



SIMATIC S7-300, CPU 314C-2 DP Compact CPU with MPI, 24 DI/16 DO, 4 AI, 2 AO, 1 Pt100, 4 high-speed counters (60 kHz), integrated DP interface, Integr. power supply 24 V DC, work memory 192 KB, Front connector (2x 40-pole) and Micro Memory Card required

| General information                                         |                                                                                         |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| HW functional status                                        | 01                                                                                      |
| Firmware version                                            | V3.3                                                                                    |
| Engineering with                                            |                                                                                         |
| • Programming package                                       | STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203                 |
| Supply voltage                                              |                                                                                         |
| Rated value (DC)                                            | 24 V                                                                                    |
| permissible range, lower limit (DC)                         | 19.2 V                                                                                  |
| permissible range, upper limit (DC)                         | 28.8 V                                                                                  |
| external protection for power supply lines (recommendation) | Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A |
| Mains buffering                                             |                                                                                         |
| • Mains/voltage failure stored energy time                  | 5 ms                                                                                    |
| • Repeat rate, min.                                         | 1 s                                                                                     |
| Load voltage L+                                             |                                                                                         |
| Digital inputs                                              |                                                                                         |
| — Rated value (DC)                                          | 24 V                                                                                    |
| — Reverse polarity protection                               | Yes                                                                                     |
| Digital outputs                                             |                                                                                         |
| — Rated value (DC)                                          | 24 V                                                                                    |
| — Reverse polarity protection                               | No                                                                                      |
| Input current                                               |                                                                                         |
| Current consumption (rated value)                           | 880 mA                                                                                  |
| Current consumption (in no-load operation), typ.            | 150 mA                                                                                  |
| Inrush current, typ.                                        | 5 A                                                                                     |
| I <sup>2</sup> t                                            | 0.7 A <sup>2</sup> ·s                                                                   |
| Digital inputs                                              |                                                                                         |
| • from load voltage L+ (without load), max.                 | 80 mA                                                                                   |
| Digital outputs                                             |                                                                                         |
| • from load voltage L+, max.                                | 50 mA                                                                                   |
| Power loss                                                  |                                                                                         |
| Power loss, typ.                                            | 13 W                                                                                    |
| Memory                                                      |                                                                                         |
| Work memory                                                 |                                                                                         |
| • integrated                                                | 192 kbyte                                                                               |
| • expandable                                                | No                                                                                      |
| Load memory                                                 |                                                                                         |
| • Plug-in (MMC)                                             | Yes                                                                                     |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Plug-in (MMC), max.</li> <li>• Data management on MMC (after last programming), min.</li> </ul>                                                                                                                                                                                                                                                                                                         | 8 Mbyte<br>10 y                                                                                                                                                                            |
| <b>Backup</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• present</li> <li>• without battery</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | Yes; Guaranteed by MMC (maintenance-free)<br>Yes; Program and data                                                                                                                         |
| <b>CPU processing times</b>                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                            |
| for bit operations, typ.                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.06 µs                                                                                                                                                                                    |
| for word operations, typ.                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.12 µs                                                                                                                                                                                    |
| for fixed point arithmetic, typ.                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.16 µs                                                                                                                                                                                    |
| for floating point arithmetic, typ.                                                                                                                                                                                                                                                                                                                                                                                                              | 0.59 µs                                                                                                                                                                                    |
| <b>CPU-blocks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                            |
| Number of blocks (total)                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.                                                                                              |
| <b>DB</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | 1 024; Number range: 1 to 16000<br>64 kbyte                                                                                                                                                |
| <b>FB</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | 1 024; Number range: 0 to 7999<br>64 kbyte                                                                                                                                                 |
| <b>FC</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | 1 024; Number range: 0 to 7999<br>64 kbyte                                                                                                                                                 |
| <b>OB</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> <li>• Number of free cycle OBs</li> <li>• Number of time alarm OBs</li> <li>• Number of delay alarm OBs</li> <li>• Number of cyclic interrupt OBs</li> <li>• Number of process alarm OBs</li> <li>• Number of DPV1 alarm OBs</li> <li>• Number of startup OBs</li> <li>• Number of asynchronous error OBs</li> <li>• Number of synchronous error OBs</li> </ul> | see instruction list<br>64 kbyte<br>1; OB 1<br>1; OB 10<br>2; OB 20, 21<br>4; OB 32, 33, 34, 35<br>1; OB 40<br>3; OB 55, 56, 57<br>1; OB 100<br>5; OB 80, 82, 85, 86, 87<br>2; OB 121, 122 |
| <b>Nesting depth</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• per priority class</li> <li>• additional within an error OB</li> </ul>                                                                                                                                                                                                                                                                                                                                  | 16<br>4                                                                                                                                                                                    |
