported	
Interface type Plug-in interface modules Synchronization submodule (FO) Plug-in interface modules Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA06-0XA0  5. Interface Interface Unterface Modules Plug-in interface modules 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 PROFINET CBA No PROFISES 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 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  • 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. 1472 byte	4. Interface	
5. Interface Interface type Interface type Plug-in interface modules Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0  Protocols Supports protocol for PROFINET IO Yes PROFINET CBA No PROFIBUS Yes AS-Interface Yes; Via add-on Redundancy mode Media redundancy - Switchover time on line break, typ Number of stations in the ring, max.  SIMATIC communication  • S7 routing Yes Open IE communication  • TCP/IP - Number of connections, max Data length, max several passive connections per port, supported  • ISO-on-TCP (RFC1006) - Number of connections, max Data length, max Data length, max UDP - Number of connections, max Data length, max Data length, max UDP - Number of connections, max Data length, max Lageth Reserved PROFINET interface and loadable FBs - Number of connections, max Lageth, max Lageth Reserved PROFINET interface and loadable FBs - Number of connections, max Lageth Reserved PROFINET interface and loadable FBs - Number of connections, max Lageth Reserved PROFINET interface and loadable FBs - Number of connections, max Lageth Reserved PROFINET interface and loadable FBs - Number of connections, max Lageth Reserved PROFINET interface and loadable FBs - Lageth Reserved PROFINET interface and loadable FBs	Interface type	Pluggable synchronization submodule (FO)
Interface type Plug-in interface modules Synchronization submodule (FO) Plug-in interface modules Synchronization module 6ES7960-1AA08-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0 Protocols Supports protocol for PROFINET IO Yes PROFINET CBA No PROFISATE Yes PROFIBUS Yes AS-Interface Yes; Via add-on Redundancy mode  Media redundancy — Switchover time on line break, typ.	Plug-in interface modules	
Plug-in interface modules  Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0  Protocols  Supports protocol for PROFINET IO  PROFINET CBA  No  PROFIBUS  AS-Interface  Media redundancy mode  Media redundancy  — Switchover time on line break, typ. — Number of stations in the ring, max.  Data length, max. — Several passive connections, max. — Data length, max. — 1472 byte	5. Interface	
Protocols  Supports protocol for PROFINET IO Yes PROFINET CBA No PROFISATE 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 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  • 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 — Number of connections, max. 118 — Data length, max. 32 kbyte; 1 452 bytes via CP 443-1 Adv.  • UDP — Number of connections, max. 118 — Data length, max. 1472 byte	Interface type	Pluggable synchronization submodule (FO)
Supports protocol for PROFINET IO PROFINET CBA No PROFISATE PROFIBUS AS-Interface Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max.  SIMATIC communication  • S7 routing Open IE communication  • TCP/IP — Number of connections, max. — Data length, max. — Several passive connections, per port, supported  • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max.	Plug-in interface modules	
PROFINET CBA PROFIsafe PROFIBUS AS-Interface Redundancy mode  Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max.  SIMATIC communication  ST routing  Open IE communication  TCP/IP — Number of connections, max. — Data length, max. — several passive connections per port, supported  ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. — Data length, max. — Data length, max. — Say Via integrated PROFINET interface or CP 443-1 and loadable FBs — Number of connections, max. — I18 — Number of connections, max. — Say Via integrated PROFINET interface or CP 443-1 and loadable FBs — Number of connections, max. — Data length, max.  Say kbyte; 1 452 bytes via CP 443-1 Adv.  Ves; via integrated PROFINET interface and loadable FBs — Number of connections, max. — Data length, max.  118 — Data length, max.  118 — Data length, max.  1472 byte	Protocols	
