



SIMATIC S7-300, CPU 312C Compact CPU with MPI, 10 DI/6 DQ, 2 high-speed counters (10 kHz) Integr. power supply 24 V DC, work memory 64 KB, Front connector (1x 40-pole) and Micro Memory Card required

General information	
HW functional status	01
Firmware version	V3.3
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	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	
<ul style="list-style-type: none"> <li>Mains/voltage failure stored energy time</li> <li>Repeat rate, min.</li> </ul>	5 ms 1 s
Load voltage L+	
Digital outputs	
— Rated value (DC)	24 V
— Reverse polarity protection	No
Input current	
Current consumption (rated value)	570 mA
Current consumption (in no-load operation), typ.	90 mA
Inrush current, typ.	5 A
I <sup>2</sup> t	0.7 A <sup>2</sup> ·s
Digital outputs	
<ul style="list-style-type: none"> <li>from load voltage L+, max.</li> </ul>	25 mA
Power loss	
Power loss, typ.	8 W
Memory	
Work memory	
<ul style="list-style-type: none"> <li>integrated</li> <li>expandable</li> </ul>	64 kbyte No
Load memory	
<ul style="list-style-type: none"> <li>Plug-in (MMC)</li> <li>Plug-in (MMC), max.</li> <li>Data management on MMC (after last programming), min.</li> </ul>	Yes 8 Mbyte 10 a
Backup	
<ul style="list-style-type: none"> <li>present</li> <li>without battery</li> </ul>	Yes; Guaranteed by MMC (maintenance-free) Yes; Program and data
CPU processing times	

for bit operations, typ.	0.1 µs
for word operations, typ.	0.24 µs
for fixed point arithmetic, typ.	0.32 µs
for floating point arithmetic, typ.	1.1 µs

### CPU-blocks

Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
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#### DB

• Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte

#### FB

• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte

#### FC

• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte

#### OB

• Number, max.	see instruction list
• Size, max.	64 kbyte
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	1; OB 10
• Number of delay alarm OBs	2; OB 20, 21
• Number of cyclic interrupt OBs	4; OB 32, 33, 34, 35
• Number of process alarm OBs	1; OB 40
• Number of startup OBs	1; OB 100
• Number of asynchronous error OBs	4; OB 80, 82, 85, 87
• Number of synchronous error OBs	2; OB 121, 122

#### Nesting depth

• per priority class	16
• additional within an error OB	4

### Counters, timers and their retentivity

#### S7 counter

• Number	256
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#### Retentivity

— adjustable	Yes
— lower limit	0
— upper limit	255
— preset	Z 0 to Z 7

#### Counting range

— lower limit	0
— upper limit	999

#### IEC counter

• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)

#### S7 times

• Number	256
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#### Retentivity

— adjustable	Yes
— lower limit	0
— upper limit	255
— preset	No retentivity

#### Time range

— lower limit	10 ms
— upper limit	9 990 s

#### IEC timer

• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)

### Data areas and their retentivity

Retentive data area (incl. timers, counters, flags), max.	64 kbyte
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#### Flag

