



SIMATIC S7-300,  
CPU 312 CPU WITH MPI INTERFACE,  
INTEGRATED 24 V DC POWER SUPPLY 32 KBYTE  
WORKING MEMORY,  
MICRO MEMORY CARD NECESSARY

## General information

|                          |      |
|--------------------------|------|
| Hardware product version | 01   |
| Firmware version         | V3.3 |

## Engineering with

|                     |  |
|---------------------|--|
| Programming package | STEP 7 V5.5 + SP1 or higher or STEP7 V5.2 + SP1 or higher with HSP 218 |
|---------------------|--|

## Supply voltage

|  |          |
|--|----------|
| 24 V DC  | Yes      |
| permissible range, lower limit (DC)                    | 19.2 V   |
| permissible range, upper limit (DC)                    | 28.8 V   |
| External protection for supply cables (recommendation) | 2 A min. |

## Mains buffering

|  |      |
|--|------|
| Mains/voltage failure stored energy time | 5 ms |
| Repeat rate, min.                        | 1 s  |

## Input current

|  |                     |
|--|---------------------|
| Current consumption (rated value)                | 650 mA              |
| Current consumption (in no-load operation), typ. | 140 mA              |
| Inrush current, typ.                             | 3.5 A               |
| $I^2t$   | 1 A <sup>2</sup> ·s |

|  |   |
|--|---|
| <b>Power losses</b>  |   |
| <b>Power loss, typ.</b>                                      | 4 W   |
| <b>Memory</b>  |   |
| <b>Work memory</b>   |   |
| <b>integrated</b>  | 32 kbyte  |
| <b>expandable</b>  | No  |
| <b>Size of retentive memory for retentive data blocks</b>    | 32 kbyte  |
| <b>Load memory</b>   |   |
| <b>pluggable (MMC)</b>                                       | Yes   |
| <b>pluggable (MMC), max.</b>                                 | 8 Mbyte   |
| <b>Data management on MMC (after last programming), min.</b> | 10 a  |
| <b>Backup</b>  |   |
| <b>present</b>   | Yes ; Guaranteed by MMC (maintenance-free)  |
| <b>without battery</b>                                       | Yes ; Program and data  |
| <b>CPU processing times</b>                                  |   |
| <b>for bit operations, typ.</b>                              | 0.1 $\mu$ s   |
| <b>for word operations, typ.</b>                             | 0.24 $\mu$ s  |
| <b>for fixed point arithmetic, typ.</b>                      | 0.32 $\mu$ s  |
| <b>for floating point arithmetic, typ.</b>                   | 1.1 $\mu$ s   |
| <b>CPU-blocks</b>  |   |
| <b>Number of blocks (total)</b>                              | 1024 ; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used. |
| <b>DB</b>  |   |
| <b>Number, max.</b>  | 1024 ; Number range: 1 to 16000   |
| <b>Size, max.</b>  | 32 kbyte  |
| <b>FB</b>  |   |
| <b>Number, max.</b>  | 1024 ; Number range: 0 to 7999  |
| <b>Size, max.</b>  | 32 kbyte  |
| <b>FC</b>  |   |
| <b>Number, max.</b>  | 1024 ; Number range: 0 to 7999  |
| <b>Size, max.</b>  | 32 kbyte  |
| <b>OB</b>  |   |
| <b>Description</b>   | see instruction list  |
| <b>Size, max.</b>  | 32 kbyte  |
| <b>Number of free cycle OBs</b>                              | 1 ; OB 1  |
| <b>Number of time alarm OBs</b>                              | 1 ; OB 10   |
| <b>Number of delay alarm OBs</b>                             | 2 ; OB 20, 21   |
| <b>Number of time interrupt OBs</b>                          | 4 ; OB 32, 33, 34, 35   |
| <b>Number of process alarm OBs</b>                           | 1 ; OB 40   |

