

SIMATIC S7-300, CPU 314C-2 PTP COMPACT CPU WITH MPI, 24 DI/16 DO, 4AI, 2AO, 1 PT100, 4 FAST COUNTERS (60 KHZ), INTEGRATED INTERFACE RS485, INTEGRATED 24V DC POWER SUPPLY, 48 KBYTE WORKING MEMORY, FRONT CONNECTOR (2 X 40PIN) AND MICRO MEMORY CARD REQUIRED

| General information                                                                                     |                                                                                        |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Hardware product version                                                                                | 01                                                                                     |
| Firmware version                                                                                        | V2.0.0                                                                                 |
| Engineering with                                                                                        |                                                                                        |
| <ul style="list-style-type: none"> <li>Programming package</li> </ul>                                   | STEP 7 V5.2 SP1 or higher (with STEP 7 V5.1 SP3 or higher, please use predecessor CPU) |
| Supply voltage                                                                                          |                                                                                        |
| Rated value (DC)                                                                                        |                                                                                        |
| <ul style="list-style-type: none"> <li>24 V DC</li> </ul>                                               | Yes                                                                                    |
| permissible range, lower limit (DC)                                                                     | 20.4 V                                                                                 |
| permissible range, upper limit (DC)                                                                     | 28.8 V                                                                                 |
| Load voltage L+                                                                                         |                                                                                        |
| <ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>                                      | 24 V                                                                                   |
| <ul style="list-style-type: none"> <li>permissible range, lower limit (DC)</li> </ul>                   | 20.4 V                                                                                 |
| <ul style="list-style-type: none"> <li>permissible range, upper limit (DC)</li> </ul>                   | 28.8 V                                                                                 |
| Input current                                                                                           |                                                                                        |
| Current consumption (rated value)                                                                       | 800 mA                                                                                 |
| Current consumption (in no-load operation), typ.                                                        | 150 mA                                                                                 |
| Inrush current, typ.                                                                                    | 11 A                                                                                   |
| Power loss                                                                                              |                                                                                        |
| Power loss, typ.                                                                                        | 14 W                                                                                   |
| Memory                                                                                                  |                                                                                        |
| Work memory                                                                                             |                                                                                        |
| <ul style="list-style-type: none"> <li>integrated</li> </ul>                                            | 48 kbyte; For program and data                                                         |
| <ul style="list-style-type: none"> <li>expandable</li> </ul>                                            | No                                                                                     |
| Load memory                                                                                             |                                                                                        |
| <ul style="list-style-type: none"> <li>Plug-in (MMC)</li> </ul>                                         | Yes                                                                                    |
| <ul style="list-style-type: none"> <li>Plug-in (MMC), max.</li> </ul>                                   | 8 Mbyte                                                                                |
| <ul style="list-style-type: none"> <li>Data management on MMC (after last programming), min.</li> </ul> | 10 y                                                                                   |
| Backup                                                                                                  |                                                                                        |
| <ul style="list-style-type: none"> <li>present</li> </ul>                                               | Yes; Guaranteed by MMC (maintenance-free)                                              |

- without battery

Yes; Program and data

## CPU processing times

|                                     |        |
|-------------------------------------|--------|
| for bit operations, typ.            | 0.1 µs |
| for bit operations, max.            | 0.2 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                    |
| <b>DB</b>                        |                          |
| • Number, max.                   | 511; DB 0 reserved       |
| • Size, max.                     | 16 kbyte                 |
| <b>FB</b>                        |                          |
| • Number, max.                   | 512; From FB 0 to FB 511 |
| • Size, max.                     | 16 kbyte                 |
| <b>FC</b>                        |                          |
| • Number, max.                   | 512; from FC 0 to FC 511 |
| • Size, max.                     | 16 kbyte                 |
| <b>OB</b>                        |                          |
| • Number, max.                   | see instruction list     |
| • Size, max.                     | 16 kbyte                 |
| • Number of time alarm OBs       | 1                        |
| • Number of delay alarm OBs      | 1                        |
| • Number of cyclic interrupt OBs | 1                        |
| • Number of process alarm OBs    | 1                        |
| <b>Nesting depth</b>             |                          |
| • per priority class             | 8                        |
| • additional within an error OB  | 4                        |