PROFIBUS  AS-Interface  Redundancy mode  Media redundancy  — Switchover time on line break, typ. — Number of stations in the ring, max.  • ST routing  Open IE communication  • TCP/IP  — Number of connections, max. — Data length, max.  — Several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max. — Data length, max. — Data length, max. — Data length, max. — Several passive connections, max. — Number of connections, max. — Data length, max. — Data length, max.  — Data length, max.  — Data length, max.  • UDP — Number of connections, max. — Data length, max.  — Data length, max.	Supports protocol for PROFINET IO	Yes
PROFIBUS  AS-Interface  Redundancy mode  Media redundancy  — Switchover time on line break, typ. — Number of stations in the ring, max.  SIMATIC communication  • S7 routing  Open IE communication  • TCP/IP  — Number of connections, max. — Data length, max. — several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max. — Data length, max. — Data length, max. — Several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max. — Data length, max. — Data length, max. — Data length, max.  — Data length, max.  • UDP — Number of connections, max. — Data length, max.  — Data length, max.  118 — Number of connections, max. — Data length, max.  118 — Number of connections, max. — Data length, max.  118 — Data length, max.  118 — Data length, max.  118 1472 byte	PROFINET CBA	No
AS-Interface  Redundancy mode  Media redundancy  — Switchover time on line break, typ. — Number of stations in the ring, max.  SIMATIC communication  • S7 routing  Open IE communication  • TCP/IP  — Number of connections, max. — Data length, max.  • UDP — Number of connections, max. — Number of connections, max. — Data length, max.  • UDP — Number of connections, max. — Data length, max.  118 — Data length, max.	PROFIsafe	Yes
Redundancy mode  Media redundancy  — Switchover time on line break, typ. — Number of stations in the ring, max.  SIMATIC communication  • \$7 routing  Open IE communication  • TCP/IP  — Number of connections, max. — Data length, max. — several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max. — Data length, max. — Data length, max. — Set via integrated PROFINET interface or CP 443-1 and loadable FBs — Number of connections, max. — Data length, max.  — Data length, max.  • UDP — Number of connections, max. — Number of connections, max. — Data length, max.  118  — Number of connections, max. — 118 — Data length, max.  118  — Number of connections, max. — 118 — Data length, max.  118 — Data length, max.  118 — Data length, max.	PROFIBUS	Yes
Media redundancy  — Switchover time on line break, typ. — Number of stations in the ring, max.  SIMATIC communication  • S7 routing  Open IE communication  • TCP/IP  — Number of connections, max. — Data length, max. — several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max. — Data length, max. — Data length, max. — Several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max. — Data length, max. — Data length, max. — Data length, max.  • UDP — Number of connections, max. — Number of connections, max. — Data length, max. — Data length, max.  118 — Data length, max.  118 — Data length, max.  118 — Data length, max.  119  1472 byte	AS-Interface	Yes; Via add-on
- Switchover time on line break, typ Number of stations in the ring, max.  50  SIMATIC communication  ● S7 routing  Open IE communication  ● TCP/IP	Redundancy mode	
— Number of stations in the ring, max.  SIMATIC communication  ● S7 routing  Open IE communication  ● TCP/IP  For Number of connections, max.  — Data length, max.  — Several passive connections per port, supported  ● ISO-on-TCP (RFC1006)  — Number of connections, max.  — Data length, max.  — Data length, max.  — Number of connections, max.  — Number of connections, max.  — Data length, max.  — Data length, max.  ● UDP  — Number of connections, max.  — Data length, max.  118  — Number of connections, max.  118  — Data length, max.  118  — Data length, max.  118  — Number of connections, max.  118  — Number of connections, max.  118  — Data length, max.  118  — Data length, max.  118	Media redundancy	
