SIEMENS

## 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),

| | |
|---|---|
| **General information** | |
| Product type designation | CPU 414-5H PN/DP |
| 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 |
| ● Backup current, max. | 1 000 µA |
| ● 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 |
| — lower limit | 0 |
| — upper limit | 2 047 |
| — 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 | 2 048 |
| Retentivity | |
| — adjustable | Yes |
| — lower limit | 0 |
| — upper limit | 2 047 |
| — preset | No times retentive |
| Time range | |

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|---|---|
| — 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** | |
| Number of expansion units, max. | 21 |
| 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. |

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| | 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 |
| 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 |

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|---|---|
| ● 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 | |
| — 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** | |
| 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 |

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| — 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 |
| — 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 |
| — Outputs, max. | 8 kbyte |
| — User data consistency, max. | 1 024 byte |
| 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) |

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|---|---|
| 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 |
| — 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** | |
| 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 |
| 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 |

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|---|---|
| ● 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 | |
| ● 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 | |
| ● 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 |

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|---|---|
| — CFC | Yes |
| — GRAPH | Yes |
| — HiGraph® | Yes |
| 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 |
| Number of simultaneously active SFBs | |
| — 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 |

**last modified:** 3/25/2021