| <b>Counters, timers and their retentivity</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                            |
| <b>S7 counter</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Number</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | 256                                                                                                                                                                                        |
| <b>Retentivity</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                            |
| — adjustable                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                                                                                                                                                                                        |
| — lower limit                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                                                                                          |
| — upper limit                                                                                                                                                                                                                                                                                                                                                                                                                                    | 255                                                                                                                                                                                        |
| — preset                                                                                                                                                                                                                                                                                                                                                                                                                                         | Z 0 to Z 7                                                                                                                                                                                 |
| <b>Counting range</b>                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                            |
| — lower limit                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                                                                                          |
| — upper limit                                                                                                                                                                                                                                                                                                                                                                                                                                    | 999                                                                                                                                                                                        |
| <b>IEC counter</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• present</li> <li>• Type</li> <li>• Number</li> </ul>                                                                                                                                                                                                                                                                                                                                                    | Yes<br>SFB<br>Unlimited (limited only by RAM capacity)                                                                                                                                     |
| <b>S7 times</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• Number</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | 256                                                                                                                                                                                        |
| <b>Retentivity</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                            |
| — 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                                      |
| • Number                                                  | Unlimited (limited only by RAM capacity) |
| Data areas and their retentivity                          |                                          |
| Retentive data area (incl. timers, counters, flags), max. | 64 kbyte                                 |
| Flag                                                      |                                          |
| • Size, max.                                              | 256 byte                                 |
| • Retentivity available                                   | Yes; MB 0 to MB 255                      |
| • Retentivity preset                                      | MB 0 to MB 15                            |
| • Number of clock memories                                | 8; 1 memory byte                         |
| Data blocks                                               |                                          |
| • Retentivity adjustable                                  | Yes; via non-retain property on DB       |
| • Retentivity preset                                      | Yes                                      |
| Local data                                                |                                          |
| • per priority class, max.                                | 32 kbyte; Max. 2048 bytes per block      |
| Address area                                              |                                          |
| I/O address area                                          |                                          |
| • Inputs                                                  | 2 048 byte                               |
| • Outputs                                                 | 2 048 byte                               |
| of which distributed                                      |                                          |
| — Inputs                                                  | 2 003 byte                               |
| — Outputs                                                 | 2 010 byte                               |
| Process image                                             |                                          |
| • Inputs                                                  | 2 048 byte                               |
| • Outputs                                                 | 2 048 byte                               |
| • Inputs, adjustable                                      | 2 048 byte                               |
| • Outputs, adjustable                                     | 2 048 byte                               |
| • Inputs, default                                         | 128 byte                                 |
| • Outputs, default                                        | 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                                                  | 16 048                                   |
| — of which central                                        | 1 016                                    |
| • Outputs                                                 | 16 096                                   |
| — of which central                                        | 1 008                                    |
| Analog channels                                           |                                          |
| • Inputs                                                  | 1 006                                    |
| — of which central                                        | 253                                      |
| • Outputs                                                 | 1 007                                    |
| — of which central                                        | 250                                      |
| Hardware configuration                                    |                                          |
| Number of expansion units, max.                           | 3                                        |
| Number of DP masters                                      |                                          |
| • integrated                                              | 1                                        |
| • via CP                                                  | 4                                        |
| Number of operable FMs and CPs (recommended)              |                                          |
| • FM                                                      | 8                                        |
| • CP, PtP                                                 | 8                                        |
| • CP, LAN                                                 | 10                                       |
| Rack                                                      |                                          |
| • Racks, max.                                             | 4                                        |
| • Modules per rack, max.                                  | 8; In rack 3 max. 7                      |

|                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time of day</b>                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                           |
| <b>Clock</b>                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• Hardware clock (real-time)</li> <li>• retentive and synchronizable</li> <li>• Backup time</li> <li>• Deviation per day, max.</li> <li>• Behavior of the clock following POWER-ON</li> <li>• Behavior of the clock following expiry of backup period</li> </ul> | <p>Yes</p> <p>Yes</p> <p>6 wk; At 40 °C ambient temperature</p> <p>10 s; Typ.: 2 s</p> <p>Clock continues running after POWER OFF</p> <p>the clock continues at the time of day it had when power was switched off</p>                    |
| <b>Operating hours counter</b>                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• Number</li> <li>• Number/Number range</li> <li>• Range of values</li> <li>• Granularity</li> <li>• retentive</li> </ul>                                                                                                                                        | <p>1</p> <p>0</p> <p>0 to 2<sup>31</sup> hours (when using SFC 101)</p> <p>1 h</p> <p>Yes; Must be restarted at each restart</p>                                                                                                          |
