



spare part SIMATIC S7-300, CPU 313C-2 DP compact CPU with MPI, 16 DI/16 DO, 3 high-speed counters (30 kHz), integrated DP interface, integrated 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	
— 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)	800 mA
Current consumption (in no-load operation), typ.	110 mA
Inrush current, typ.	5 A
I ² t	0.7 A ² ·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

<ul style="list-style-type: none"> • Plug-in (MMC), max. 	8 Mbyte
<ul style="list-style-type: none"> • Data management on MMC (after last programming), min. 	10 a
Backup	
<ul style="list-style-type: none"> • present 	Yes; Guaranteed by MMC (maintenance-free)
<ul style="list-style-type: none"> • without battery 	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.07 µs
for word operations, typ.	0.15 µs
for fixed point arithmetic, typ.	0.2 µs
for floating point arithmetic, typ.	0.72 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	
<ul style="list-style-type: none"> • Number, max. 	1 024; Number range: 1 to 16000
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
FB	
<ul style="list-style-type: none"> • Number, max. 	1 024; Number range: 0 to 7999
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
FC	
<ul style="list-style-type: none"> • Number, max. 	1 024; Number range: 0 to 7999
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
OB	
<ul style="list-style-type: none"> • Number, max. 	see instruction list
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
<ul style="list-style-type: none"> • Number of free cycle OBs 	1; OB 1
<ul style="list-style-type: none"> • Number of time alarm OBs 	1; OB 10
<ul style="list-style-type: none"> • Number of delay alarm OBs 	2; OB 20, 21
<ul style="list-style-type: none"> • Number of cyclic interrupt OBs 	4; OB 32, 33, 34, 35
<ul style="list-style-type: none"> • Number of process alarm OBs 	1; OB 40
<ul style="list-style-type: none"> • Number of DPV1 alarm OBs 	3; OB 55, 56, 57
<ul style="list-style-type: none"> • Number of startup OBs 	1; OB 100
<ul style="list-style-type: none"> • Number of asynchronous error OBs 	5; OB 80, 82, 85, 86, 87
<ul style="list-style-type: none"> • Number of synchronous error OBs 	2; OB 121, 122
Nesting depth	
<ul style="list-style-type: none"> • per priority class 	16
<ul style="list-style-type: none"> • additional within an error OB 	4
Counters, timers and their retentivity	
S7 counter	
<ul style="list-style-type: none"> • Number 	256
Retentivity	
— adjustable	Yes
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
IEC counter	
<ul style="list-style-type: none"> • present 	Yes
<ul style="list-style-type: none"> • Type 	SFB
<ul style="list-style-type: none"> • Number 	Unlimited (limited only by RAM capacity)
S7 times	
<ul style="list-style-type: none"> • 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
• 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	2 030 byte
— Outputs	2 030 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
Digital channels	
• Inputs	16 256
— of which central	1 008
• Outputs	16 256
— of which central	1 008
Analog channels	
• Inputs	1 015
— of which central	248
• Outputs	1 015
— of which central	248
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	6
Rack	
• Racks, max.	4
• Modules per rack, max.	8; In rack 3 max. 7
Time of day	
Clock	
• 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