• Size, max.	256 byte
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<ul style="list-style-type: none"> <li>• Retentivity available</li> <li>• Retentivity preset</li> <li>• Number of clock memories</li> </ul>	Yes; MB 0 to MB 255 MB 0 to MB 15 8; 1 memory byte
<b>Data blocks</b>	
<ul style="list-style-type: none"> <li>• Retentivity adjustable</li> <li>• Retentivity preset</li> </ul>	Yes; via non-retain property on DB Yes
<b>Local data</b>	
<ul style="list-style-type: none"> <li>• per priority class, max.</li> </ul>	32 kbyte; Max. 2048 bytes per block
<b>Address area</b>	
<b>I/O address area</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> </ul>	1 024 byte 1 024 byte
of which distributed	
<ul style="list-style-type: none"> <li>— Inputs</li> <li>— Outputs</li> </ul>	none none
<b>Process image</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> <li>• Inputs, adjustable</li> <li>• Outputs, adjustable</li> <li>• Inputs, default</li> <li>• Outputs, default</li> </ul>	1 024 byte 1 024 byte 1 024 byte 1 024 byte 128 byte 128 byte
<b>Default addresses of the integrated channels</b>	
<ul style="list-style-type: none"> <li>— Digital inputs</li> <li>— Digital outputs</li> </ul>	124.0 to 125.1 124.0 to 124.5
<b>Digital channels</b>	
<ul style="list-style-type: none"> <li>• Inputs               <ul style="list-style-type: none"> <li>— of which central</li> </ul> </li> <li>• Outputs               <ul style="list-style-type: none"> <li>— of which central</li> </ul> </li> </ul>	266 266 262 262
<b>Analog channels</b>	
<ul style="list-style-type: none"> <li>• Inputs               <ul style="list-style-type: none"> <li>— of which central</li> </ul> </li> <li>• Outputs               <ul style="list-style-type: none"> <li>— of which central</li> </ul> </li> </ul>	64 64 64 64
<b>Hardware configuration</b>	
Number of expansion units, max.	0
<b>Number of DP masters</b>	
<ul style="list-style-type: none"> <li>• integrated</li> <li>• via CP</li> </ul>	none 4
<b>Number of operable FMs and CPs (recommended)</b>	
<ul style="list-style-type: none"> <li>• FM</li> <li>• CP, PtP</li> <li>• CP, LAN</li> </ul>	8 8 4
<b>Rack</b>	
<ul style="list-style-type: none"> <li>• Racks, max.</li> <li>• Modules per rack, max.</li> </ul>	1 8
<b>Time of day</b>	
<b>Clock</b>	
<ul style="list-style-type: none"> <li>• Software clock</li> <li>• retentive and synchronizable</li> <li>• Deviation per day, max.</li> <li>• Behavior of the clock following POWER-ON</li> </ul>	Yes No; Buffered: No, Can be synchronized: Yes 10 s; Typ.: 2 s the clock continues at the time of day it had when power was switched off
<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>	1 0 0 to 2 <sup>31</sup> hours (when using SFC 101) 1 h Yes; Must be restarted at each restart
<b>Clock synchronization</b>	
<ul style="list-style-type: none"> <li>• supported</li> <li>• to MPI, master</li> </ul>	Yes Yes