| <b>Clock synchronization</b>                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• supported</li> <li>• to MPI, master</li> <li>• to MPI, slave</li> <li>• to DP, master</li> <li>• to DP, slave</li> <li>• in AS, master</li> <li>• in AS, slave</li> </ul>                                                                                      | <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes; With DP slave only slave clock</p> <p>Yes</p> <p>Yes</p> <p>No</p>                                                                                                                               |
| <b>Digital inputs</b>                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                           |
| Number of digital inputs                                                                                                                                                                                                                                                                                | 24                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>• of which inputs usable for technological functions</li> </ul>                                                                                                                                                                                                  | 16                                                                                                                                                                                                                                        |
| integrated channels (DI)                                                                                                                                                                                                                                                                                | 24                                                                                                                                                                                                                                        |
| Input characteristic curve in accordance with IEC 61131, type 1                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                                                                       |
| <b>Number of simultaneously controllable inputs</b>                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                           |
| <b>horizontal installation</b>                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                           |
| — up to 40 °C, max.                                                                                                                                                                                                                                                                                     | 24                                                                                                                                                                                                                                        |
| — up to 60 °C, max.                                                                                                                                                                                                                                                                                     | 12                                                                                                                                                                                                                                        |
| <b>vertical installation</b>                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                           |
| — up to 40 °C, max.                                                                                                                                                                                                                                                                                     | 12                                                                                                                                                                                                                                        |
| <b>Input voltage</b>                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• Rated value (DC)</li> <li>• for signal "0"</li> <li>• for signal "1"</li> </ul>                                                                                                                                                                                | <p>24 V</p> <p>-3 to +5V</p> <p>+15 to +30 V</p>                                                                                                                                                                                          |
| <b>Input current</b>                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• for signal "1", typ.</li> </ul>                                                                                                                                                                                                                                | 8 mA                                                                                                                                                                                                                                      |
| <b>Input delay (for rated value of input voltage)</b>                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                           |
| <b>for standard inputs</b>                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                           |
| — parameterizable                                                                                                                                                                                                                                                                                       | Yes; 0.1 / 0.3 / 3 / 15 ms (You can reconfigure the input delay of the standard inputs during program runtime. Please note that under certain circumstances your newly set filter time may not be effective until the next filter cycle.) |
| — Rated value                                                                                                                                                                                                                                                                                           | 3 ms                                                                                                                                                                                                                                      |
| <b>for technological functions</b>                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                           |
| — at "0" to "1", max.                                                                                                                                                                                                                                                                                   | 8 µs; Minimum pulse width/minimum pause between pulses at maximum counting frequency                                                                                                                                                      |
| <b>Cable length</b>                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• shielded, max.</li> <li>• unshielded, max.</li> </ul>                                                                                                                                                                                                          | <p>1 000 m; 50 m for technological functions</p> <p>600 m; for technological functions: No</p>                                                                                                                                            |
| <b>for technological functions</b>                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                           |
| — shielded, max.                                                                                                                                                                                                                                                                                        | 50 m; at maximum count frequency                                                                                                                                                                                                          |
| — unshielded, max.                                                                                                                                                                                                                                                                                      | not allowed                                                                                                                                                                                                                               |
| <b>Digital outputs</b>                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                           |
| Number of digital outputs                                                                                                                                                                                                                                                                               | 16                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>• of which high-speed outputs</li> </ul>                                                                                                                                                                                                                         | 4; Notice: You cannot connect the fast outputs of your CPU in parallel                                                                                                                                                                    |
| integrated channels (DO)                                                                                                                                                                                                                                                                                | 16                                                                                                                                                                                                                                        |