<ul style="list-style-type: none"> • Behavior of the clock following expiry of backup period 	the clock continues at the time of day it had when power was switched off
Operating hours counter	
<ul style="list-style-type: none"> • Number • Number/Number range • Range of values • Granularity • retentive 	<p>1</p> <p>0</p> <p>0 to 2³¹ hours (when using SFC 101)</p> <p>1 h</p> <p>Yes; Must be restarted at each restart</p>
Clock synchronization	
<ul style="list-style-type: none"> • supported • to MPI, master • on MPI, device • to DP, master • on DP, device • in AS, master • in AS, device 	<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>
Digital inputs	
Number of digital inputs	16
<ul style="list-style-type: none"> • of which inputs usable for technological functions 	12
integrated channels (DI)	16
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
horizontal installation	
— up to 40 °C, max.	16
— up to 60 °C, max.	8
vertical installation	
— up to 40 °C, max.	8
Input voltage	
<ul style="list-style-type: none"> • Rated value (DC) • for signal "0" • for signal "1" 	<p>24 V</p> <p>-3 to +5V</p> <p>+15 to +30 V</p>
Input current	
<ul style="list-style-type: none"> • for signal "1", typ. 	8 mA
Input delay (for rated value of input voltage)	
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
Cable length	
<ul style="list-style-type: none"> • shielded, max. • unshielded, max. 	<p>1 000 m; 100 m for technological functions</p> <p>600 m; for technological functions: No</p>
for technological functions	
— shielded, max.	100 m; at maximum count frequency
— unshielded, max.	not allowed
Digital outputs	
Number of digital outputs	16
<ul style="list-style-type: none"> • 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	Yes; Clocked electronically
<ul style="list-style-type: none"> • Response threshold, typ. 	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
<ul style="list-style-type: none"> • on lamp load, max. 	5 W
Load resistance range	
<ul style="list-style-type: none"> • lower limit • upper limit 	<p>48 Ω</p> <p>4 kΩ</p>

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	0
integrated channels (AI)	0
Analog outputs	
integrated channels (AO)	0
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
Interfaces	
Number of PROFINET interfaces	0
Number of RS 485 interfaces	2; MPI and PROFIBUS DP
Number of RS 422 interfaces	0
1. Interface	
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

2. Interface

Interface type	Integrated RS 485 interface
Isolated	Yes
Interface types	
<ul style="list-style-type: none"> • RS 485 • Output current of the interface, max. 	<p>Yes</p> <p>200 mA</p>
Protocols	
<ul style="list-style-type: none"> • MPI • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master • PROFIBUS DP device 	<p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>Yes</p> <p>Yes</p>
PROFIBUS DP master	
<ul style="list-style-type: none"> • Transmission rate, max. • max. number of DP devices 	<p>12 Mbit/s</p> <p>124</p>
Services	
<ul style="list-style-type: none"> — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication — S7 communication, as client — S7 communication, as server — Equidistance — Isochronous mode — SYNC/FREEZE — activation/deactivation of DP devices — max. number of DP devices that can be activated/deactivated at the same time — Direct data exchange (slave-to-slave communication) — DPV1 	<p>Yes</p> <p>Yes</p> <p>No</p> <p>Yes; I blocks only</p> <p>Yes; Yes (only server; connection configured at one end)</p> <p>No</p> <p>Yes</p> <p>Yes</p> <p>No</p> <p>Yes</p> <p>Yes</p> <p>8</p> <p>Yes; as subscriber</p> <p>Yes</p>
Address area	
<ul style="list-style-type: none"> — Inputs, max. — Outputs, max. 	<p>2 kbyte</p> <p>2 kbyte</p>
User data per DP device	
<ul style="list-style-type: none"> — Inputs, max. — Outputs, max. 	<p>244 byte</p> <p>244 byte</p>
PROFIBUS DP device	
<ul style="list-style-type: none"> • GSD file • Transmission rate, max. • automatic baud rate search • Address area, max. • User data per address area, max. 	<p>The latest GSD file is available on the Internet (http://www.siemens.com/profibus-gsd)</p> <p>12 Mbit/s</p> <p>Yes; only with passive interface</p> <p>32</p> <p>32 byte</p>
Services	
<ul style="list-style-type: none"> — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication — S7 communication, as client — S7 communication, as server — Direct data exchange (slave-to-slave communication) — DPV1 	<p>Yes</p> <p>Yes; Only with active interface</p> <p>No</p> <p>No</p> <p>Yes; Yes (only server; connection configured at one end)</p> <p>No</p> <p>Yes</p> <p>Yes</p> <p>No</p>
Transfer memory	
<ul style="list-style-type: none"> — Inputs — Outputs 	<p>244 byte</p> <p>244 byte</p>

