



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	
Product type designation	CPU 312C
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 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
$I^2t$	0.7 A <sup>2</sup> ·s
Digital outputs	
• from load voltage L+, max.	25 mA
Power loss	
Power loss, typ.	8 W
Memory	
Work memory	
• integrated	64 kbyte
• expandable	No
Load memory	
• Plug-in (MMC)	Yes
• Plug-in (MMC), max.	8 Mbyte
• Data management on MMC (after last programming), min.	10 a
Backup	
• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	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.
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
Retentivity	
— adjustable	Yes
— 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
Retentivity	
— adjustable	Yes
— preset	No retentivity
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	64 kbyte
Flag	
• Size, max.	256 byte
• Retentivity available	Yes; MB 0 to MB 255

<ul style="list-style-type: none"> <li>• Retentivity preset</li> </ul>	MB 0 to MB 15
<ul style="list-style-type: none"> <li>• Number of clock memories</li> </ul>	8; 1 memory byte
<b>Data blocks</b>	
<ul style="list-style-type: none"> <li>• Retentivity adjustable</li> </ul>	Yes; via non-retain property on DB
<ul style="list-style-type: none"> <li>• Retentivity preset</li> </ul>	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> </ul>	1 024 byte
<ul style="list-style-type: none"> <li>• Outputs</li> </ul>	1 024 byte
<b>of which distributed</b>	
<ul style="list-style-type: none"> <li>— Inputs</li> </ul>	none
<ul style="list-style-type: none"> <li>— Outputs</li> </ul>	none
<b>Process image</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> </ul>	1 024 byte
<ul style="list-style-type: none"> <li>• Outputs</li> </ul>	1 024 byte
<ul style="list-style-type: none"> <li>• Inputs, adjustable</li> </ul>	1 024 byte
<ul style="list-style-type: none"> <li>• Outputs, adjustable</li> </ul>	1 024 byte
<ul style="list-style-type: none"> <li>• Inputs, default</li> </ul>	128 byte
<ul style="list-style-type: none"> <li>• Outputs, default</li> </ul>	128 byte
<b>Default addresses of the integrated channels</b>	
<ul style="list-style-type: none"> <li>— Digital inputs</li> </ul>	124.0 to 125.1
<ul style="list-style-type: none"> <li>— Digital outputs</li> </ul>	124.0 to 124.5
<b>Digital channels</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> </ul>	266
<ul style="list-style-type: none"> <li>— of which central</li> </ul>	266
<ul style="list-style-type: none"> <li>• Outputs</li> </ul>	262
<ul style="list-style-type: none"> <li>— of which central</li> </ul>	262
<b>Analog channels</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> </ul>	64
<ul style="list-style-type: none"> <li>— of which central</li> </ul>	64
<ul style="list-style-type: none"> <li>• Outputs</li> </ul>	64
<ul style="list-style-type: none"> <li>— of which central</li> </ul>	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> </ul>	none
<ul style="list-style-type: none"> <li>• via CP</li> </ul>	4
<b>Number of operable FMs and CPs (recommended)</b>	
<ul style="list-style-type: none"> <li>• FM</li> </ul>	8
<ul style="list-style-type: none"> <li>• CP, PtP</li> </ul>	8
<ul style="list-style-type: none"> <li>• CP, LAN</li> </ul>	4
<b>Rack</b>	
<ul style="list-style-type: none"> <li>• Racks, max.</li> </ul>	1
<ul style="list-style-type: none"> <li>• Modules per rack, max.</li> </ul>	8
<b>Time of day</b>	
<b>Clock</b>	
<ul style="list-style-type: none"> <li>• Software clock</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• retentive and synchronizable</li> </ul>	No; Buffered: No, Can be synchronized: Yes
<ul style="list-style-type: none"> <li>• Deviation per day, max.</li> </ul>	10 s; Typ.: 2 s
<ul style="list-style-type: none"> <li>• Behavior of the clock following POWER-ON</li> </ul>	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> </ul>	1
<ul style="list-style-type: none"> <li>• Number/Number range</li> </ul>	0
<ul style="list-style-type: none"> <li>• Range of values</li> </ul>	0 to 2 <sup>31</sup> hours (when using SFC 101)
<ul style="list-style-type: none"> <li>• Granularity</li> </ul>	1 h
<ul style="list-style-type: none"> <li>• retentive</li> </ul>	Yes; Must be restarted at each restart
<b>Clock synchronization</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	Yes