|                                                                       |                                                                                               |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Short-circuit protection                                              | Yes; Clocked electronically                                                                   |
| • Response threshold, typ.                                            | 1 A                                                                                           |
| Limitation of inductive shutdown voltage to                           | L+ (-48 V)                                                                                    |
| Controlling a digital input                                           | Yes                                                                                           |
| 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 "1", min.                                                | L+ (-0.8 V)                                                                                   |
| Output current                                                        |                                                                                               |
| • for signal "1" rated value                                          | 500 mA                                                                                        |
| • for signal "1" permissible range, min.                              | 5 mA                                                                                          |
| • for signal "1" permissible range, max.                              | 0.6 A                                                                                         |
| • for signal "1" minimum load current                                 | 5 mA                                                                                          |
| • for signal "0" residual current, max.                               | 0.5 mA                                                                                        |
| Parallel switching of two outputs                                     |                                                                                               |
| • for uprating                                                        | No                                                                                            |
| • for redundant control of a load                                     | Yes                                                                                           |
| Switching frequency                                                   |                                                                                               |
| • with resistive load, max.                                           | 100 Hz                                                                                        |
| • with inductive load, max.                                           | 0.5 Hz                                                                                        |
| • on lamp load, max.                                                  | 100 Hz                                                                                        |
| • of the pulse outputs, with resistive load, max.                     | 2.5 kHz                                                                                       |
| Total current of the outputs (per group)                              |                                                                                               |
| horizontal installation                                               |                                                                                               |
| — up to 40 °C, max.                                                   | 3 A                                                                                           |
| — up to 60 °C, max.                                                   | 2 A                                                                                           |
| vertical installation                                                 |                                                                                               |
| — up to 40 °C, max.                                                   | 2 A                                                                                           |
| Cable length                                                          |                                                                                               |
| • shielded, max.                                                      | 1 000 m                                                                                       |
| • unshielded, max.                                                    | 600 m                                                                                         |
| Analog inputs                                                         |                                                                                               |
| Number of analog inputs                                               | 5                                                                                             |
| • For voltage/current measurement                                     | 4                                                                                             |
| • For resistance/resistance thermometer measurement                   | 1                                                                                             |
| integrated channels (AI)                                              | 5; 4x current/voltage, 1x resistance                                                          |
| permissible input voltage for current input (destruction limit), max. | 5 V; Permanent                                                                                |
| permissible input voltage for voltage input (destruction limit), max. | 30 V; Permanent                                                                               |
| permissible input current for voltage input (destruction limit), max. | 0.5 mA; Permanent                                                                             |
| permissible input current for current input (destruction limit), max. | 50 mA; Permanent                                                                              |
| Electrical input frequency, max.                                      | 400 Hz                                                                                        |
| No-load voltage for resistance-type transmitter, typ.                 | 3.3 V                                                                                         |
| Constant measurement current for resistance-type transmitter, typ.    | 1.25 mA                                                                                       |
| Technical unit for temperature measurement adjustable                 | Yes; Degrees Celsius / degrees Fahrenheit / Kelvin                                            |
| Input ranges                                                          |                                                                                               |
| • Voltage                                                             | Yes; $\pm 10$ V / 100 k $\Omega$ ; 0 V to 10 V / 100 k $\Omega$                               |
| • Current                                                             | Yes; $\pm 20$ mA / 100 $\Omega$ ; 0 mA to 20 mA / 100 $\Omega$ ; 4 mA to 20 mA / 100 $\Omega$ |
| • Resistance thermometer                                              | Yes; Pt 100 / 10 M $\Omega$                                                                   |
| • Resistance                                                          | Yes; 0 $\Omega$ to 600 $\Omega$ / 10 M $\Omega$                                               |
| 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 $\Omega$                                      |
| Thermocouple (TC)                                                      |                                                    |
| Temperature compensation                                               |                                                    |
| — parameterizable                                                      | No                                                 |
| Characteristic linearization                                           |                                                    |
| • parameterizable                                                      | Yes; by software                                   |
| — for resistance thermometer                                           | Pt 100                                             |
| Cable length                                                           |                                                    |
| • shielded, max.                                                       | 100 m                                              |
| Analog outputs                                                         |                                                    |
| Number of analog outputs                                               | 2                                                  |
| integrated channels (AO)                                               | 2                                                  |
| Voltage output, short-circuit protection                               | Yes                                                |
| Voltage output, short-circuit current, max.                            | 55 mA                                              |
| Current output, no-load voltage, max.                                  | 14 V                                               |
| 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                                                |
| Connection of actuators                                                |                                                    |
| • for voltage output two-wire connection                               | Yes; Without compensation of the line resistances  |
| • for voltage output four-wire connection                              | No                                                 |
| • for current output two-wire connection                               | Yes                                                |
| Load impedance (in rated range of output)                              |                                                    |
| • with voltage outputs, min.                                           | 1 k $\Omega$                                       |
| • with voltage outputs, capacitive load, max.                          | 0.1 $\mu$ F                                        |