Protocols	
PROFIsafe	No
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> Number of GD loops, max. 	8
<ul style="list-style-type: none"> Number of GD packets, max. 	8
<ul style="list-style-type: none"> Number of GD packets, transmitter, max. 	8
<ul style="list-style-type: none"> Number of GD packets, receiver, max. 	8
<ul style="list-style-type: none"> Size of GD packets, max. 	22 byte
<ul style="list-style-type: none"> Size of GD packet (of which consistent), max. 	22 byte
S7 basic communication	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> User data per job, max. 	76 byte
<ul style="list-style-type: none"> 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)
S7 communication	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> as server 	Yes
<ul style="list-style-type: none"> as client 	Yes; Via CP and loadable FB
<ul style="list-style-type: none"> User data per job, max. 	180 kbyte; With PUT/GET
<ul style="list-style-type: none"> User data per job (of which consistent), max. 	240 byte; as server
S5 compatible communication	
<ul style="list-style-type: none"> supported 	Yes; via CP and loadable FC
Number of connections	
<ul style="list-style-type: none"> overall 	8
<ul style="list-style-type: none"> usable for PG communication <ul style="list-style-type: none"> reserved for PG communication adjustable for PG communication, min. adjustable for PG communication, max. 	7 1 1 7
<ul style="list-style-type: none"> usable for OP communication <ul style="list-style-type: none"> reserved for OP communication adjustable for OP communication, min. adjustable for OP communication, max. 	7 1 1 7
<ul style="list-style-type: none"> usable for S7 basic communication <ul style="list-style-type: none"> reserved for S7 basic communication adjustable for S7 basic communication, min. adjustable for S7 basic communication, max. 	4 0 0 4
<ul style="list-style-type: none"> usable for routing 	4; max.
S7 message functions	
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
Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
Status/control	
<ul style="list-style-type: none"> Status/control variable 	Yes
<ul style="list-style-type: none"> Variables 	Inputs, outputs, memory bits, DB, times, counters
<ul style="list-style-type: none"> Number of variables, max. <ul style="list-style-type: none"> of which status variables, max. of which control variables, max. 	30 30 14
Forcing	
<ul style="list-style-type: none"> Forcing 	Yes
<ul style="list-style-type: none"> Forcing, variables 	Inputs, outputs

• Number of variables, max.	10
Diagnostic buffer	
• present	Yes
• Number of entries, max.	500
— adjustable	No
— of which powerfail-proof	100; Only the last 100 entries are retained
• Number of entries readable in RUN, max.	499
— adjustable	Yes; From 10 to 499
— preset	10
Service data	
• can be read out	Yes
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• Status indicator digital input (green)	Yes
• Status indicator digital output (green)	Yes
Integrated Functions	
Counter	
• Number of counters	3; See "Technological Functions" manual
• Counting frequency, max.	30 kHz
Frequency measurement	
• Number of frequency meters	3; up to 30 kHz (see "Technological Functions" manual)
controlled positioning	No
integrated function blocks (closed-loop control)	Yes; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz
Potential separation	
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	Yes
• between the channels, in groups of	8
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	600 V DC
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Configuration	
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
Programming	
• Command set	see instruction list
• Nesting levels	8
• System functions (SFC)	see instruction list
• System function blocks (SFB)	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes

— GRAPH	Yes
— HiGraph®	Yes
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy

Dimensions	
Width	80 mm
Height	125 mm
Depth	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	10	EC000236
	ETIM	9	EC000236
	ETIM	8	EC000236
	ETIM	7	EC000236
	IDEA	4	3565
	UNSPSC	15	32-15-17-05




Approvals / Certificates





General Product Approval

[Miscellaneous](#) [Manufacturer Declaration](#)






General Product Approval	EMV	For use in hazardous locations
	China RoHS	Manufacturer Declaration
		
		FM

For use in hazardous locations	Maritime application
	
	
	
Miscellaneous	CCC-Ex

Maritime application







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

other Industrial Communication



Profibus



Profibus

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