|   |  |
|---|--|
| <b>Number of startup OBs</b>                  | 1 ; OB 100                               |
| <b>Number of asynchronous error OBs</b>       | 4 ; OB 80, 82, 85, 87                    |
| <b>Number of synchronous error OBs</b>        | 2 ; OB 121, 122                          |
| <b>Nesting depth</b>                          |  |
| <b>per priority class</b>                     | 16                                       |
| <b>additional within an error OB</b>          | 4  |
| <b>Counters, timers and their retentivity</b> |  |
| <b>S7 counter</b>                             |  |
| <b>Number</b>                                 | 256                                      |
| <b>Retentivity</b>                            |  |
| <b>adjustable</b>                             | Yes                                      |
| <b>lower limit</b>                            | 0  |
| <b>upper limit</b>                            | 255                                      |
| <b>preset</b>                                 | Z 0 to Z 7                               |
| <b>Counting range</b>                         |  |
| <b>lower limit</b>                            | 0  |
| <b>upper limit</b>                            | 999                                      |
| <b>IEC counter</b>                            |  |
| <b>present</b>                                | Yes                                      |
| <b>Type</b>                                   | SFB                                      |
| <b>Number</b>                                 | Unlimited (limited only by RAM capacity) |
| <b>S7 times</b>                               |  |
| <b>Number</b>                                 | 256                                      |
| <b>Retentivity</b>                            |  |
| <b>adjustable</b>                             | Yes                                      |
| <b>lower limit</b>                            | 0  |
| <b>upper limit</b>                            | 255                                      |
| <b>preset</b>                                 | No retentivity                           |
| <b>Time range</b>                             |  |
| <b>lower limit</b>                            | 10 ms                                    |
| <b>upper limit</b>                            | 9990 s                                   |
| <b>IEC timer</b>                              |  |
| <b>present</b>                                | Yes                                      |
| <b>Type</b>                                   | SFB                                      |
| <b>Number</b>                                 | Unlimited (limited only by RAM capacity) |
| <b>Data areas and their retentivity</b>       |  |
| <b>retentive data area, total</b>             | All (incl. memory bits, times, counters) |
| <b>Flag</b>                                   |  |

|                                  |                                     |
|----------------------------------|-------------------------------------|
| <b>Number, max.</b>              | 256 byte                            |
| <b>Retentivity available</b>     | Yes ; MB 0 to MB 255                |
| <b>Retentivity preset</b>        | MB 0 to MB 15                       |
| <b>Number of clock memories</b>  | 8 ; 1 memory byte                   |
| <b>Data blocks</b>               |                                     |
| <b>Number, max.</b>              | 1024 ; Number range: 1 to 16000     |
| <b>Size, max.</b>                | 32 kbyte                            |
| <b>Retentivity adjustable</b>    | Yes ; via non-retain property on DB |
| <b>Retentivity preset</b>        | Yes                                 |
| <b>Local data</b>                |                                     |
| <b>per priority class, max.</b>  | 32 kbyte ; Max. 2 KB per block      |
| <b>Address area</b>              |                                     |
| <b>I/O address area</b>          |                                     |
| <b>Inputs</b>                    | 1024 byte                           |
| <b>Outputs</b>                   | 1024 byte                           |
| <b>Process image</b>             |                                     |
| <b>Inputs</b>                    | 1024 byte                           |
| <b>Outputs</b>                   | 1024 byte                           |
| <b>Inputs, adjustable</b>        | 1024 byte                           |
| <b>Outputs, adjustable</b>       | 1024 byte                           |
| <b>Inputs, default</b>           | 128 byte                            |
| <b>Outputs, default</b>          | 128 byte                            |
| <b>Digital channels</b>          |                                     |
| <b>Inputs</b>                    | 256                                 |
| <b>Outputs</b>                   | 256                                 |
| <b>Inputs, of which central</b>  | 256                                 |
| <b>Outputs, of which central</b> | 256                                 |
| <b>Analog channels</b>           |                                     |
| <b>Inputs</b>                    | 64                                  |
| <b>Outputs</b>                   | 64                                  |
| <b>Inputs, of which central</b>  | 64                                  |
| <b>Outputs, of which central</b> | 64                                  |
| <b>Hardware configuration</b>    |                                     |
| <b>Racks, max.</b>               | 1                                   |
| <b>Modules per rack, max.</b>    | 8                                   |
| <b>Expansion devices, max.</b>   | 0                                   |
| <b>Number of DP masters</b>      |                                     |
| <b>integrated</b>                | 0                                   |