| • with current outputs, max.                                           | 300 $\Omega$                                       |
| • with current outputs, inductive load, max.                           | 0.1 mH                                             |
| Destruction limits against externally applied voltages and currents    |                                                    |
| • Voltages at the outputs towards MANA                                 | 16 V; Permanent                                    |
| • Current, max.                                                        | 50 mA; Permanent                                   |
| Cable length                                                           |                                                    |
| • shielded, max.                                                       | 200 m                                              |
| Analog value generation for the inputs                                 |                                                    |
| Measurement principle                                                  | Actual value encryption (successive approximation) |
| Integration and conversion time/resolution per channel                 |                                                    |
| • Resolution with overrange (bit including sign), max.                 | 12 bit                                             |
| • Integration time, parameterizable                                    | Yes; 16.6 / 20 ms                                  |
| • Interference voltage suppression for interference frequency f1 in Hz | 50 / 60 Hz                                         |
| • Time constant of the input filter                                    | 0.38 ms                                            |
| • Basic execution time of the module (all channels released)           | 1 ms                                               |
| Analog value generation for the outputs                                |                                                    |
| Integration and conversion time/resolution per channel                 |                                                    |

|                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> <li>Conversion time (per channel)</li> </ul>                                                                                                                                                                                                                                   | 12 bit<br>1 ms                                                                                                               |
| <b>Settling time</b>                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                              |
| <ul style="list-style-type: none"> <li>for resistive load</li> <li>for capacitive load</li> <li>for inductive load</li> </ul>                                                                                                                                                                                                                                                   | 0.6 ms<br>1 ms<br>0.5 ms                                                                                                     |
| <b>Encoder</b>                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              |
| <b>Connection of signal encoders</b>                                                                                                                                                                                                                                                                                                                                            |                                                                                                                              |
| <ul style="list-style-type: none"> <li>for voltage measurement</li> <li>for current measurement as 2-wire transducer</li> <li>for current measurement as 4-wire transducer</li> <li>for resistance measurement with two-wire connection</li> <li>for resistance measurement with three-wire connection</li> <li>for resistance measurement with four-wire connection</li> </ul> | Yes<br>Yes; with external supply<br>Yes<br>Yes; Without compensation of the line resistances<br>No<br>No                     |
| <b>Connectable encoders</b>                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                              |
| <ul style="list-style-type: none"> <li>2-wire sensor</li> <li>— permissible quiescent current (2-wire sensor), max.</li> </ul>                                                                                                                                                                                                                                                  | Yes<br>1.5 mA                                                                                                                |
| <b>Errors/accuracies</b>                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                              |
| Temperature error (relative to input range), (+/-)                                                                                                                                                                                                                                                                                                                              | 0.006 %/K                                                                                                                    |
| Crosstalk between the inputs, min.                                                                                                                                                                                                                                                                                                                                              | 60 dB                                                                                                                        |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)                                                                                                                                                                                                                                                                                                       | 0.06 %                                                                                                                       |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)                                                                                                                                                                                                                                                                                                          | 0.1 %                                                                                                                        |
| Linearity error (relative to output range), (+/-)                                                                                                                                                                                                                                                                                                                               | 0.15 %                                                                                                                       |
| Temperature error (relative to output range), (+/-)                                                                                                                                                                                                                                                                                                                             | 0.01 %/K                                                                                                                     |
| Crosstalk between the outputs, min.                                                                                                                                                                                                                                                                                                                                             | 60 dB                                                                                                                        |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)                                                                                                                                                                                                                                                                                                      | 0.06 %                                                                                                                       |
| <b>Operational error limit in overall temperature range</b>                                                                                                                                                                                                                                                                                                                     |                                                                                                                              |
| <ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> <li>Current, relative to input range, (+/-)</li> <li>Resistance, relative to input range, (+/-)</li> <li>Voltage, relative to output range, (+/-)</li> <li>Current, relative to output range, (+/-)</li> </ul>                                                                              | 1 %<br>1 %<br>1 %<br>1 %<br>1 %                                                                                              |
| <b>Basic error limit (operational limit at 25 °C)</b>                                                                                                                                                                                                                                                                                                                           |                                                                                                                              |
| <ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> <li>Current, relative to input range, (+/-)</li> <li>Resistance, relative to input range, (+/-)</li> <li>Resistance thermometer, relative to input range, (+/-)</li> <li>Voltage, relative to output range, (+/-)</li> <li>Current, relative to output range, (+/-)</li> </ul>              | 0.8 %; Linearity error ±0.06 %<br>0.8 %; Linearity error ±0.06 %<br>0.8 %; Linearity error ±0.2 %<br>0.8 %<br>0.8 %<br>0.8 % |
