



SIMATIC S7-300, CPU 313C-2 DP Compact CPU with MPI, 16 DI/16 DO, 3 high-speed counters (30 kHz), integrated DP interface, Integr. power supply 24 V DC, work memory 128 KB, Front connector (1x 40-pole) and Micro Memory Card required

General information	
Product type designation	CPU 313C-2
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	
— load voltage / at digital input / at DC / rated value	24 V
— Reverse polarity protection	Yes
Digital outputs	
— Rated value (DC)	24 V
— Reverse polarity protection	No
Input current	
Current consumption (rated value)	800 mA
Current consumption (in no-load operation), typ.	110 mA
Inrush current, typ.	5 A
$I^2t$	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.	9 W
Memory	
Work memory	
• integrated	128 kbyte
• expandable	No
Load memory	
• Plug-in (MMC)	Yes
• Plug-in (MMC), max.	8 Mbyte

<ul style="list-style-type: none"> <li>Data management on MMC (after last programming), min.</li> </ul>	10 a
<b>Backup</b>	
<ul style="list-style-type: none"> <li>present</li> <li>without battery</li> </ul>	Yes; Guaranteed by MMC (maintenance-free) Yes; Program and data
<b>CPU processing times</b>	
for bit operations, typ.	0.07 $\mu$ s
for word operations, typ.	0.15 $\mu$ s
for fixed point arithmetic, typ.	0.2 $\mu$ s
for floating point arithmetic, typ.	0.72 $\mu$ s
<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 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 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 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 64 kbyte 1; OB 1 1; OB 10 2; OB 20, 21 4; OB 32, 33, 34, 35 1; OB 40 3; OB 55, 56, 57 1; OB 100 5; OB 80, 82, 85, 86, 87 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 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>	
<ul style="list-style-type: none"> <li>adjustable</li> <li>preset</li> </ul>	Yes Z 0 to Z 7
<b>Counting range</b>	
<ul style="list-style-type: none"> <li>lower limit</li> <li>upper limit</li> </ul>	0 999
<b>IEC counter</b>	
<ul style="list-style-type: none"> <li>present</li> <li>Type</li> <li>Number</li> </ul>	Yes SFB Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
<ul style="list-style-type: none"> <li>Number</li> </ul>	256
<b>Retentivity</b>	
<ul style="list-style-type: none"> <li>adjustable</li> <li>preset</li> </ul>	Yes No retentivity
<b>Time range</b>	
<ul style="list-style-type: none"> <li>lower limit</li> <li>upper limit</li> </ul>	10 ms 9 990 s
<b>IEC timer</b>	
<ul style="list-style-type: none"> <li>present</li> <li>Type</li> </ul>	Yes SFB

• Number	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
Retentive data area (incl. timers, counters, flags), max.	64 kbyte
<b>Flag</b>	
• 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
<b>Data blocks</b>	
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
<b>Local data</b>	
• per priority class, max.	32 kbyte; Max. 2048 bytes per block
<b>Address area</b>	
<b>I/O address area</b>	
• Inputs	2 048 byte
• Outputs	2 048 byte
of which distributed	
— Inputs	2 030 byte
— Outputs	2 030 byte
<b>Process image</b>	
• 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
<b>Default addresses of the integrated channels</b>	
— Digital inputs	124.0 to 125.7
— Digital outputs	124.0 to 125.7
<b>Digital channels</b>	
• Inputs	16 256
— of which central	1 008
• Outputs	16 256
— of which central	1 008
<b>Analog channels</b>	
• Inputs	1 015
— of which central	248
• Outputs	1 015
— of which central	248
<b>Hardware configuration</b>	
Number of expansion units, max.	3
<b>Number of DP masters</b>	
• integrated	1
• via CP	4
<b>Number of operable FMs and CPs (recommended)</b>	
• FM	8
• CP, PtP	8
• CP, LAN	6
<b>Rack</b>	
• Racks, max.	4
• Modules per rack, max.	8; In rack 3 max. 7
<b>Time of day</b>	
<b>Clock</b>	
• Hardware clock (real-time)	Yes
• retentive and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature
• Deviation per day, max.	10 s; Typ.: 2 s
• Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	the clock continues at the time of day it had when power was switched off