|   |   |
|---|---|
| via CP  | 4   |
| <b>Number of operable FMs and CPs (recommended)</b> |   |
| FM  | 8   |
| CP, point-to-point                                  | 8   |
| CP, LAN   | 4   |
| <b>Time of day</b>                                  |   |
| <b>Clock</b>  |   |
| Software clock                                      | Yes   |
| battery-backed and synchronizable                   | No ; Buffered No Can be synchronized Yes                                  |
| Deviation per day, max.                             | 10 s ; Typ.: 2 s  |
| Behavior of the clock following POWER-ON            | The clock continues at the time of day it had when power was switched off |
| <b>Operating hours counter</b>                      |   |
| Number  | 1   |
| Number/Number range                                 | 0   |
| Range of values                                     | 0 to 2 <sup>31</sup> hours (when using SFC 101)                           |
| Granularity   | 1 hour  |
| retentive   | Yes ; Must be restarted at each restart                                   |
| <b>Clock synchronization</b>                        |   |
| supported   | Yes   |
| to MPI, master                                      | Yes   |
| to MPI, slave                                       | Yes   |
| in AS, master                                       | Yes   |
| in AS, slave  | No  |
| <b>Interfaces</b>                                   |   |
| 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                          | 0   |
| <b>1st interface</b>                                |   |
| Type of interface                                   | Integrated RS 485 interface   |
| Physics   | RS 485  |
| Isolated  | No  |
| Power supply to interface (15 to 30 V DC), max.     | 200 mA  |
| <b>Functionality</b>                                |   |
| MPI   | Yes   |
| DP master   | No  |

|   |   |
|---|---|
| DP slave                                      | No  |
| Point-to-point connection                     | No  |
| <b>MPI</b>                                    |   |
| Transmission rate, max.                       | 187.5 kbit/s  |
| <b>Services</b>                               |   |
| PG/OP communication                           | Yes   |
| Routing                                       | No  |
| Global data communication                     | Yes   |
| S7 basic communication                        | Yes   |
| S7 communication                              | Yes ; Only server, configured on one side   |
| S7 communication, as client                   | No  |
| S7 communication, as server                   | Yes   |
| <b>Communication functions</b>                |   |
| PG/OP communication                           | Yes   |
| Data record routing                           | No  |
| <b>Global data communication</b>              |   |
| supported                                     | Yes   |
| Number of GD loops, max.                      | 8   |
| Number of GD packets, max.                    | 8   |
| Number of GD packets, transmitter, max.       | 8   |
| Number of GD packets, receiver, max.          | 8   |
| Size of GD packets, max.                      | 22 byte   |
| Size of GD packet (of which consistent), max. | 22 byte   |
| <b>S7 basic communication</b>                 |   |
| supported                                     | Yes   |
| User data per job, max.                       | 76 byte   |
| User data per job (of which consistent), max. | 76 byte ; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server) |
| <b>S7 communication</b>                       |   |
| supported                                     | Yes   |
| as server                                     | Yes   |
| as client                                     | Yes ; Via CP and loadable FB  |
| User data per job, max.                       | 180 byte ; With PUT/GET   |
| User data per job (of which consistent), max. | 240 byte ; as server  |
| <b>S5-compatible communication</b>            |   |
| supported                                     | Yes ; via CP and loadable FC  |
| <b>Number of connections</b>                  |   |
| overall                                       | 6   |
| usable for PG communication                   | 5   |

