# SIEMENS

SIMATIC S7-300, CPU 315T-2 DP, CENTRAL PROCESSING UNIT FOR PLC AND TECHNOLOGY 128 KBYTE WORKING MEMORY, 1. INTERFACE MPI/DP 12MBIT/S 2. INTERFACE DP(DRIVE), INTEGRATED I/O FOR TECHNOLOGY FRONT CONNECTOR (1 X 40PIN) AND MICRO MEMORY CARD MIN. 4MB NECESSARY

| General information | |
| --- | --- |
| Hardware product version | 01 |
| Firmware version | CPU: V2.3.1, integrated technology: V3.1.1 |
| Engineering with | |
| • Programming package | STEP 7 V 5.3 SP1 or higher and S7-Technology option package V2.0 |

| Supply voltage | |
| --- | --- |
| Rated value (DC) | |
| • 24 V DC | Yes |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| external protection for power supply lines (recommendation) | 2 A min. |
| Load voltage L+ | |
| • Rated value (DC) | 24 V |
| • Reverse polarity protection | No |

| Input current | |
| --- | --- |
| Current consumption (in no-load operation), typ. | 200 mA |
| Inrush current, typ. | 2.5 A |
| I²t | 1 A²·s |

| Power loss | |
| --- | --- |
| Power loss, typ. | 6 W |

| Memory | |
| --- | --- |
| Work memory | |
| • integrated | 128 kbyte |
| • expandable | No |
| Load memory | |
| • Plug-in (MMC) | Yes |
| • Plug-in (MMC), max. | 8 Mbyte |
| • Data management on MMC (after last programming), min. | 10 y |
| Backup | |

| | |
|---|---|
| • present | Yes; Guaranteed by MMC (maintenance-free) |

## Battery

### Backup battery

| | |
|---|---|
| • Backup time, max. | 10 y; Data retention on the MMC (after last programming) |

## CPU processing times

| | |
|---|---|
| for bit operations, typ. | 0.1 µs |
| for bit operations, max. | 0.1 µs |
| for word operations, typ. | 0.2 µs |
| for fixed point arithmetic, typ. | 2 µs |
| for floating point arithmetic, typ. | 3 µs |

## CPU-blocks

| | |
|---|---|
| Number of blocks (total) | 1 024 |

### DB

| | |
|---|---|
| • Number, max. | 1 023; DB 0 reserved |
| • Size, max. | 16 kbyte |

### FB

| | |
|---|---|
| • Number, max. | 2 048; see instruction list |
| • Size, max. | 16 kbyte |

### FC

| | |
|---|---|
| • Number, max. | 2 048; see instruction list |
| • Size, max. | 16 kbyte |

### OB

| | |
|---|---|
| • Number, max. | see instruction list |
| • Size, max. | 16 kbyte |
| • Number of free cycle OBs | 1 |
| • Number of time alarm OBs | 1 |
| • Number of delay alarm OBs | 1 |
| • Number of cyclic interrupt OBs | 1 |
| • Number of process alarm OBs | 1 |
| • Number of startup OBs | 1 |
| • Number of asynchronous error OBs | 1 |
| • Number of synchronous error OBs | 2 |

### Nesting depth

| | |
|---|---|
| • per priority class | 8 |
| • additional within an error OB | 4 |

## Counters, timers and their retentivity

### S7 counter

| | |
|---|---|
| • Number | 256 |

### Retentivity

| | |
|---|---|
| — adjustable | Yes |

| | |
|---|---|
| — preset | Z 0 to Z 7 |
| **Counting range** | |
| — can be set | Yes |
| — lower limit | 0 |
| — upper limit | 999 |
| **IEC counter** | |
| • Number | Unlimited (limited only by RAM capacity) |
| **S7 times** | |
| • Number | 256 |
| **Retentivity** | |
| — adjustable | Yes |
| — preset | No retentivity |
| **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 in total | 1024 (DBs, FCs, FBs). The maximum number of loadable blocks can be reduced by the MMC that you use. |
| **Flag** | |
| • Number, max. | 2 048 byte |
| • Retentivity available | Yes; MB 0 to MB 2047 |
| • Retentivity preset | MB 0 to MB 15 |
| • Number of clock memories | 8; 1 memory byte |
| **Data blocks** | |
| • Number, max. | 1 023; DB 0 reserved |
| • Size, max. | 16 kbyte |
| • Retentivity adjustable | Yes |
| **Local data** | |
| • per priority class, max. | 1 024 byte |

## Address area

| | |
|---|---|
| **I/O address area** | |
| • Inputs | 2 kbyte |
| • Outputs | 2 kbyte |
| **of which distributed** | |
| — Inputs | 2 kbyte |
| — Outputs | 2 kbyte |
| **Process image** | |