## Counters, timers and their retentivity

|                       |     |
|-----------------------|-----|
| <b>S7 counter</b>     |     |
| • Number              | 256 |
| <b>Retentivity</b>    |     |
| — adjustable          | Yes |
| — lower limit         | 0   |
| — upper limit         | 256 |
| <b>Counting range</b> |     |
| — lower limit         | 0   |
| — upper limit         | 999 |
| <b>S7 times</b>       |     |
| • Number              | 256 |
| <b>Retentivity</b>    |     |

|                                              |                        |
|----------------------------------------------|------------------------|
| — adjustable                                 | Yes                    |
| — lower limit                                | 0                      |
| — upper limit                                | 256                    |
| — 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             |                        |
| Flag                                         |                        |
| • Number, max.                               | 256 byte               |
| • Retentivity available                      | Yes; MB 0 to MB 255    |
| • Retentivity preset                         | MB 0 to MB 15          |
| • Number of clock memories                   | 8                      |
| Data blocks                                  |                        |
| • Number, max.                               | 511; from DB1 to DB511 |
| • Size, max.                                 | 16 kbyte               |
| Local data                                   |                        |
| • per priority class, max.                   | 510 byte               |
| Address area                                 |                        |
| I/O address area                             |                        |
| • Inputs                                     | 1 kbyte                |
| • Outputs                                    | 1 kbyte                |
| Process image                                |                        |
| • Inputs                                     | 128 byte               |
| • Outputs                                    | 128 byte               |
| Default addresses of the integrated channels |                        |
| — Digital inputs                             | 124.0 to 126.7         |
| — Digital outputs                            | 124.0 to 125.7         |
| — Analog inputs                              | 752 to 761             |
| — Analog outputs                             | 752 to 755             |
| Digital channels                             |                        |
| • Inputs                                     | 992                    |
| — of which central                           | 992                    |
| • Outputs                                    | 992                    |
| — of which central                           | 992                    |
| Analog channels                              |                        |
| • Inputs                                     | 253                    |
| — of which central                           | 248                    |

|                                                       |                                                 |
|-------------------------------------------------------|-------------------------------------------------|
| • Outputs                                             | 124                                             |
| — of which central                                    | 248                                             |
| <b>Hardware configuration</b>                         |                                                 |
| Number of expansion units, max.                       | 3                                               |
| <b>Number of DP masters</b>                           |                                                 |
| • via CP                                              | 4                                               |
| <b>Number of operable FMs and CPs (recommended)</b>   |                                                 |
| • FM                                                  | 8                                               |
| • CP, PtP                                             | 8                                               |
| • CP, LAN                                             | 10                                              |
| <b>Rack</b>                                           |                                                 |
| • Racks, max.                                         | 4                                               |
| • Modules per rack, max.                              | 8; In rack 3 max. 7                             |
| <b>Time of day</b>                                    |                                                 |
| <b>Clock</b>                                          |                                                 |
| • Hardware clock (real-time)                          | Yes                                             |
| • retentive and synchronizable                        | Yes                                             |
| • Backup time                                         | 6 wk                                            |
| • Deviation per day, max.                             | 10 s                                            |
| <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                                             |
| <b>Clock synchronization</b>                          |                                                 |
| • supported                                           | Yes                                             |
| • to MPI, master                                      | Yes                                             |
| • to MPI, slave                                       | Yes                                             |
| • in AS, master                                       | Yes                                             |
| <b>Digital inputs</b>                                 |                                                 |
| Number of digital inputs                              | 24                                              |
| integrated channels (DI)                              | 24                                              |
| <b>Input voltage</b>                                  |                                                 |
| • Rated value (DC)                                    | 24 V                                            |
| • for signal "0"                                      | -3 to +5V                                       |
| • for signal "1"                                      | +15 to +30V                                     |
| <b>Input current</b>                                  |                                                 |
| • for signal "1", typ.                                | 8 mA                                            |
| <b>Input delay (for rated value of input voltage)</b> |                                                 |
| for standard inputs                                   |                                                 |