| <b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1</math> = interference frequency</b>                                                                                                                                                                                                                                                 |                                                                                                                              |
| <ul style="list-style-type: none"> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> <li>Common mode interference, min.</li> </ul>                                                                                                                                                                                           | 30 dB<br>40 dB                                                                                                               |
| <b>Interfaces</b>                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                              |
| Number of industrial Ethernet interfaces                                                                                                                                                                                                                                                                                                                                        | 0                                                                                                                            |
| Number of PROFINET interfaces                                                                                                                                                                                                                                                                                                                                                   | 0                                                                                                                            |
| Number of RS 485 interfaces                                                                                                                                                                                                                                                                                                                                                     | 2; MPI and PROFIBUS DP                                                                                                       |
| Number of RS 422 interfaces                                                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                            |
| <b>1. Interface</b>                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                              |
| Interface type                                                                                                                                                                                                                                                                                                                                                                  | Integrated RS 485 interface                                                                                                  |
| Isolated                                                                                                                                                                                                                                                                                                                                                                        | No                                                                                                                           |
| <b>Interface types</b>                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                              |
| <ul style="list-style-type: none"> <li>RS 485</li> <li>Output current of the interface, max.</li> </ul>                                                                                                                                                                                                                                                                         | Yes<br>200 mA                                                                                                                |

|                                                                              |                                                                                                                                            |
|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Protocols</b>                                                             |                                                                                                                                            |
| • MPI                                                                        | Yes                                                                                                                                        |
| • PROFIBUS DP master                                                         | No                                                                                                                                         |
| • PROFIBUS 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                                                                    | Yes                                                                                                                                        |
| — Global data communication                                                  | Yes                                                                                                                                        |
| — S7 basic communication                                                     | Yes                                                                                                                                        |
| — S7 communication                                                           | Yes; Only server, configured on one side                                                                                                   |
| — S7 communication, as client                                                | No; but via CP and loadable FB                                                                                                             |
| — S7 communication, as server                                                | Yes                                                                                                                                        |
| <b>2. Interface</b>                                                          |                                                                                                                                            |
| Interface type                                                               | Integrated RS 485 interface                                                                                                                |
| Isolated                                                                     | Yes                                                                                                                                        |
| <b>Interface types</b>                                                       |                                                                                                                                            |
| • RS 485                                                                     | Yes                                                                                                                                        |
| • Output current of the interface, max.                                      | 200 mA                                                                                                                                     |
| <b>Protocols</b>                                                             |                                                                                                                                            |
| • MPI                                                                        | No                                                                                                                                         |
| • PROFINET IO Controller                                                     | No                                                                                                                                         |
| • PROFINET IO Device                                                         | No                                                                                                                                         |
| • PROFINET CBA                                                               | No                                                                                                                                         |
| • PROFIBUS DP master                                                         | Yes                                                                                                                                        |
| • PROFIBUS DP slave                                                          | Yes                                                                                                                                        |
| • Point-to-point connection                                                  | No                                                                                                                                         |
| <b>PROFIBUS DP master</b>                                                    |                                                                                                                                            |
| • Transmission rate, max.                                                    | 12 Mbit/s                                                                                                                                  |
| • Number of DP slaves, max.                                                  | 124                                                                                                                                        |
| <b>Services</b>                                                              |                                                                                                                                            |
