Data sheet

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),

Conough information	
General information	CDLL444 FLI DN/DD
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 FEPROM	Yes; with Memory Card (FLASH)
 expandable FEPROM, 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
Battery	
Backup battery	
Backup current, typ.	180 µA; Valid up to 40°C

	4000
Backup current, max.	1 000 μΑ
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	v.
— adjustable	Yes
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
IEC counter	Yes
• procent	1 mile
• present	
• Type	SFB
Type Number	
Type Number S7 times	SFB Unlimited (limited only by RAM capacity)
TypeNumberS7 timesNumber	SFB
TypeNumberS7 timesNumberRetentivity	SFB Unlimited (limited only by RAM capacity) 2 048
 Type Number Number Retentivity adjustable 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes
 Type Number S7 times Number Retentivity — adjustable — preset 	SFB Unlimited (limited only by RAM capacity) 2 048
 Type Number S7 times Number Retentivity — adjustable — preset Time range 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive
 Type Number Number Retentivity — adjustable — preset Time range — lower limit 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive
 Type Number Number Retentivity — adjustable — preset Time range — lower limit — upper limit 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive
 Type Number Number Retentivity — adjustable — preset Time range — lower limit — upper limit IEC timer 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive 10 ms 9 990 s
 Type Number Number Retentivity — adjustable — preset Time range — lower limit — upper limit IEC timer present 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive 10 ms 9 990 s Yes
 Type Number Number Retentivity — adjustable — preset Time range — lower limit — upper limit IEC timer present Type 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive 10 ms 9 990 s Yes SFB
 Type Number Number Retentivity — adjustable — preset Time range — lower limit — upper limit IEC timer present 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes No times retentive 10 ms 9 990 s Yes

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	0,
adjustable, max.	16 kbyte
• preset	8 kbyte
Address area	
I/O address area	
• Inputs	8 kbyte
Outputs	8 kbyte
Process image	C Hayle
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	
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

Number 16	Deviation per day (unbuffered), max.	8.6 s; Power on
Number Authors 16		0.0 0, 1 0.00 0.11
Number Number narge 0.10 t.5		16
• rientriue Yes	-	
Cock syephtherization * upported	•	
• to MPI, master • to MPI, device • to DP, master • to MPI, device • to DP, master • on DP, device • to DP, master • na S, master • na S, device • na S, device • on Ethernet via NTP • Yes • na S, device • on Ethernet via NTP • Yes, As client Time difference in system when synchronizing via • Ethernet, max. • Ethernet, max. • PMI, mox. • Do ms Therefaces Number of RS 485 interfaces Number of RS 485 interfaces		165
	•	Von
• In DIP, Insister • In DP, device • In DP, device • In DP, device • In AS, master • In AS, device • In AS, device • In AS, device • In BR, device		
• to DP, master • no IP, device • in AS, master • in AS, device • no R. device • no		
on DP, device in AS, master in AS, device on 6 Ethernet via NTP Yes in AS, device Yes on 6 Ethernet via NTP Yes, As client Interdifference in system when synchronizing via Ethernet, max. in BMP, max. 200 ms Interface Number of Star 16 Interfaces No Number of Interin interfaces Optical interface No Interface type MPUPROFIBUS DP Isolated Yes Name of other interfaces Isolated Yes Name of other interfaces Isolated Yes Name Protection Interface type Name Interface type Name Interface type Interface type Interface type Interface type Interface type Interface type Isolated Yes Interface type I	•	
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Interface bype Interface byp		
• on Ethernet via NTP Time difference in system when synchronizing via • Etherence, max. • MPH, max. MPHPROFIBUS DP		
### Time difference in system when synchronizing via ### Eithernet, max. ### Imax. ### Interfaces Number of RS 485 interfaces 2		
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MPI, max. 200 ms		
Number of R8 485 interfaces 2	•	
Number of RS 485 interfaces 2; Fiber-optic interface Optical interface No 1. Interface WPPROFIBUS DP Interface type MPUPROFIBUS DP Interface types RS 485 Yes Output current of the interface, max. 150 mA Protocols MPI PROFIBUS DP master PROFIBUS DP device No No MPI Number of connections 32, 1f a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 2 Mibils Services PC/IOP communication Yes Global data communication No S7 basic communication, as client Yes PROFIBUS DP Devices Yes PROFIBUS DP master 1 (1) Mibils Services PC/IOP communication Yes Services PROFIBUS DP master 1 (2) Mibils No S7 communication Yes S7 communication Yes S7 communication, as client Yes S7 communication, as server 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 S7 communication Yes S8 Services 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 S7 communication, as client Yes PROFIBUS DP master Number of connections, max. 12 Mibils S8 Services PCIOP communication Yes S9 Services PCIOP communication Yes S9 Services PCIOP communication No S7 basic communication No S7 basic communication Yes S7 communication Yes S7 communication Yes S7 communication Yes S7 communication Yes S8 Communication Yes S9 Commun		200 ms
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— S7 communication, as server— EquidistanceNo	— S7 communication	
— Equidistance No	 S7 communication, as client 	Yes
	 S7 communication, as server 	Yes
— Isochronous mode	— Equidistance	No
	— Isochronous mode	No
— SYNC/FREEZE No	— SYNC/FREEZE	No

 activation/deactivation of DP devices 	No
Direct data exchange (slave-to-slave	No
communication)	V
— DPV1	Yes
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
1st interface / DP master / payload data per DP Device / head	
user data per DP device, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
1st interface / PROFIBUS DP device / header	
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 device	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, max. 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)	No
ports), supported	110
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
inputo, max.	
— Outputs, max.	8 kbyte
•	8 kbyte 1 024 byte
— Outputs, max.	
Outputs, max. User data consistency, max.	
Outputs, max. User data consistency, max. Open IE communication	1 024 byte

Keep-alive function, supported	Yes
3. Interface	
Interface type	PROFIBUS DP
Interface types	I NOT IBOO DI
• RS 485	Yes
	150 mA
Output current of the interface, max. Protected.	150 IIIA
Protocols	Vac
PROFIBUS DP davises	Yes
PROFIBUS DP device	No
PROFIBUS DP master	40
Number of connections, max. Transportation make maximum.	16
Transmission rate, max.	12 Mbit/s
max. number of DP devices	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 devices 	No
 Direct data exchange (slave-to-slave communication) 	No
— DPV0	Yes
— DPV1	Yes
Address area	
— Inputs, max.	6 kbyte
— Outputs, max.	6 kbyte
3rd interface / DP master / payload data per DP Device / head	ler
 user data per DP device, 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	
Redundancy mode	
Media redundancy	
Switchover time on line break, typ.	200 ms
— Switchover time of line break, typ. — Number of stations in the ring, max.	50
— Number of stations in the ring, max. SIMATIC communication	
	Yes
S7 routing Open IF communication	1 00
Open IE communication	Voc. via integrated PROFINET interface and leadable FRe
TCP/IP Number of connections, may	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	
• 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 	64/64
CPU, max.	
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
	900
preset, max. Process control messages	
Process control messages Number of archives that can log on simultaneously (SFB 37	Yes 16
AR_SEND)	
Test commissioning functions	Voc
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	
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 functions (SFC) System function blocks (SFB)	see instruction list
	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	
— 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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last modified:	4/25/2024 🖸