|                                                                       |                                                    |
|-----------------------------------------------------------------------|----------------------------------------------------|
| — parameterizable                                                     | Yes; 0.1 / 0.3 / 3 / 15 ms                         |
| for counter/technological functions                                   |                                                    |
| — at "0" to "1", max.                                                 | 8 µs                                               |
| Cable length                                                          |                                                    |
| • shielded, max.                                                      | 1 000 m; 100 m for technological functions         |
| • unshielded, max.                                                    | 600 m                                              |
| Digital outputs                                                       |                                                    |
| Number of digital outputs                                             | 16                                                 |
| integrated channels (DO)                                              | 16                                                 |
| Short-circuit protection                                              | Yes; Clocked electronically                        |
| Limitation of inductive shutdown voltage to                           | L+ (-48 V)                                         |
| Output voltage                                                        |                                                    |
| • for signal "1", min.                                                | L+ (-0.8 V)                                        |
| Output current                                                        |                                                    |
| • for signal "1" permissible range, max.                              | 500 mA                                             |
| • for signal "1" permissible range for 0 to 60 °C, max.               | 500 mA                                             |
| • for signal "1" minimum load current                                 | 5 mA                                               |
| • for signal "0" residual current, max.                               | 0.5 mA                                             |
| Switching frequency                                                   |                                                    |
| • with resistive load, max.                                           | 100 Hz                                             |
| • with inductive load, max.                                           | 0.5 Hz                                             |
| Total current of the outputs (per group)                              |                                                    |
| all mounting positions                                                |                                                    |
| — up to 40 °C, max.                                                   | 8 A                                                |
| — up to 60 °C, max.                                                   | 4 A                                                |
| Cable length                                                          |                                                    |
| • shielded, max.                                                      | 1 000 m                                            |
| • unshielded, max.                                                    | 600 m                                              |
| Analog inputs                                                         |                                                    |
| Number of analog inputs                                               |                                                    |
| • For voltage/current measurement                                     | 4                                                  |
| • For resistance/resistance thermometer measurement                   | 1                                                  |
| integrated channels (AI)                                              | 4+1                                                |
| permissible input voltage for current input (destruction limit), max. | 5 V; Permanent                                     |
| permissible input current for voltage input (destruction limit), max. | 0.5 mA; Permanent                                  |
| Technical unit for temperature measurement adjustable                 | Yes; Degrees Celsius / degrees Fahrenheit / Kelvin |
| Input ranges                                                          |                                                    |