| — PG/OP communication                                                        | Yes                                                                                                                                        |
| — Routing                                                                    | Yes                                                                                                                                        |
| — Global data communication                                                  | No                                                                                                                                         |
| — S7 basic communication                                                     | Yes; I blocks only                                                                                                                         |
| — S7 communication                                                           | Yes; Only server, configured on one side                                                                                                   |
| — S7 communication, as client                                                | No                                                                                                                                         |
| — S7 communication, as server                                                | Yes                                                                                                                                        |
| — Equidistance                                                               | Yes                                                                                                                                        |
| — Isochronous mode                                                           | No                                                                                                                                         |
| — SYNC/FREEZE                                                                | Yes                                                                                                                                        |
| — Activation/deactivation of DP slaves                                       | Yes                                                                                                                                        |
| — Number of DP slaves that can be simultaneously activated/deactivated, max. | 8                                                                                                                                          |
| — Direct data exchange (slave-to-slave communication)                        | Yes; as subscriber                                                                                                                         |
| — DPV1                                                                       | Yes                                                                                                                                        |
| <b>Address area</b>                                                          |                                                                                                                                            |
| — Inputs, max.                                                               | 2 kbyte                                                                                                                                    |
| — Outputs, max.                                                              | 2 kbyte                                                                                                                                    |
| <b>User data per DP slave</b>                                                |                                                                                                                                            |
| — Inputs, max.                                                               | 244 byte                                                                                                                                   |
| — Outputs, max.                                                              | 244 byte                                                                                                                                   |
| <b>PROFIBUS DP slave</b>                                                     |                                                                                                                                            |
| • GSD file                                                                   | The latest GSD file is available on the Internet ( <a href="http://www.siemens.com/profibus-gsd">http://www.siemens.com/profibus-gsd</a> ) |
| • Transmission rate, max.                                                    | 12 Mbit/s                                                                                                                                  |
| • automatic baud rate search                                                 | Yes; only with passive interface                                                                                                           |
| • Address area, max.                                                         | 32                                                                                                                                         |

|                                                       |                                                                                    |
|-------------------------------------------------------|------------------------------------------------------------------------------------|
| • User data per address area, max.                    | 32 byte                                                                            |
| <b>Services</b>                                       |                                                                                    |
| — PG/OP communication                                 | Yes                                                                                |
| — Routing                                             | Yes; Only with active interface                                                    |
| — Global data communication                           | No                                                                                 |
| — S7 basic communication                              | No                                                                                 |
| — S7 communication                                    | Yes; Only server, configured on one side                                           |
| — S7 communication, as client                         | No                                                                                 |
| — S7 communication, as server                         | Yes                                                                                |
| — Direct data exchange (slave-to-slave communication) | Yes                                                                                |
| — DPV1                                                | No                                                                                 |
| <b>Transfer memory</b>                                |                                                                                    |
| — Inputs                                              | 244 byte                                                                           |
| — Outputs                                             | 244 byte                                                                           |
| <b>Protocols</b>                                      |                                                                                    |
| PROFIsafe                                             | No                                                                                 |
| <b>communication functions / header</b>               |                                                                                    |
| PG/OP communication                                   | Yes                                                                                |
| Data record routing                                   | Yes                                                                                |
| <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 kbyte; 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                                             | 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                 | 0                                                                                  |
| — adjustable for S7 basic communication, min.         | 0                                                                                  |
| — adjustable for S7 basic communication, max.         | 8                                                                                  |
| • usable for routing                                  | 4; max.                                                                            |
| <b>S7 message functions</b>                           |                                                                                    |
| Number of login stations for message functions, max.  | 12; 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>                                                                       |                                                                                |
| <ul style="list-style-type: none"> <li>• Status/control variable</li> </ul>                 | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• Variables</li> </ul>                               | Inputs, outputs, memory bits, DB, times, counters                              |
| <ul style="list-style-type: none"> <li>• Number of variables, max.</li> </ul>               | 30                                                                             |
| — of which status variables, max.                                                           | 30                                                                             |
| — of which control variables, max.                                                          | 14                                                                             |
| <b>Forcing</b>                                                                              |                                                                                |
