

Siemens 6ES7414-5HM06-0AB0 Manual

Brand	Siemens
Product Series	Siemens
Product Type	designation CPU 414-5H PN/DP

Description

6ES7414-5HM06-0AB0

SIMATIC S7-400H, CPU 414-5H, central processing unit for S7-400H and S7-400F/FH, 5 interfaces: 1x MPI/DP, 1x DP, 1x PN and 2 for sync modules, 4 MB memory (2 MB data/2 MB program),

General information

Product type designation CPU 414-5H PN/DP

HW functional status 1

Firmware version V6.0

Product function

- Isochronous mode No

Engineering with

- Programming package As of STEP 7 V5.5 SP2 with HF1

CiR - Configuration in RUN

CiR synchronization time, basic load 100 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 other

Work memory

- integrated 4 Mbyte
- integrated (for program) 2 Mbyte
- integrated (for data) 2 Mbyte
- expandable No

Load memory

- expandable FEPR0M Yes; with Memory Card (FLASH)
- expandable FEPR0M, max. 64 Mbyte
- integrated RAM, max. 512 kbyte
- expandable RAM Yes
- expandable RAM, max. 64 Mbyte

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Backup

- present Yes
- with battery Yes; all data
- without battery No

Battery

Backup battery

- Backup current, typ. 180 μ A; Valid up to 40°C
- Backup current, max. 1 000 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 V DC to 15 V DC

CPU processing times

for bit operations, typ. 18.75 ns

for word operations, typ. 18.75 ns

for fixed point arithmetic, typ. 18.75 ns

for floating point arithmetic, typ. 37.5 ns

CPU-blocks

DB

- Number, max. 6 000; Number range: 1 to 16000
- Size, max. 64 kbyte

FB

- Number, max. 3 000; Number range: 0 to 7999
- Size, max. 64 kbyte

FC

- Number, max. 3 000; 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 4; OB 10-13
- Number of delay alarm OBs 4; OB 20-23
- Number of cyclic 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 2 048

Retentivity

- adjustable Yes
- preset Z 0 to Z 7

Counting range

- lower limit 0
- upper limit 999

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IEC counter

- present Yes
- Type SFB
- Number Unlimited (limited only by RAM capacity)

S7 times

- Number 2 048

Retentivity

- adjustable Yes
- preset No times retentive

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 (incl. timers, counters, flags), max. Total working and load memory (with backup battery)

Flag

- Size, max. 8 192 byte
- Retentivity available Yes
- Retentivity preset MB 0 to MB 15
- Number of clock memories 8; in 1 memory byte

Local data

- adjustable, max. 16 kbyte
- preset 8 kbyte

Address area

I/O address area

- Inputs 8 kbyte
- 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 65 536
- of which central 65 536
- Outputs 65 536
- of which central 65 536

Analog channels

- Inputs 4 096
- of which central 4 096
- Outputs 4 096
- of which central 4 096

Hardware configuration

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Number of expansion units, max. 21

connectable OPs 63

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, PtP 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

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 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 RS 485 interfaces 2

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Number of other interfaces 2; Fiber-optic interface

Optical interface No

1. Interface

Interface type MPI/PROFIBUS DP

Isolated Yes

Interface types

- RS 485 Yes
- Output current of the interface, max. 150 mA

Protocols

- MPI Yes
- PROFIBUS DP master Yes
- PROFIBUS 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
- Transmission rate, max. 12 Mbit/s

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

PROFIBUS 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
- Transmission rate, max. 12 Mbit/s
- Number of DP slaves, max. 32

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 No
- Isochronous mode No
- SYNC/FREEZE No

- Activation/deactivation of DP slaves No
- Direct data exchange (slave-to-slave communication)

No

- DPV1 Yes

Address area

- Inputs, max. 2 kbyte
- Outputs, max. 2 kbyte

User data per DP slave

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— User data per DP slave, max. 244 byte

— Inputs, max. 244 byte

— Outputs, max. 244 byte

— Slots, max. 244

— per slot, max. 128 byte

PROFIBUS DP slave

- Number of connections No configuration of CPU as DP slave

2. Interface

Interface type PROFINET

Isolated Yes

automatic detection of transmission rate Yes; Autosensing

Autonegotiation Yes

Autocrossing Yes

Change of IP address at runtime, supported No

Interface types

- RJ 45 (Ethernet) Yes

- Number of ports 2

- integrated switch Yes

Protocols

- 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

PROFINET IO Controller

- Transmission rate, max. 100 Mbit/s

Services

— 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 μ s, 500 μ s, 1 ms, 2 ms, 4 ms

— 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 consistency, max. 1 024 byte

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Open IE communication

- Number of connections, max. 62
- 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 PROFIBUS DP

Interface types

- RS 485 Yes
- Output current of the interface, max. 150 mA

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

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 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

Address area

- Inputs, max. 6 kbyte
- Outputs, max. 6 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

4. 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

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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. 62
- 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. 62
- 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. 62

- Data length, max. 1 472 byte

Web server

- supported No

Isochronous mode

Equidistance No

communication functions / header

PG/OP communication Yes

- Number of connectable OPs without message processing 63
- Number of connectable OPs with message processing 63; When using Alarm_S/SQ and Alarm_D/DQ

Data record routing Yes

Global data communication

- supported No

S7 basic communication

- communication function / S7 basic communication 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

Number of connections

- overall 64
- 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. 63; Max. 63 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

Program alarms Yes

Process diagnostic messages Yes

simultaneously active Alarm-S blocks, max. 400; 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.

2 500

- preset, max. 900

Process control messages Yes

Number of archives that can log on simultaneously (SFB 37

AR_SEND)

16

Test commissioning functions

Status block Yes

Single step Yes

Number of breakpoints 16

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
- Forcing, variables Inputs/outputs, bit memories, distributed I/Os
- Number of variables, max. 256

Diagnostic buffer

- present Yes
- Number of entries, max. 3 200
- adjustable Yes
- preset 120

Service data

- can be read out Yes

EMC

Emission of radio interference acc. to EN 55 011

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- Limit class A, for use in industrial areas Yes
- Limit class B, for use in residential areas No

configuration / header

Configuration software

- STEP 7 Yes

configuration / programming / header

- 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

— LAD Yes

— FBD Yes

— STL Yes

— SCL Yes

— CFC Yes

— GRAPH Yes

— HiGraph® Yes

configuration / programming / number of simultaneously active SFC / header

— RD_REC 8

— WR_REC 8

— WR_PARM 8

— PARM_MOD 1

— WR_DPARM 2

— DPNRM_DG 8

— RDSYSST 8

— DP_TOPOL 1

configuration / programming / number of simultaneously active SFB / header

— RDREC 8

— WRREC 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

Weights

Weight, approx. 995 g

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