<b>Operating hours counter</b>	
• Number	1
• Number/Number range	0
• Range of values	0 to 2 <sup>31</sup> hours (when using SFC 101)
• Granularity	1 h
• retentive	Yes; Must be restarted at each restart
<b>Clock synchronization</b>	
• supported	Yes
• to MPI, master	Yes
• on MPI, device	Yes
• to DP, master	Yes; With DP slave only slave clock
• on DP, device	Yes
• in AS, master	Yes
• in AS, device	No
<b>Digital inputs</b>	
Number of digital inputs	16
• of which inputs usable for technological functions	12
integrated channels (DI)	16
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.	16
— up to 60 °C, max.	8
vertical installation	
— up to 40 °C, max.	8
<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.	16 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	16
• of which high-speed outputs	4; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	16
Short-circuit protection	
• 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>	
• 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
<b>Total current of the outputs (per group)</b>	
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
<b>Cable length</b>	
• shielded, max.	1 000 m
• unshielded, max.	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	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
<b>Interfaces</b>	
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
Interface types	
• RS 485	Yes
• Output current of the interface, max.	200 mA
Protocols	
• MPI	Yes
• PROFIBUS DP master	No
• PROFIBUS DP device	No
• Point-to-point connection	No
MPI	
• Transmission rate, max.	187.5 kbit/s
Services	
— 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 device	Yes
<b>PROFIBUS DP master</b>	
• Transmission rate, max.	12 Mbit/s
• max. number of DP devices	124
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	Yes; 1 blocks only
— S7 communication	Yes; Yes (only server; connection configured at one end)
— S7 communication, as client	No
— S7 communication, as server	Yes
— Equidistance	Yes
— Isochronous mode	No
— SYNC/FREEZE	Yes
— activation/deactivation of DP devices	Yes
— max. number of DP devices that can be activated/deactivated at the same time	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 device</b>	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
<b>2nd interface / PROFIBUS DP device / header</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; Yes (only server; connection configured at one end)
— 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>	
<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> </ul>	Yes
<ul style="list-style-type: none"> <li>• User data per job, max.</li> </ul>	76 byte
<ul style="list-style-type: none"> <li>• User data per job (of which consistent), max.</li> </ul>	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> </ul>	Yes
<ul style="list-style-type: none"> <li>• as server</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• as client</li> </ul>	Yes; Via CP and loadable FB
<ul style="list-style-type: none"> <li>• User data per job, max.</li> </ul>	180 kbyte; With PUT/GET
<ul style="list-style-type: none"> <li>• User data per job (of which consistent), max.</li> </ul>	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> </ul>	8
<ul style="list-style-type: none"> <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> </ul>	7 1 1 7
<ul style="list-style-type: none"> <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> </ul>	7 1 1 7
<ul style="list-style-type: none"> <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>	4 0 0 4
<ul style="list-style-type: none"> <li>• usable for routing</li> </ul>	4; max.
<b>S7 message functions</b>	
Number of login stations for message functions, max.	8; 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
<ul style="list-style-type: none"> <li>— of which status variables, max.</li> </ul>	30
<ul style="list-style-type: none"> <li>— of which control variables, max.</li> </ul>	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
<ul style="list-style-type: none"> <li>— adjustable</li> </ul>	No
<ul style="list-style-type: none"> <li>— of which powerfail-proof</li> </ul>	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>	
• can be read out	Yes
<b>Interrupts/diagnostics/status information</b>	
<b>Diagnostics indication LED</b>	
• Status indicator digital input (green)	Yes
• Status indicator digital output (green)	Yes
<b>Integrated Functions</b>	
<b>Counter</b>	
• Number of counters	3; See "Technological Functions" manual
• Counting frequency, max.	30 kHz
<b>Frequency measurement</b>	
• Number of frequency meters	3; up to 30 kHz (see "Technological Functions" manual)
<b>controlled positioning</b>	
	No
<b>integrated function blocks (closed-loop control)</b>	
	Yes; PID controller (see "Technological Functions" manual)
<b>PID controller</b>	
	Yes
<b>Number of pulse outputs</b>	
	3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
<b>Limit frequency (pulse)</b>	
	2.5 kHz
<b>Potential separation</b>	
<b>Potential separation digital inputs</b>	
• Potential separation digital inputs	Yes
• between the channels	No
• between the channels and backplane bus	Yes
<b>Potential separation digital outputs</b>	
• Potential separation digital outputs	Yes
• between the channels	Yes
• between the channels, in groups of	8
• between the channels and backplane bus	Yes
<b>Isolation</b>	
<b>Isolation tested with</b>	
	600 V DC
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
• min.	0 °C
• max.	60 °C
<b>configuration / header</b>	
<b>Configuration software</b>	
• 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
<b>Programming language</b>	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
<b>Know-how protection</b>	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
<b>Dimensions</b>	
<b>Width</b>	
	80 mm
<b>Height</b>	
	125 mm
<b>Depth</b>	
	130 mm

**Weights**

Weight, approx. 500 g

**Classifications**

	Version	Classification
eClass	14	27-24-22-07
eClass	12	27-24-22-07
eClass	9.1	27-24-22-07
eClass	9	27-24-22-07
eClass	8	27-24-22-07
eClass	7.1	27-24-22-07
eClass	6	27-24-22-07
ETIM	9	EC000236
ETIM	8	EC000236
ETIM	7	EC000236
IDEA	4	3565
UNSPSC	15	32-15-17-05

**Approvals / Certificates**

General Product Approval

EMV

[Manufacturer Declaration](#)



For use in hazardous locations



FM



[Miscellaneous](#)

For use in hazardous locations

Marine / Shipping

[CCC-Ex](#)



Marine / Shipping

Industrial Communication



[CCS \(China Classification Society\)](#)



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