| <ul style="list-style-type: none"> <li>• Forcing</li> </ul>                                 | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• Forcing, variables</li> </ul>                      | Inputs, outputs                                                                |
| <ul style="list-style-type: none"> <li>• Number of variables, max.</li> </ul>               | 10                                                                             |
| <b>Diagnostic buffer</b>                                                                    |                                                                                |
| <ul style="list-style-type: none"> <li>• present</li> </ul>                                 | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• Number of entries, max.</li> </ul>                 | 500                                                                            |
| — adjustable                                                                                | No                                                                             |
| — of which powerfail-proof                                                                  | 100; Only the last 100 entries are retained                                    |
| <ul style="list-style-type: none"> <li>• Number of entries readable in RUN, max.</li> </ul> | 499                                                                            |
| — adjustable                                                                                | Yes; From 10 to 499                                                            |
| — preset                                                                                    | 10                                                                             |
| <b>Service data</b>                                                                         |                                                                                |
| <ul style="list-style-type: none"> <li>• can be read out</li> </ul>                         | Yes                                                                            |
| <b>Interrupts/diagnostics/status information</b>                                            |                                                                                |
| <b>Diagnostics indication LED</b>                                                           |                                                                                |
| <ul style="list-style-type: none"> <li>• Status indicator digital input (green)</li> </ul>  | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• Status indicator digital output (green)</li> </ul> | Yes                                                                            |
| <b>Integrated Functions</b>                                                                 |                                                                                |
| <b>Counter</b>                                                                              |                                                                                |
| <ul style="list-style-type: none"> <li>• Number of counters</li> </ul>                      | 4; See "Technological Functions" manual                                        |
| <ul style="list-style-type: none"> <li>• Counting frequency, max.</li> </ul>                | 60 kHz                                                                         |
| <b>Frequency measurement</b>                                                                |                                                                                |
| <ul style="list-style-type: none"> <li>• Number of frequency meters</li> </ul>              | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• Number of frequency meters</li> </ul>              | 4; up to 60 kHz (see "Technological Functions" manual)                         |
| controlled positioning                                                                      | Yes                                                                            |
| integrated function blocks (closed-loop control)                                            | Yes; PID controller (see "Technological Functions" manual)                     |
| PID controller                                                                              | Yes                                                                            |
| Number of pulse outputs                                                                     | 4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual) |
| Limit frequency (pulse)                                                                     | 2.5 kHz                                                                        |
| <b>Potential separation</b>                                                                 |                                                                                |
| <b>Potential separation digital inputs</b>                                                  |                                                                                |
| <ul style="list-style-type: none"> <li>• Potential separation digital inputs</li> </ul>     | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• between the channels</li> </ul>                    | No                                                                             |
| <ul style="list-style-type: none"> <li>• between the channels and backplane bus</li> </ul>  | Yes                                                                            |
| <b>Potential separation digital outputs</b>                                                 |                                                                                |
| <ul style="list-style-type: none"> <li>• Potential separation digital outputs</li> </ul>    | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• between the channels</li> </ul>                    | Yes                                                                            |
| <ul style="list-style-type: none"> <li>• between the channels, in groups of</li> </ul>      | 8                                                                              |
| <ul style="list-style-type: none"> <li>• between the channels and backplane bus</li> </ul>  | Yes                                                                            |
| <b>Potential separation analog inputs</b>                                                   |                                                                                |
| <ul style="list-style-type: none"> <li>• Potential separation analog inputs</li> </ul>      | Yes; common for analog I/O                                                     |
| <ul style="list-style-type: none"> <li>• between the channels</li> </ul>                    | No                                                                             |
| <ul style="list-style-type: none"> <li>• between the channels and backplane bus</li> </ul>  | Yes                                                                            |
| <b>Potential separation analog outputs</b>                                                  |                                                                                |
| <ul style="list-style-type: none"> <li>• Potential separation analog outputs</li> </ul>     | Yes; common for analog I/O                                                     |
| <ul style="list-style-type: none"> <li>• between the channels</li> </ul>                    | No                                                                             |
| <ul style="list-style-type: none"> <li>• between the channels and backplane bus</li> </ul>  | Yes                                                                            |
| <b>Isolation</b>                                                                            |                                                                                |

|                                               |                                                                                               |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------|
| Isolation tested with                         | 600 V DC                                                                                      |
| <b>Ambient conditions</b>                     |                                                                                               |
| Ambient temperature during operation          |                                                                                               |
| • min.                                        | 0 °C                                                                                          |
| • max.                                        | 60 °C                                                                                         |
| <b>configuration / header</b>                 |                                                                                               |
| Configuration software                        |                                                                                               |
| • STEP 7                                      | Yes; STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203                  |
| • STEP 7 Lite                                 | No                                                                                            |
| <b>configuration / programming / header</b>   |                                                                                               |
| • 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                                                                                           |
| • Block encryption                            | Yes; With S7 block Privacy                                                                    |
| <b>Dimensions</b>                             |                                                                                               |
| Width                                         | 120 mm                                                                                        |
| Height                                        | 125 mm                                                                                        |
| Depth                                         | 130 mm                                                                                        |
| <b>Weights</b>                                |                                                                                               |
| Weight, approx.                               | 680 g                                                                                         |
| <b>last modified:</b>                         | 8/24/2021  |