SIMATIC communication  Soluting  Open IE communication  TCP/IP  Number of connections, max.  Data length, max.  Substitute of the substitu	<ul> <li>Switchover time on line break, typ.</li> </ul>	< 200 ms
Open IE communication      TCP/IP     Yes; via integrated PROFINET interface and loadable FBs     Number of connections, max.     Data length, max.     several passive connections per port, supported      ISO-on-TCP (RFC1006)     Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs     Number of connections, max.     Data length, max.      Data length, max.      UDP     Yes; via integrated PROFINET interface or CP 443-1 Adv.  Yes; via integrated PROFINET interface and loadable FBs  118     Number of connections, max.  118     Number of connections, max.  118     Number of connections, max.  118     1472 byte	<ul> <li>Number of stations in the ring, max.</li> </ul>	50
Open IE communication  • TCP/IP  — Number of connections, max.  — Data length, max.  — several passive connections per port, supported  • ISO-on-TCP (RFC1006)  — Number of connections, max.  — Data length, max.  — Data length, max.  — Number of connections, max.  — Data length, max.  — Data length, max.  • UDP  — Number of connections, max.  — Data length, max.  — Data length, max.  118  — Number of connections, max.  118	SIMATIC communication	
<ul> <li>TCP/IP         <ul> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <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)</li> <li>Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>UDP</li> <li>Number of connections, max.</li> <li>118</li> <li>Number of connections, max.</li> <li>118</li> <li>Data length, max.</li> <li>1472 byte</li> </ul>	• S7 routing	Yes
<ul> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>several passive connections per port, supported</li> <li>ISO-on-TCP (RFC1006)</li> <li>Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>UDP</li> <li>Number of connections, max.</li> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <li>Number of connections, max.</li> <li>118</li> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>1472 byte</li> </ul>	Open IE communication	
<ul> <li>— Data length, max.</li> <li>— several passive connections per port, supported</li> <li>◆ ISO-on-TCP (RFC1006)</li> <li>— Number of connections, max.</li> <li>— Data length, max.</li> <li>◆ UDP</li> <li>— Number of connections, max.</li> <li>→ Data length, max.</li> </ul>	• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
<ul> <li>— several passive connections per port, supported</li> <li>◆ ISO-on-TCP (RFC1006)</li> <li>— Number of connections, max.</li> <li>— Data length, max.</li> <li>◆ UDP</li> <li>— Number of connections, max.</li> <li>+ UDP</li> <li>— Data length, max.</li> <li>+ 1472 byte</li> </ul>	<ul> <li>Number of connections, max.</li> </ul>	118
<ul> <li>supported</li> <li>ISO-on-TCP (RFC1006)</li> <li>Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>UDP</li> <li>Number of connections, max.</li> <li>Number of connections, max.</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>118</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>1472 byte</li> </ul>	— Data length, max.	32 kbyte
loadable FBs  — Number of connections, max.  — Data length, max.  • UDP  — Number of connections, max.  — Number of connections, max.  — Data length, max.  118  Yes; via integrated PROFINET interface and loadable FBs  — 118  — Data length, max.  1472 byte		Yes
<ul> <li>— Data length, max.</li> <li>■ UDP</li> <li>— Number of connections, max.</li> <li>— Data length, max.</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>— Data length, max.</li> <li>1 472 byte</li> </ul>	• ISO-on-TCP (RFC1006)	
<ul> <li>UDP</li> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <li>Number of connections, max.</li> <li>Data length, max.</li> <li>1472 byte</li> </ul>	<ul> <li>Number of connections, max.</li> </ul>	118
<ul> <li>◆ UDP</li> <li>Yes; via integrated PROFINET interface and loadable FBs</li> <li>— Number of connections, max.</li> <li>— Data length, max.</li> <li>1472 byte</li> </ul>	— Data length, max.	32 kbyte; 1 452 bytes via CP 443-1 Adv.
— Data length, max. 1 472 byte	• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Data length, max. 1 472 byte		118
		1 472 byte