<ul style="list-style-type: none"> <li>● to MPI, slave</li> </ul>	Yes
<ul style="list-style-type: none"> <li>● in AS, master</li> </ul>	Yes
<ul style="list-style-type: none"> <li>● in AS, slave</li> </ul>	No
<b>Digital inputs</b>	
Number of digital inputs	10
<ul style="list-style-type: none"> <li>● of which inputs usable for technological functions integrated channels (DI)</li> </ul>	8
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.	10
— up to 60 °C, max.	5
<b>vertical installation</b>	
— up to 40 °C, max.	5
<b>Input voltage</b>	
<ul style="list-style-type: none"> <li>● Rated value (DC)</li> </ul>	24 V
<ul style="list-style-type: none"> <li>● for signal "0"</li> </ul>	-3 to +5V
<ul style="list-style-type: none"> <li>● for signal "1"</li> </ul>	+15 to +30 V
<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.	48 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> </ul>	1 000 m; 100 m for technological functions
<ul style="list-style-type: none"> <li>● unshielded, max.</li> </ul>	600 m; for technological functions: No
<b>for technological functions</b>	
— shielded, max.	100 m; at maximum count frequency
— unshielded, max.	not allowed
<b>Digital outputs</b>	
Number of digital outputs	6
<ul style="list-style-type: none"> <li>● of which high-speed outputs integrated channels (DO)</li> </ul>	2; Notice: You cannot connect the fast outputs of your CPU in parallel
Short-circuit protection	6
<ul style="list-style-type: none"> <li>● Response threshold, typ.</li> </ul>	Yes; Clocked electronically
Limitation of inductive shutdown voltage to	1 A
Controlling a digital input	L+ (-48 V)
Switching capacity of the outputs	Yes
<ul style="list-style-type: none"> <li>● on lamp load, max.</li> </ul>	5 W
<b>Load resistance range</b>	
<ul style="list-style-type: none"> <li>● lower limit</li> </ul>	48 Ω
<ul style="list-style-type: none"> <li>● upper limit</li> </ul>	4 kΩ
<b>Output voltage</b>	
<ul style="list-style-type: none"> <li>● for signal "1", min.</li> </ul>	L+ (-0.8 V)
<b>Output current</b>	
<ul style="list-style-type: none"> <li>● for signal "1" rated value</li> </ul>	500 mA
<ul style="list-style-type: none"> <li>● for signal "1" permissible range, min.</li> </ul>	5 mA
<ul style="list-style-type: none"> <li>● for signal "1" permissible range, max.</li> </ul>	0.6 A
<ul style="list-style-type: none"> <li>● for signal "1" minimum load current</li> </ul>	5 mA
<ul style="list-style-type: none"> <li>● for signal "0" residual current, max.</li> </ul>	0.5 mA
<b>Parallel switching of two outputs</b>	
<ul style="list-style-type: none"> <li>● for uprating</li> </ul>	No
<ul style="list-style-type: none"> <li>● for redundant control of a load</li> </ul>	Yes
<b>Switching frequency</b>	
<ul style="list-style-type: none"> <li>● with resistive load, max.</li> </ul>	100 Hz
<ul style="list-style-type: none"> <li>● with inductive load, max.</li> </ul>	0.5 Hz

<ul style="list-style-type: none"> <li>• on lamp load, max.</li> </ul>	100 Hz
<ul style="list-style-type: none"> <li>• of the pulse outputs, with resistive load, max.</li> </ul>	2.5 kHz
<b>Total current of the outputs (per group)</b>	
horizontal installation	
— up to 40 °C, max.	2 A
— up to 60 °C, max.	1.5 A
vertical installation	
— up to 40 °C, max.	1.5 A
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	1 000 m
<ul style="list-style-type: none"> <li>• unshielded, max.</li> </ul>	600 m
<b>Analog inputs</b>	
Number of analog inputs	0
integrated channels (AI)	0
<b>Analog outputs</b>	
Number of analog outputs	0
integrated channels (AO)	0
<b>Encoder</b>	
Connectable encoders	
<ul style="list-style-type: none"> <li>• 2-wire sensor</li> </ul>	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
<b>Interfaces</b>	
Number of industrial Ethernet interfaces	0
Number of PROFINET interfaces	0
Number of RS 485 interfaces	1; MPI
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> </ul>	Yes
<ul style="list-style-type: none"> <li>• Output current of the interface, max.</li> </ul>	200 mA
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>• MPI</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• PROFIBUS DP master</li> </ul>	No
<ul style="list-style-type: none"> <li>• PROFIBUS DP slave</li> </ul>	No
<ul style="list-style-type: none"> <li>• Point-to-point connection</li> </ul>	No
<b>MPI</b>	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	187.5 kbit/s
<b>Services</b>	
— PG/OP communication	Yes
— Routing	No
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes; Only server, configured on one side
— S7 communication, as client	No; but via CP and loadable FB
— S7 communication, as server	Yes
<b>Protocols</b>	
PROFIsafe	No
<b>communication functions / header</b>	
PG/OP communication	Yes
Data record routing	No
<b>Global data communication</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Number of GD loops, max.</li> </ul>	8
<ul style="list-style-type: none"> <li>• Number of GD packets, max.</li> </ul>	8
<ul style="list-style-type: none"> <li>• Number of GD packets, transmitter, max.</li> </ul>	8
<ul style="list-style-type: none"> <li>• Number of GD packets, receiver, max.</li> </ul>	8
<ul style="list-style-type: none"> <li>• Size of GD packets, max.</li> </ul>	22 byte
<ul style="list-style-type: none"> <li>• Size of GD packet (of which consistent), max.</li> </ul>	22 byte
<b>S7 basic communication</b>	

