

SIMATIC S7-400, CPU 414-2 256 KB WORKING MEMORY (128 KB CODE, 128 KB DATA) 1. INTERFACE MPI/DP 12 MBIT/S 2. INTERFACE DP

CiR – Configuration in RUN

| | |
|---|-------------|
| CiR synchronization time, basic load | 100 ms |
| CiR synchronization time, time per I/O byte | 120 μ s |

Supply voltage

| | |
|---|-----|
| Rated value (DC) | Yes |
| <ul style="list-style-type: none"> • 24 V DC | |

Input current

| | |
|----------------------------------|---|
| from backplane bus 5 V DC, typ. | 1.5 A |
| from backplane bus 5 V DC, max. | 1.6 A |
| from backplane bus 24 V DC, max. | 300 mA; Total current consumption of the components connected to the MPI/DP interfaces, but no more than 150 mA per interface |

Power loss

| | |
|------------------|-------|
| Power loss, typ. | 7.5 W |
|------------------|-------|

Memory

| | |
|--|-------------------------------|
| Work memory | |
| <ul style="list-style-type: none"> • integrated | 256 kbyte |
| <ul style="list-style-type: none"> • integrated (for program) | 128 kbyte |
| <ul style="list-style-type: none"> • integrated (for data) | 128 kbyte |
| <ul style="list-style-type: none"> • expandable | No |
| Load memory | |
| <ul style="list-style-type: none"> • expandable FEPRM | Yes; with Memory Card (FLASH) |
| <ul style="list-style-type: none"> • expandable FEPRM, max. | 64 Mbyte |
| <ul style="list-style-type: none"> • integrated RAM, max. | 256 kbyte |
| <ul style="list-style-type: none"> • expandable RAM | Yes; with Memory Card (RAM) |
| <ul style="list-style-type: none"> • expandable RAM, max. | 64 Mbyte |

Backup

| | |
|---|---------------|
| <ul style="list-style-type: none"> • present | Yes |
| <ul style="list-style-type: none"> • with battery | Yes; all data |
| <ul style="list-style-type: none"> • without battery | No |

Battery

| | |
|--|-------------|
| Backup battery | |
| <ul style="list-style-type: none"> • Backup current, typ. | 40 μ A |
| <ul style="list-style-type: none"> • Backup current, max. | 380 μ A |

- Feeding of external backup voltage to CPU 5 V DC to 15 V DC

CPU processing times

| | |
|-------------------------------------|-------------|
| for bit operations, typ. | 0.1 μ s |
| for word operations, typ. | 0.1 μ s |
| for fixed point arithmetic, typ. | 0.1 μ s |
| for floating point arithmetic, typ. | 0.6 μ s |

CPU-blocks

| | |
|----------------------------------|----------------------|
| DB | |
| • Number, max. | 4 095; DB 0 reserved |
| • Size, max. | 64 kbyte |
| FB | |
| • Number, max. | 2 048 |
| • Size, max. | 64 kbyte |
| FC | |
| • Number, max. | 2 048 |
| • Size, max. | 64 kbyte |
| OB | |
| • Number, max. | see instruction list |
| • Size, max. | 64 kbyte |
| • Number of time alarm OBs | 4 |
| • Number of delay alarm OBs | 4 |
| • Number of cyclic interrupt OBs | 4 |
| • Number of process alarm OBs | 4 |
| Nesting depth | |
| • per priority class | 24 |
| • additional within an error OB | 2 |

Counters, timers and their retentivity

| | |
|-----------------------|------------|
| S7 counter | |
| • Number | 256 |
| Retentivity | |
| — adjustable | Yes |
| — lower limit | 0 |
| — upper limit | 255 |
| — preset | Z 0 to Z 7 |
| Counting range | |
| — lower limit | 1 |
| — upper limit | 999 |
| IEC counter | |
| • present | Yes |
| • Type | SFB |
| S7 times | |

| | |
|--|--|
| • Number | 256 |
| Retentivity | |
| — adjustable | Yes |
| — lower limit | 0 |
| — upper limit | 255 |
| — preset | No retentivity |
| Time range | |
| — lower limit | 10 ms |
| — upper limit | 9 990 s |
| IEC timer | |
| • present | Yes |
| • Type | SFB |
| Data areas and their retentivity | |
| retentive data area in total | Total working and load memory (with backup battery) |
| Flag | |
| • Number, max. | 8 kbyte |
| • Retentivity available | Yes; From MB 0 to MB 8 191 |
| • Retentivity preset | MB 0 to MB 15 |
| • Number of clock memories | 8; 1 memory byte |
| Address area | |
| I/O address area | |
| • Inputs | 8 kbyte |
| • Outputs | 8 kbyte |
| Process image | |
| • Inputs, adjustable | 8 kbyte; adjustable at the expense of the code area of the RAM |
| • Outputs, adjustable | 8 kbyte; adjustable at the expense of the code area of the RAM |
| • 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. | 8 |
| 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 |