• MODBUS

• Foundation Fieldbus

Yes; via DP/FF Link

Yes; Via add-on

DC/OD communication	Voo
PG/OP communication	Yes
<ul> <li>Number of connectable OPs without message processing</li> </ul>	119
<ul> <li>Number of connectable OPs with message processing</li> </ul>	119; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
S7 communication	
• 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
S5 compatible communication	
• supported	Yes; via CP and FC AG_SEND and FC AG_RECV
User data per job, max.	8 kbyte
<ul> <li>User data per job (of which consistent), max.</li> </ul>	240 byte
Number of simultaneous AG-SEND/AG-RECV	64/64
orders per CPU, max.	
Standard communication (FMS)	V V OD 11 111 ED
• supported	Yes; Via CP and loadable FB
Number of connections	
• overall	120
<ul> <li>usable for PG communication</li> </ul>	
<ul> <li>reserved for PG communication</li> </ul>	1
<ul><li>usable for OP communication</li></ul>	
<ul> <li>reserved for OP communication</li> </ul>	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> <li>Number of instances for alarm 8 and S7 communication blocks, max.</li> </ul>	10 000
• preset, max.	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
<ul> <li>Number of variables, max.</li> </ul>	70
Diagnostic buffer	
• present	Yes
<ul> <li>Number of entries, max.</li> </ul>	3 200
Service data	
• can be read out	Yes
Ctandarda annua de contituatos	
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	
	0 °C
Ambient temperature during operation	0 °C 70 °C
Ambient temperature during operation  • min.	
Ambient temperature during operation  • min.  • max.	
Ambient temperature during operation  • min.  • max.  Configuration	
Ambient temperature during operation  • min.  • max.  Configuration  Programming	70 °C
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set	70 °C see instruction list
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels	70 °C  see instruction list 7
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels  • Access to consistent data in process image	70 °C  see instruction list 7 Yes
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels  • Access to consistent data in process image  • System functions (SFC)	70 °C  see instruction list 7  Yes see instruction list
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels  • Access to consistent data in process image  • System functions (SFC)  • System function blocks (SFB)	70 °C  see instruction list 7  Yes see instruction list
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels  • Access to consistent data in process image  • System functions (SFC)  • System function blocks (SFB)  Programming language	see instruction list 7 Yes see instruction list see instruction list
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels  • Access to consistent data in process image  • System functions (SFC)  • System function blocks (SFB)  Programming language  — SCL	see instruction list 7 Yes see instruction list see instruction list
Ambient temperature during operation  • min. • max.  Configuration  Programming  • Command set • Nesting levels • Access to consistent data in process image • System functions (SFC) • System function blocks (SFB)  Programming language  — SCL — CFC  Number of simultaneously active SFCs	see instruction list 7 Yes see instruction list see instruction list
Ambient temperature during operation  • min.  • max.  Configuration  Programming  • Command set  • Nesting levels  • Access to consistent data in process image  • System functions (SFC)  • System function blocks (SFB)  Programming language  — SCL  — CFC  Number of simultaneously active SFCs  — RD_REC	see instruction list 7 Yes see instruction list see instruction list Yes Yes
Ambient temperature during operation  • min. • max.  Configuration  Programming  • Command set • Nesting levels • Access to consistent data in process image • System functions (SFC) • System function blocks (SFB)  Programming language  — SCL — CFC  Number of simultaneously active SFCs — RD_REC — WR_REC	see instruction list 7 Yes see instruction list see instruction list Yes Yes Yes 8; SFC 59; per interface 8; SFC 58; per interface
Ambient temperature during operation  • min. • max.  Configuration  Programming  • Command set • Nesting levels • Access to consistent data in process image • System functions (SFC) • System function blocks (SFB)  Programming language  — SCL — CFC  Number of simultaneously active SFCs — RD_REC — WR_REC — WR_PARM	see instruction list 7 Yes see instruction list see instruction list Yes Yes Yes 8; SFC 59; per interface 8; SFC 58; per interface 8; SFC 55; per interface
Ambient temperature during operation  • min. • max.  Configuration  Programming  • Command set • Nesting levels • Access to consistent data in process image • System functions (SFC) • System function blocks (SFB)  Programming language  — SCL — CFC  Number of simultaneously active SFCs — RD_REC — WR_REC	see instruction list 7 Yes see instruction list see instruction list Yes Yes Yes 8; SFC 59; per interface 8; SFC 58; 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		

1.1 kg

10/27/2020

Weight, approx.

last modified: