

SIEMENS

Product data sheet

6ES7412-5HK06-0AB0


SIMATIC S7-400H, CPU 412-5H,
CENTRAL UNIT FOR S7-400H AND S7-400F/FH,
5 INTERFACES: 1X MPI/DP, 1X DP,
1X PN AND 2 FOR SYNC MODULES 1 MB MEMORY
(512 KB DATA/512 KB CODE)

General information

Hardware product version	1
Firmware version	V6.0

Engineering with

Programming package	As of STEP 7 V5.5 SP2 with HF1
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CiR - Configuration in RUN

CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O slave	0 µs

Supply voltage

24 V DC	No ; Power supply via system power supply
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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 losses	
Power loss, typ.	7.5 W
Backup battery	
Battery operation	
Backup current, typ.	180 μ A ; Valid up to 40°C
Backup current, max.	1000 μ A
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	5 to 15 VDC
Feeding of external backup voltage to CPU	5 to 15 VDC
Memory	
Work memory	
integrated	1 Mbyte
integrated (for program)	512 kbyte
integrated (for data)	512 kbyte
expandable	No
Load memory	
expandable FEPRM	Yes ; with Memory Card (FLASH)
expandable FEPRM, max.	64 Mbyte
integrated RAM, max.	512 kbyte
expandable RAM	Yes
expandable RAM, max.	64 Mbyte
Backup	
present	Yes
with battery	Yes ; all data
without battery	No
CPU processing times	
for bit operations, min.	31.25 ns
for word operations, min.	31.25 ns
for fixed point arithmetic, min.	31.25 ns
for floating point arithmetic, min.	62.5 ns
CPU-blocks	
DB	
Number, max.	6000 ; Number range: 1 - 16.000

Size, max.	64 kbyte
FB	
Number, max.	3000 ; Number range: 0 to 7999
Size, max.	64 kbyte
FC	
Number, max.	3000 ; 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	4 ; OB 10-13
Number of delay alarm OBs	4 ; OB 20-23
Number of time interrupt OBs	4 ; OB 32-35
Number of process alarm OBs	4 ; OB 40-43
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	1
Counters, timers and their retentivity	
S7 counter	
Number	2048
Retentivity	
adjustable	Yes
lower limit	0
upper limit	2047
preset	Z 0 to Z 7
Counting range	
lower limit	0
upper limit	999

IEC counter	
present	Yes
Type	SFB
Number	Unlimited (limited only by RAM capacity)
S7 times	
Number	2048
Retentivity	
adjustable	Yes
lower limit	0
upper limit	2047
preset	No times retentive
Time range	
lower limit	10 ms
upper limit	9990 s
IEC timer	
present	Yes
Type	SFB
Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area, total	Total working and load memory (with backup battery)
Flag	
Number, max.	8192 byte
Retentivity available	Yes
Retentivity preset	MB 0 to MB 15
Number of clock memories	8 ; (in 1 memory byte)
Data blocks	
Number, max.	6000 ; Number range: 1 to 16000
Size, max.	64 kbyte
Local data	
adjustable, max.	16 kbyte
preset	8 kbyte
Address area	
I/O address area	

Inputs	8 kbyte
Outputs	8 kbyte
of which, distributed	
MPI/DP interface, inputs	2 kbyte
MPI/DP interface, outputs	2 kbyte
DP interface, inputs	4 kbyte
DP interface, outputs	4 kbyte
PN interface, inputs	8 kbyte
PN interface, outputs	8 kbyte
Process image	
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
Subprocess images	
Number of subprocess images, max.	15
Digital channels	
Inputs	65536
Outputs	65536
Inputs, of which central	65536
Outputs, of which central	65536
Analog channels	
Inputs	4096
Outputs	4096
Inputs, of which central	4096
Outputs, of which central	4096
Hardware configuration	
Expansion devices, max.	21
connectable OPs	47
Multicomputing	No
Interface modules	