Hardware configuration

| | |
|--|--|
| Number of expansion units, max. | 21; of which 6 ER with K-bus |
| connectable OPs | 31 without message processing, 8 with message processing |
| Multicomputing | Yes; 4 CPUs max. (with UR1 or UR2) |
| Interface modules | |
| • Number of connectable IMs (total), max. | 6 |
| • Number of connectable IM 460s, max. | 6 |
| • Number of connectable IM 463s, max. | 4; IM 463-2 |
| Number of DP masters | |
| • integrated | 2 |
| • via CP | 10 |
| • via IM 467 | 4 |
| • Mixed mode IM + CP permitted | No; IM 467 cannot be used jointly with CP 443-5 Ext. |
| • via interface module | 0 |
| • Number of pluggable S5 modules (via adapter capsule in central device), max. | 6 |
| Number of operable FMs and CPs (recommended) | |
| • FM | 32; Limited by number of slots and number of connections |
| • CP, PtP | 32; limited by number of slots |
| • CP, LAN | 32; limited by number of connections |
| • PROFIBUS and Ethernet CPs | 14; incl. CP 443-5 Ext. and IM 467 |
| Slots | |
| • required slots | 1 |
| Time of day | |
| Clock | |
| • Hardware clock (real-time) | Yes |
| • retentive and synchronizable | Yes |
| • Resolution | 1 ms |
| Operating hours counter | |
| • Number | 8 |
| 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 |
| 1. Interface | |
| Physics | RS 485 / PROFIBUS |

| | |
|---|-----------------|
| Isolated | Yes |
| Number of connection resources | MPI: 32, DP: 16 |
| Protocols | |
| • MPI | Yes |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| MPI | |
| • Number of connections | 32 |
| • Transmission rate, max. | 12 Mbit/s |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | Yes |
| — S7 basic communication | Yes |
| — S7 communication | Yes |
| PROFIBUS DP master | |
| • Number of connections, max. | 16 |
| • 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 |
| — Equidistance | Yes |
| — SYNC/FREEZE | Yes |
| — Activation/deactivation of DP slaves | Yes |
| — Direct data exchange (slave-to-slave communication) | Yes |
| Address area | |
| — Inputs, max. | 2 kbyte |
| — Outputs, max. | 2 kbyte |
| User data per DP slave | |
| — Inputs, max. | 244 byte |
| — Outputs, max. | 244 byte |
| — Slots, max. | 244 |
| — per slot, max. | 128 byte |
| PROFIBUS DP slave | |
| • Transmission rate, max. | 12 Mbit/s |
| • Address area, max. | 32 |
| • User data per address area, max. | 32 byte |

| | |
|---|----------------------------|
| — of which consistent, max. | 32 byte |
| Services | |
| — PG/OP communication | Yes; with interface active |
| — Routing | Yes; with interface active |
| Transfer memory | |
| — Inputs | 244 byte |
| — Outputs | 244 byte |
| 2. Interface | |
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of connection resources | 16 |
| Protocols | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| 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 |
| — Equidistance | Yes |
| — SYNC/FREEZE | Yes |
| — Activation/deactivation of DP slaves | Yes |
| — Direct data exchange (slave-to-slave communication) | Yes |
| Address area | |
| — Inputs, max. | 6 kbyte |
| — Outputs, max. | 6 kbyte |
| User data per DP slave | |
| — Inputs, max. | 128 byte |
| — Outputs, max. | 128 byte |
| PROFIBUS DP slave | |
| • Transmission rate, max. | 12 Mbit/s |
| • Address area, max. | 32 |
| • User data per address area, max. | 32 byte |
| — of which consistent, max. | 32 byte |
| Services | |

| | |
|---|---|
| — Routing | Yes; with interface active |
| Transfer memory | |
| — Inputs | 244 byte |
| — Outputs | 244 byte |
| Isochronous mode | |
| Isochronous operation (application synchronized up to terminal) | Yes |
| Equidistance | Yes |
| User data per isochronous slave, max. | 128 byte |
| shortest clock pulse | 5 ms; 2.5 ms without using the SFCs 126 / 127 |
| Communication functions | |
| PG/OP communication | Yes |
| Global data communication | |
| • supported | Yes |
| • Number of GD packets, transmitter, max. | 8 |
| • Number of GD packets, receiver, max. | 16 |
| • Size of GD packets, max. | 64 byte |
| S7 basic communication | |
| • supported | Yes |
| • User data per job, max. | 76 byte |
| S7 communication | |
| • supported | Yes |
| • as server | Yes |
| • as client | Yes |
| • User data per job, max. | 64 kbyte |
| S5 compatible communication | |
| • supported | Yes; via CP and FC AG_SEND and FC AG_RECV |
| • User data per job, max. | 8 kbyte |
| Standard communication (FMS) | |
| • supported | Yes; Via CP and loadable FB |
| Number of connections | |
| • overall | 32; of which one is reserved for PG and OP |
| • 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. | 8 |
| Symbol-related messages | Yes |
| Program alarms | Yes |
| Alarm 8-blocks | Yes |
| Process control messages | Yes |

Test commissioning functions

| | |
|---------------------------|-----|
| Status block | Yes |
| Single step | Yes |
| Number of breakpoints | 4 |
| Status/control | |
| • Status/control variable | Yes |
| Forcing | |
| • Forcing | Yes |
| Diagnostic buffer | |
| • present | Yes |
| • Number of entries, max. | 400 |
| — adjustable | Yes |

Configuration

| | |
|---|-----|
| Configuration software | |
| • STEP 7 | Yes |
| Programming | |
| • Nesting levels | 8 |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — STL | Yes |
| — SCL | Yes |
| — CFC | Yes |
| — GRAPH | Yes |
| — HiGraph® | Yes |
| Know-how protection | |
| • User program protection/password protection | Yes |

Dimensions

| | |
|--------|--------|
| Width | 25 mm |
| Height | 290 mm |
| Depth | 219 mm |

Weights

| | |
|-----------------|-------|
| Weight, approx. | 720 g |
|-----------------|-------|

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