|                                                        |                         |
|--------------------------------------------------------|-------------------------|
| • Current                                              | Yes                     |
| • Resistance thermometer                               | Yes                     |
| • Resistance                                           | Yes                     |
| Input ranges (rated values), voltages                  |                         |
| • 0 to +10 V                                           | Yes                     |
| • Input resistance (0 to 10 V)                         | 100 k $\Omega$          |
| Input ranges (rated values), currents                  |                         |
| • 0 to 20 mA                                           | Yes                     |
| • Input resistance (0 to 20 mA)                        | 100 $\Omega$            |
| • -20 mA to +20 mA                                     | Yes                     |
| • Input resistance (-20 mA to +20 mA)                  | 100 $\Omega$            |
| • 4 mA to 20 mA                                        | Yes                     |
| • Input resistance (4 mA to 20 mA)                     | 100 $\Omega$            |
| Input ranges (rated values), resistance thermometer    |                         |
| • Pt 100                                               | Yes                     |
| • Input resistance (Pt 100)                            | 10 M $\Omega$           |
| Input ranges (rated values), resistors                 |                         |
| • 0 to 600 ohms                                        | Yes                     |
| • Input resistance (0 to 600 ohms)                     | 10 M $\Omega$           |
| Cable length                                           |                         |
| • shielded, max.                                       | 100 m                   |
| Analog outputs                                         |                         |
| Number of analog outputs                               | 2                       |
| integrated channels (AO)                               | 2                       |
| Output ranges, voltage                                 |                         |
| • 0 to 10 V                                            | Yes                     |
| • -10 V to +10 V                                       | Yes                     |
| Output ranges, current                                 |                         |
| • 0 to 20 mA                                           | Yes                     |
| • -20 mA to +20 mA                                     | Yes                     |
| • 4 mA to 20 mA                                        | Yes                     |
| Analog value generation for the inputs                 |                         |
| Integration and conversion time/resolution per channel |                         |
| • Resolution with overrange (bit including sign), max. | 12 bit                  |
| • Integration time, parameterizable                    | Yes; 2,5 / 16,6 / 20 ms |
| Analog value generation for the outputs                |                         |
| Integration and conversion time/resolution per channel |                         |
| • Resolution with overrange (bit including sign), max. | 12 bit                  |
| • Conversion time (per channel)                        | 1 ms                    |

|                                                                   |                             |
|-------------------------------------------------------------------|-----------------------------|
| <b>Encoder</b>                                                    |                             |
| <b>Connectable encoders</b>                                       |                             |
| <ul style="list-style-type: none"> <li>• 2-wire sensor</li> </ul> | Yes                         |
| — permissible quiescent current (2-wire sensor), max.             | 1.5 mA                      |
| <b>Errors/accuracies</b>                                          |                             |
| <b>Basic error limit (operational limit at 25 °C)</b>             |                             |
| • Voltage, relative to input range, (+/-)                         | 0.7 %                       |
| • Current, relative to input range, (+/-)                         | 0.7 %                       |
| • Resistance, relative to input range, (+/-)                      | 3 %                         |
| • Resistance thermometer, relative to input range, (+/-)          | 3 %                         |
| • Voltage, relative to output range, (+/-)                        | 0.7 %                       |
| • Current, relative to output range, (+/-)                        | 0.7 %                       |
| <b>Interfaces</b>                                                 |                             |
| <b>MPI</b>                                                        |                             |
| • Cable length, max.                                              | 50 m; without repeater      |
| <b>Point-to-point</b>                                             |                             |
| • Cable length, max.                                              | 1 200 m                     |
| <b>Integrated protocol driver</b>                                 |                             |
| — 3964 (R)                                                        | Yes                         |
| — ASCII                                                           | Yes                         |
| — RK512                                                           | Yes                         |
| <b>Transmission rate, RS 422/485</b>                              |                             |
| — with 3964 (R) protocol, max.                                    | 19.2 kbit/s                 |
| — with ASCII protocol, max.                                       | 19.2 kbit/s                 |
| — with RK 512 protocol, max.                                      | 19.2 kbit/s                 |
| <b>1. Interface</b>                                               |                             |
| Interface type                                                    | 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                         |
| • PROFIBUS DP master                                              | No                          |
| • PROFIBUS DP slave                                               | No                          |
| • Point-to-point connection                                       | No                          |
| <b>MPI</b>                                                        |                             |
| • Number of connections                                           | 12                          |
| • 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 |
| — S7 communication, as client | No  |
| — S7 communication, as server | Yes |

## 2. Interface

|                                                             |                                  |
|-------------------------------------------------------------|----------------------------------|
| Interface type                                              | Integrated RS 422/ 485 interface |
| Physics                                                     | RS 422/RS 485 (X.27)             |
| Isolated                                                    | Yes                              |
| Number of connection resources                              | none                             |
| <b>Functionality</b>                                        |                                  |
| • MPI                                                       | No                               |
| • PROFIBUS DP master                                        | No                               |
| • PROFIBUS DP slave                                         | No                               |
| • Point-to-point connection                                 | Yes                              |
| <b>Point-to-point connection</b>                            |                                  |
| • Transmission rate, max.                                   | 38.4 kbit/s                      |
| • Interface controllable from the user program              | Yes                              |
| • Interface can trigger alarm/interrupt in the user program | Yes                              |