09/01/2017

| | |
|---|---|
| ● Inputs | 128 byte |
| ● Outputs | 128 byte |
| **Digital channels** | |
| ● Inputs | 16 384 |
| — of which central | 256 |
| ● Outputs | 16 384 |
| — of which central | 256 |
| **Analog channels** | |
| ● Inputs | 1 024 |
| — of which central | 64 |
| ● Outputs | 1 024 |
| — of which central | 64 |

## Hardware configuration

| | |
|---|---|
| **Number of DP masters** | |
| ● integrated | 2; 1 DP and 1 DP (drive) |
| ● via CP | 2; for DP |
| **Number of operable FMs and CPs (recommended)** | |
| ● FM | 8 |
| ● CP, PtP | 8 |
| ● CP, LAN | 10 |
| **Rack** | |
| ● Racks, max. | 1 |
| ● Modules per rack, max. | 8 |

## Time of day

| | |
|---|---|
| **Clock** | |
| ● Hardware clock (real-time) | Yes |
| ● retentive and synchronizable | Yes |
| ● Backup time | 6 wk; At 40 °C ambient temperature |
| ● Deviation per day, max. | 10 s |
| **Operating hours counter** | |
| ● Number | 1 |
| ● Number/Number range | 0 |
| ● Range of values | 0 to 2^31 hours (when using SFC 101) |
| ● Granularity | 1 hour |
| ● retentive | Yes; Must be restarted at each restart |
| **Clock synchronization** | |
| ● supported | Yes |
| ● to MPI, master | Yes |
| ● to MPI, slave | Yes |
| ● in AS, master | Yes |
| ● in AS, slave | Yes |

| Digital inputs | |
|---|---|
| Number of digital inputs | 4 |
| Functions | technological functions, e.g. reference point detection (BERO); digital inputs can also be used (with restrictions) in STEP 7 user program. |
| Input characteristic curve in accordance with IEC 61131, type 1 | Yes |
| Number of simultaneously controllable inputs | |
|     all mounting positions | |
|         — up to 40 °C, max. | 4 |
|         — up to 60 °C, max. | 4 |
| Input voltage | |
|     • Rated value (DC) | 24 V |
|     • for signal "0" | -3 to +5V |
|     • for signal "1" | +15 to +30V |
| Input current | |
|     • for signal "1", typ. | 7 mA |
| Input delay (for rated value of input voltage) | |
|     for counter/technological functions | |
|         — at "0" to "1", max. | 10 µs; Typical |
|         — at "1" to "0", max. | 10 µs; Typical |
| Cable length | |
|     • shielded, max. | 1 000 m |
|     • unshielded, max. | 600 m |

| Digital outputs | |
|---|---|
| Number of digital outputs | 8 |
| Functions | For technology functions, e.g. high-speed cam switch signals |
| Short-circuit protection | Yes |
|     • Response threshold, typ. | 1 A |
| Limitation of inductive shutdown voltage to | 2L+ (-48 V) |
| Controlling a digital input | No |
| Switching capacity of the outputs | |
|     • on lamp load, max. | 5 W |
| Load resistance range | |
|     • lower limit | 48 $\Omega$ |
|     • upper limit | 4 k$\Omega$ |
| Output voltage | |
|     • for signal "0", max. | 3 V |
|     • for signal "1", min. | 2L+ (-2,5 V) |
| Output current | |
|     • for signal "1" rated value | 0.5 A |

| | |
|---|---|
| • for signal "1" permissible range for 0 to 60 °C, min. | 5 mA |
| • for signal "1" permissible range for 0 to 60 °C, max. | 0.6 A |
| • for signal "0" residual current, max. | 0.3 mA |
| **Parallel switching of two outputs** | |
| • for uprating | No |
| • for redundant control of a load | No |
| **Switching frequency** | |
| • with resistive load, max. | 100 Hz |
| • with inductive load, max. | 0.2 Hz; According to IEC 60947-5-1, DC-13 |
| • on lamp load, max. | 100 Hz |
| **Total current of the outputs (per group)** | |
| horizontal installation | |
| — up to 40 °C, max. | 4 A |
| — up to 60 °C, max. | 3 A |
| all other mounting positions | |
| — up to 40 °C, max. | 3 A |
| **Cable length** | |
| • shielded, max. | 1 000 m |
| • unshielded, max. | 600 m |