• to MPI, master	Yes
• on MPI, device	Yes
• in AS, master	Yes
• in AS, device	No
<b>Digital inputs</b>	
Number of digital inputs	10
• of which inputs usable for technological functions	8
integrated channels (DI)	10
Input characteristic curve in accordance with IEC 61131, type 1	Yes
<b>Number of simultaneously controllable inputs</b>	
horizontal installation	
— up to 40 °C, max.	10
— up to 60 °C, max.	5
vertical installation	
— up to 40 °C, max.	5
<b>Input voltage</b>	
• Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+15 to +30 V
<b>Input current</b>	
• for signal "1", typ.	8 mA
<b>Input delay (for rated value of input voltage)</b>	
for standard inputs	
— parameterizable	Yes; 0.1 / 0.3 / 3 / 15 ms (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
for technological functions	
— at "0" to "1", max.	48 µs; Minimum pulse width/minimum pause between pulses at maximum counting frequency
<b>Cable length</b>	
• shielded, max.	1 000 m; 100 m for technological functions
• unshielded, max.	600 m; for technological functions: No
for technological functions	
— shielded, max.	100 m; at maximum count frequency
— unshielded, max.	not allowed
<b>Digital outputs</b>	
Number of digital outputs	6
• of which high-speed outputs	2; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	6
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
<b>Switching capacity of the outputs</b>	
• on lamp load, max.	5 W
<b>Load resistance range</b>	
• lower limit	48 Ω
• upper limit	4 kΩ
<b>Output voltage</b>	
• for signal "1", min.	L+ (-0.8 V)
<b>Output current</b>	
• 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
<b>Parallel switching of two outputs</b>	
• for uprating	No
• for redundant control of a load	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>	
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 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
Interface types	
<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
Protocols	
<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 device</li> </ul>	No
<ul style="list-style-type: none"> <li>• Point-to-point connection</li> </ul>	No
MPI	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	187.5 kbit/s
Services	
— 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
Global data communication	
<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 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>	

Counter	
<ul style="list-style-type: none"> <li>• Number of counters</li> <li>• Counting frequency, max.</li> </ul>	2; See "Technological Functions" manual 10 kHz
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	
<ul style="list-style-type: none"> <li>• Potential separation digital inputs</li> <li>• between the channels</li> <li>• between the channels and backplane bus</li> </ul>	Yes No Yes
Potential separation digital outputs	
<ul style="list-style-type: none"> <li>• Potential separation digital outputs</li> <li>• between the channels</li> <li>• between the channels and backplane bus</li> </ul>	Yes No Yes
<b>Isolation</b>	
Isolation tested with	600 V DC
<b>Ambient conditions</b>	
Ambient temperature during operation	
<ul style="list-style-type: none"> <li>• min.</li> <li>• max.</li> </ul>	0 °C 60 °C
<b>configuration / header</b>	
Configuration software	
<ul style="list-style-type: none"> <li>• STEP 7</li> <li>• STEP 7 Lite</li> </ul>	Yes; STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203 No
configuration / programming / header	
<ul style="list-style-type: none"> <li>• Command set</li> <li>• Nesting levels</li> <li>• System functions (SFC)</li> <li>• System function blocks (SFB)</li> </ul>	see instruction list 8 see instruction list see instruction list
Programming language	
<ul style="list-style-type: none"> <li>— LAD</li> <li>— FBD</li> <li>— STL</li> <li>— SCL</li> <li>— GRAPH</li> <li>— HiGraph®</li> </ul>	Yes Yes Yes Yes Yes Yes
Know-how protection	
<ul style="list-style-type: none"> <li>• User program protection/password protection</li> <li>• Block encryption</li> </ul>	Yes 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>	4/25/2024 