## Communication functions

|                                                 |           |
|-------------------------------------------------|-----------|
| PG/OP communication                             | Yes       |
| <b>Global data communication</b>                |           |
| • supported                                     | Yes       |
| • Number of GD loops, max.                      | 4         |
| • Number of GD packets, max.                    | 4         |
| • Number of GD packets, transmitter, max.       | 4         |
| • Number of GD packets, receiver, max.          | 4         |
| • 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   |
| <b>S7 communication</b>                         |           |
| • supported                                     | Yes       |
| • as server                                     | Yes       |
| • as client                                     | Yes       |
| • User data per job, max.                       | 180 kbyte |



|                                                      |                                                   |
|------------------------------------------------------|---------------------------------------------------|
| • User data per job (of which consistent), max.      | 64 byte                                           |
| <b>S5 compatible communication</b>                   |                                                   |
| • supported                                          | Yes                                               |
| <b>Number of connections</b>                         |                                                   |
| • overall                                            | 12                                                |
| • usable for PG communication                        | 11                                                |
| — reserved for PG communication                      | 1                                                 |
| — adjustable for PG communication, min.              | 1                                                 |
| — adjustable for PG communication, max.              | 11                                                |
| • usable for OP communication                        | 11                                                |
| — reserved for OP communication                      | 1                                                 |
| — adjustable for OP communication, min.              | 1                                                 |
| — adjustable for OP communication, max.              | 11                                                |
| • usable for S7 basic communication                  | 8                                                 |
| — reserved for S7 basic communication                | 8                                                 |
| — adjustable for S7 basic communication, min.        | 0                                                 |
| — adjustable for S7 basic communication, max.        | 8                                                 |
| <b>S7 message functions</b>                          |                                                   |
| Number of login stations for message functions, max. | 12                                                |
| Process diagnostic messages                          | Yes                                               |
| simultaneously active Alarm-S blocks, max.           | 40                                                |
| <b>Test commissioning functions</b>                  |                                                   |
| Status block                                         | Yes                                               |
| Single step                                          | Yes                                               |
| Number of breakpoints                                | 2                                                 |
| <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                                               |
| • Forcing, variables                                 | Inputs, outputs                                   |
| • Number of variables, max.                          | 10                                                |
| <b>Integrated Functions</b>                          |                                                   |
| Number of counters                                   | 4                                                 |
| Counting frequency (counter) max.                    | 60 kHz                                            |
| Frequency measurement                                | Yes                                               |

|                            |         |
|----------------------------|---------|
| Number of frequency meters | 4       |
| controlled positioning     | Yes     |
| PID controller             | Yes     |
| Number of pulse outputs    | 4       |
| Limit frequency (pulse)    | 2.5 kHz |

## Potential separation

### Potential separation digital inputs

- Potential separation digital inputs Yes
- between the channels, in groups of 16
- between the channels and backplane bus Yes

### Potential separation digital outputs

- Potential separation digital outputs Yes
- between the channels, in groups of 8
- between the channels and backplane bus Yes

### Potential separation analog inputs

- Potential separation analog inputs Yes; common for analog I/O
- between the channels and backplane bus Yes

### Potential separation analog outputs

- Potential separation analog outputs Yes; common for analog I/O
- between the channels and backplane bus Yes

## Configuration

### Configuration software

- STEP 7 Yes; V5.1 SP2

### 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

## Dimensions

|        |        |
|--------|--------|
| Width  | 120 mm |
| Height | 125 mm |

|                 |            |
|-----------------|------------|
| Depth           | 130 mm     |
| Weights         |            |
| Weight, approx. | 676 g      |
| last modified:  | 08/28/2017 |