Number of connectable IMs (total), max.	6
Number of connectable IM 460s, max.	6
Number of connectable IM 463s, max.	4 ; Single mode only
Number of DP masters	
integrated	2
via CP	10 ; CP 443-5 Extended
Mixed mode IM + CP permitted	No
via interface module	0
Number of IO Controllers	
integrated	1
via CP	0
Number of operable FMs and CPs (recommended)	
FM	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections
CP, point-to-point	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
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^{31} - 1 hours
Granularity	1 hour
retentive	Yes
Clock synchronization	
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
Time difference in system when synchronizing via	
Ethernet, max.	10 ms ; Via NTP
MPI, max.	200 ms
Interfaces	
Number of USB interfaces	0
Number of parallel interfaces	0
Number of 20 mA interfaces (TTY)	0
Number of RS 232 interfaces	0
Number of RS 422 interfaces	0
Number of other interfaces	2 ; Fiber-optic interface
1st interface	
Type of interface	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: 16
Functionality	
MPI	Yes
DP master	Yes
DP slave	No
MPI	
Number of connections	32 ; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
Services	
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
Transmission rate, max.	12 Mbit/s
DP master	
Number of connections, max.	16 ; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
Services	
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
Transmission rate, max.	12 Mbit/s
Number of DP slaves, max.	32
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
DP slave	
Number of connections	No configuration of CPU as DP slave
2nd interface	
Type of interface	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic detection of transmission speed	Yes ; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
supported	Yes
Switchover time on line break, typically	200 ms
Number of stations in the ring, max.	50
Change of IP address at runtime, supported	No
Number of connection resources	48
Functionality	
DP master	No
DP slave	No
PROFINET IO Controller	Yes
PROFINET IO Device	No
PROFINET CBA	No
Open IE communication	Yes
Web server	No
Local Operating Network	No
PROFINET IO Controller	
Services	
PG/OP communication	Yes
S7 routing	Yes
S7 communication	Yes

Isochronous mode	No
Open IE communication	Yes
Transmission rate, max.	100 Mbit/s
Number of connectable IO devices, max.	256 ; In redundant mode via both interfaces
Max. number of connectable IO devices for RT	256
of which in line, max.	256
Shared device, supported	Yes ; Single mode only
Prioritized startup supported	No
Activation/deactivation of IO Devices	No
IO Devices changing during operation (partner ports), supported	No
Device replacement without swap medium	Yes
Updating time	250 μ 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
Outputs, max.	8 kbyte
User data per address area, max.	
User data consistency, max.	1024 byte
Open IE communication	
Open IE communication, supported	Yes
Number of connections, max.	46
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
3rd interface	
Type of interface	integrated
Physics	RS 485 / PROFIBUS
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	16
Functionality	
DP master	Yes
DP slave	No

DP master	
Number of connections, max.	16
Services	
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
DPV0	Yes
DPV1	Yes
Transmission rate, max.	12 Mbit/s
Transmission rate, min.	9.6 kbit/s
Number of DP slaves, max.	64
Address area	
Inputs, max.	4 kbyte
Outputs, max.	4 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
4th interface	
Type of interface	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0

5. Interface	
Type of interface	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
equidistance	No
Communication functions	
PG/OP communication	Yes
Number of connectable OPs without message processing	47
Number of connectable OPs with message processing	47 ; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
S7 routing	Yes
Global data communication	
supported	No
S7 basic communication	
supported	No
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 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
Standard communication (FMS)	
supported	Yes ; Via CP and loadable FB

Open IE communication	
TCP/IP	Yes ; via integrated PROFINET interface and loadable FBs
Number of connections, max.	46
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.	46
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.	46
Data length, max.	1472 byte
Web server	
supported	No
Number of connections	
overall	48
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
S7 message functions	

Number of login stations for message functions, max.	47 ; Max. 47 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	No
SCAN procedure	No
Number of additional values	
Block related messages	Yes
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	250 ; 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.	600
preset, max.	300
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	16
Test commissioning functions	
Status/control	
Status/control variable	Yes ; Up to 16 variable tables
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of variables, max.	70
Forcing	
Forcing	Yes
Force, variables	Inputs/outputs, bit memories, distributed I/Os
Number of variables, max.	256
Status block	Yes
Single step	Yes
Number of breakpoints	16
Diagnostic buffer	
present	Yes
Number of entries, max.	3200
adjustable	Yes
preset	120

Service data	
Can be read out	Yes
EMC	
Emission of radio interference acc. to EN 55 011	
Limit class A, for use in industrial areas	Yes
Limit class B, for use in residential areas	No
Configuration	
Configuration software	
STEP 7	Yes
programming	
Programming language	
LAD	Yes
FBD	Yes
STL	Yes
SCL	Yes
CFC	Yes
GRAPH	Yes
HiGraph®	Yes
Command set	see instruction list
Nesting levels	7
Access to consistent data in process image	Yes
System functions (SFC)	see instruction list
Number of simultaneously active SFCs	
RD_REC	8
WR_REC	8
WR_PARM	8
PARM_MOD	1
WR_DPARM	2
DPNRM_DG	8
RDSYSST	8
DP_TOPOL	1
System function blocks (SFB)	see instruction list
Number of simultaneously active SFBs	

RD_REC	8
WR_REC	8
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
Required slots	2
Weight	
Weight, approx.	995 g
Status	Jul 17, 2012