<ul style="list-style-type: none"> <li>supported</li> <li>User data per job, max.</li> <li>User data per job (of which consistent), max.</li> </ul>	Yes 76 byte 76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
<b>S7 communication</b>	
<ul style="list-style-type: none"> <li>supported</li> <li>as server</li> <li>as client</li> <li>User data per job, max.</li> <li>User data per job (of which consistent), max.</li> </ul>	Yes Yes Yes; Via CP and loadable FB 180 byte; (with PUT/GET) 240 byte; as server
<b>S5 compatible communication</b>	
<ul style="list-style-type: none"> <li>supported</li> </ul>	Yes; via CP and loadable FC
<b>Number of connections</b>	
<ul style="list-style-type: none"> <li>overall</li> <li>usable for PG communication               <ul style="list-style-type: none"> <li>reserved for PG communication</li> <li>adjustable for PG communication, min.</li> <li>adjustable for PG communication, max.</li> </ul> </li> <li>usable for OP communication               <ul style="list-style-type: none"> <li>reserved for OP communication</li> <li>adjustable for OP communication, min.</li> <li>adjustable for OP communication, max.</li> </ul> </li> <li>usable for S7 basic communication               <ul style="list-style-type: none"> <li>reserved for S7 basic communication</li> <li>adjustable for S7 basic communication, min.</li> <li>adjustable for S7 basic communication, max.</li> </ul> </li> </ul>	6 5 1 1 5 5 1 1 5 5 1 1 5 2 0 0 2
<b>S7 message functions</b>	
Number of login stations for message functions, max.	6; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
<b>Test commissioning functions</b>	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
<b>Status/control</b>	
<ul style="list-style-type: none"> <li>Status/control variable</li> <li>Variables</li> <li>Number of variables, max.               <ul style="list-style-type: none"> <li>of which status variables, max.</li> <li>of which control variables, max.</li> </ul> </li> </ul>	Yes Inputs, outputs, memory bits, DB, times, counters 30 30 14
<b>Forcing</b>	
<ul style="list-style-type: none"> <li>Forcing</li> <li>Forcing, variables</li> <li>Number of variables, max.</li> </ul>	Yes Inputs, outputs 10
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>present</li> <li>Number of entries, max.               <ul style="list-style-type: none"> <li>adjustable</li> <li>of which powerfail-proof</li> </ul> </li> <li>Number of entries readable in RUN, max.               <ul style="list-style-type: none"> <li>adjustable</li> <li>preset</li> </ul> </li> </ul>	Yes 500 No 100; Only the last 100 entries are retained 499 Yes; From 10 to 499 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> <li>Status indicator digital output (green)</li> </ul>	Yes Yes
<b>Integrated Functions</b>	
Frequency measurement	Yes
<ul style="list-style-type: none"> <li>Number of frequency meters</li> </ul>	2; up to 10 kHz (see "Technological Functions" manual)
controlled positioning	No

integrated function blocks (closed-loop control)	No
PID controller	No
Number of pulse outputs	2; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz
<b>Potential separation</b>	
Potential separation digital inputs	
• Potential separation digital inputs	Yes
• between the channels	No
• between the channels and backplane bus	Yes
Potential separation digital outputs	
• Potential separation digital outputs	Yes
• between the channels	No
• between the channels and backplane bus	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
configuration / programming / header	
• 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
— GRAPH	Yes
— HiGraph®	Yes
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
<b>Dimensions</b>	
Width	80 mm
Height	125 mm
Depth	130 mm
<b>Weights</b>	
Weight, approx.	410 g
<b>last modified:</b>	7/28/2021 