|  |  |
|--|--|
| reserved for PG communication                        | 1  |
| Adjustable for PG communication, min.                | 1  |
| Adjustable for PG communication, max.                | 5  |
| usable for OP communication                          | 5  |
| reserved for OP communication                        | 1  |
| adjustable for OP communication, min.                | 1  |
| adjustable for OP communication, max.                | 5  |
| usable for S7 basic communication                    | 2  |
| Reserved for S7 basic communication                  | 0  |
| adjustable for S7 basic communication, min.          | 0  |
| adjustable for S7 basic communication, max.          | 2  |
| <b>S7 message functions</b>                          |  |
| Number of login stations for message functions, max. | 6 ; Depending on the configured connections for PG/OP and S7 basic communication |
| Process diagnostic messages                          | Yes  |
| simultaneously active Alarm-S blocks, max.           | 300  |
| <b>Test commissioning functions</b>                  |  |
| Status block   | Yes ; Up to 2 simultaneously   |
| Single step  | Yes  |
| Number of breakpoints                                | 4  |
| <b>Status/control</b>                                |  |
| Status/control variable                              | Yes  |
| Variables  | Inputs, outputs, memory bits, DB, times, counters                                |
| Number of variables, max.                            | 30   |
| of which status variables, max.                      | 30   |
| of which control variables, max.                     | 14   |
| <b>Forcing</b>                                       |  |
| Forcing  | Yes  |
| Force, variables                                     | Inputs, outputs  |
| Number of variables, max.                            | 10   |
| <b>Diagnostic buffer</b>                             |  |
| present  | Yes  |
| Number of entries, max.                              | 500  |
| adjustable   | No   |
| Of which powerfail-proof                             | 100 ; Only the last 100 entries are retained                                     |
| Number of entries readable in RUN, max.              | 499  |
| adjustable   | Yes ; From 10 to 499   |
| preset   | 10   |
| <b>Service data</b>                                  |  |

|  |   |
|--|---|
| <b>Can be read out</b>                             | Yes                                     |
| <b>Ambient conditions</b>                          |   |
| <b>Operating temperature</b>                       |   |
| <b>Min.</b>  | 0 °C                                    |
| <b>max.</b>  | 60 °C                                   |
| <b>Configuration</b>                               |   |
| <b>Configuration software</b>                      |   |
| <b>STEP 7</b>                                      | Yes ; V5.2 SP1 or higher with HW update |
| <b>programming</b>                                 |   |
| <b>Command set</b>                                 | see instruction list                    |
| <b>Nesting levels</b>                              | 8                                       |
| <b>Programming language</b>                        |   |
| <b>LAD</b>   | Yes                                     |
| <b>FBD</b>   | Yes                                     |
| <b>STL</b>   | Yes                                     |
| <b>SCL</b>   | Yes                                     |
| <b>GRAPH</b>                                       | Yes                                     |
| <b>HiGraph®</b>                                    | Yes                                     |
| <b>Software libraries</b>                          |   |
| <b>System functions (SFC)</b>                      | see instruction list                    |
| <b>System function blocks (SFB)</b>                | see instruction list                    |
| <b>Know-how protection</b>                         |   |
| <b>User program protection/password protection</b> | Yes                                     |
| <b>Block encryption</b>                            | Yes ; With S7 block Privacy             |
| <b>Dimensions</b>                                  |   |
| <b>Width</b>                                       | 40 mm                                   |
| <b>Height</b>                                      | 125 mm                                  |
| <b>Depth</b>                                       | 130 mm                                  |
| <b>Weight</b>                                      |   |
| <b>Weight, approx.</b>                             | 270 g                                   |
| Status   | Feb 25, 2013                            |