## Encoder

| | |
|---|---|
| **Connectable encoders** | |
| • 2-wire sensor | No |

## 1. Interface

| | |
|---|---|
| Interface type | Integrated RS 485 interface |
| Physics | RS 485 |
| Isolated | Yes |
| Power supply to interface (15 to 30 V DC), max. | 200 mA |
| **Functionality** | |
| • MPI | Yes |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • Point-to-point connection | No |
| **MPI** | |
| • Transmission rate, max. | 12 Mbit/s |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | Yes |
| — S7 basic communication | Yes |

| | |
|---|---|
| — S7 communication | Yes |
| — S7 communication, as client | Yes; Via CP and loadable FB |
| — S7 communication, as server | Yes |
| **DP master** | |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 124 |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | No |
| — Equidistance | Yes |
| — SYNC/FREEZE | Yes |
| — DPV1 | Yes |
| Address area | |
| — Inputs, max. | 244 kbyte; KB --> 244 bytes per DP slave |
| — Outputs, max. | 244 kbyte; KB --> 244 bytes per DP slave |
| **DP slave** | |
| • Transmission rate, max. | 12 Mbit/s |
| • automatic baud rate search | No |
| • Address area, max. | 32 |
| • User data per address area, max. | 32 byte |
| Services | |
| — Routing | Yes |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | No |
| — Direct data exchange (slave-to-slave communication) | Yes |
| — DPV1 | No |
| Transfer memory | |
| — Inputs | 244 byte |
| — Outputs | 244 byte |
| **2. Interface** | |
| Interface type | Integrated RS 485 interface |
| Physics | RS 485 |
| Isolated | Yes |
| Power supply to interface (15 to 30 V DC), max. | 200 mA |
| Functionality | |
| • MPI | No |

09/01/2017

| | |
|---|---|
| • PROFIBUS DP master | Yes; DP(DRIVE)-Master |
| • PROFIBUS DP slave | No |
| • Point-to-point connection | No |
| **DP master** | |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 32 |
| **Services** | |
| — PG/OP communication | No |
| — Routing | No |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | No |
| — Equidistance | Yes |
| — SYNC/FREEZE | No |
| — Activation/deactivation of DP slaves | No |
| — DPV1 | No |
| **Address area** | |
| — Inputs, max. | 244 kbyte; KB --> 244 bytes per DP slave |
| — Outputs, max. | 244 kbyte; KB --> 244 bytes per DP slave |
| **Communication functions** | |
| PG/OP communication | Yes |
| **Global data communication** | |
| • 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 |
| **S7 basic communication** | |
| • 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) |
| **S7 communication** | |
| • 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. | 64 byte; as server |
| **S5 compatible communication** | |

| | |
|---|---|
| • supported | Yes; via CP and loadable FC |
| **Number of connections** | |
| • overall | 16 |
| • usable for PG communication | 15 |
| — reserved for PG communication | 1 |
| — adjustable for PG communication, min. | 1 |
| — adjustable for PG communication, max. | 15 |
| • usable for OP communication | 15 |
| — reserved for OP communication | 1 |
| — adjustable for OP communication, min. | 1 |
| — adjustable for OP communication, max. | 15 |
| • usable for S7 basic communication | 12 |
| — reserved for S7 basic communication | 0 |
| — adjustable for S7 basic communication, min. | 0 |
| — adjustable for S7 basic communication, max. | 12 |

| **S7 message functions** | |
|---|---|
| Number of login stations for message functions, max. | 16; Depending on the configured connections for PG/OP and S7 basic communication |
| Process diagnostic messages | Yes |
| simultaneously active Alarm-S blocks, max. | 40 |

| **Test commissioning functions** | |
|---|---|
| Status block | Yes |
| Single step | Yes |
| Number of breakpoints | 2 |
| **Status/control** | |
| • 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 |
| **Forcing** | |
| • Forcing | Yes |
| • Forcing, variables | Inputs, outputs |
| • Number of variables, max. | 10 |
| **Diagnostic buffer** | |
| • present | Yes |
| • Number of entries, max. | 100 |
| — adjustable | No |

| **Interrupts/diagnostics/status information** | |
|---|---|

| | |
|---|---|
| Alarms | No |
| Diagnostic functions | No |
| **Diagnostics indication LED** | |
| • Status indicator digital input (green) | Yes |
| • Status indicator digital output (green) | Yes |

## Potential separation

| | |
|---|---|
| **Potential separation digital inputs** | |
| • between the channels and backplane bus | Yes |
| **Potential separation digital outputs** | |
| • between the channels and backplane bus | Yes |

## Permissible potential difference

| | |
|---|---|
| between different circuits | 75 V DC/60 V AC |

## Isolation

| | |
|---|---|
| Isolation tested with | 500 V DC |

## Configuration

| | |
|---|---|
| **Configuration software** | |
| • STEP 7 | Yes; V5.2 SP1 or higher and S7 Technology option package |
| **Programming** | |
| • Command set | see instruction list |
| • Nesting levels | 8 |
| • 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 |
| **Know-how protection** | |
| • User program protection/password protection | Yes |
| **Cycle time monitoring** | |
| • lower limit | 1 ms |
| • upper limit | 6 000 ms |
| • adjustable | Yes |
| • preset | 150 ms |

## Dimensions

| | |
|---|---|
| Width | 160 mm |
| Height | 125 mm |

| Depth | 130 mm |
|---|---|

| Weights | |
|---|---|
| Weight, approx. | 750 g |

| last modified: | 08/28/2017 |
|---|---|

09/01/2017