

SIPLUS S7-300 CPU CPU 313C-2DP with conformal coating according to EN 50155 T1 Cat 1 CI A/ B based on 6ES7313-6CG04-0AB0 . 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



Figure similar

General information	
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)	
<ul style="list-style-type: none"> <li>24 V DC</li> </ul>	Yes; A power supply according to EN 50155 shall be used
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 inputs	
— Rated value (DC)	24 V

— Reverse polarity protection	Yes
<b>Digital outputs</b>	
— Rated value (DC)	24 V
— Reverse polarity protection	No
<b>Input current</b>	
Current consumption (rated value)	650 mA
Current consumption (in no-load operation), typ.	150 mA
Inrush current, typ.	5 A
$I^2t$	0.7 A <sup>2</sup> ·s
<b>Digital inputs</b>	
• from load voltage L+ (without load), max.	80 mA
<b>Digital outputs</b>	
• from load voltage L+, max.	50 mA
<b>Power loss</b>	
Power loss, typ.	12 W
<b>Memory</b>	
<b>Work memory</b>	
• integrated	128 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	64 kbyte
<b>Load memory</b>	
• Plug-in (MMC)	Yes
• Plug-in (MMC), max.	8 Mbyte
• Data management on MMC (after last programming), min.	10 y
<b>Backup</b>	
• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data
<b>CPU processing times</b>	
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
<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>	
• Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
<b>FB</b>	

• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>FC</b>	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>OB</b>	
• Description	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
<b>Nesting depth</b>	
• per priority class	16
• additional within an error OB	4
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
• Number	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>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
• Number	256
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	255
— preset	No retentivity

<b>Time range</b>	
— lower limit	10 ms
— upper limit	9 990 s
<b>IEC timer</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
retentive data area in total	All, max. 64 KB
<b>Flag</b>	
• Number, 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	1 024 byte
• Outputs	1 024 byte
<b>of which distributed</b>	
— 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	1 016
— of which central	1 016
• Outputs	1 008
— of which central	1 008

Analog channels	
• Inputs	253
— of which central	253
• Outputs	250
— 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	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
• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
Operating hours counter	
• 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
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, master	Yes; With DP slave only slave clock
• to DP, slave	Yes
• in AS, master	Yes
• in AS, slave	No

### Digital inputs

Number of digital inputs	16
<ul style="list-style-type: none"> <li>• of which inputs usable for technological functions</li> </ul>	12
integrated channels (DI)	16
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.	16
— up to 60 °C, max.	8
<b>vertical installation</b>	
— up to 40 °C, max.	8
<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 +30V
<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.	16 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	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
<ul style="list-style-type: none"> <li>• Response threshold, typ.</li> </ul>	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 Ω
• upper limit	4 kΩ
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	
Number of analog outputs	0
integrated channels (AO)	0
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA

Interfaces	
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

1. Interface	
Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA
Protocols	
• MPI	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	No
• Point-to-point connection	No
MPI	
• Transmission rate, max.	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

2. Interface	
Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Protocols	
• MPI	No
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
PROFIBUS DP master	
• Transmission rate, max.	12 Mbit/s
Services	
— PG/OP communication	Yes



— Routing	Yes
— Global data communication	No
— S7 basic communication	Yes; I 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 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; 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

## Communication functions

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> </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 byte; 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.

## 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

• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• Number of variables, max.	30
— of which status variables, max.	30
— of which control variables, max.	14

### Forcing

• Forcing	Yes
• 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
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### Interrupts/diagnostics/status information

#### Diagnostics indication LED

• Status indicator digital input (green)	Yes
• Status indicator digital output (green)	Yes

### Integrated Functions

Number of counters	3; See "Technological Functions" manual
Counting frequency (counter) max.	30 kHz
Frequency measurement	Yes
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

### Permissible potential difference

between different circuits	75 V DC/60 V AC
Between the inputs and MANA (UCM)	8 V DC
between MANA and M internally (UISO)	75 V DC/60 V AC

### Isolation

Isolation tested with	600 V DC
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### Standards, approvals, certificates

CE mark	Yes
UL approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes

### Use in hazardous areas

• ATEX	No
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### Railway application

• EN 50155	Yes; Sections 4, 5 and 12; no further agreements apply; T1, Category 1, Class A/B, EN 50155:2007
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### Ambient conditions

Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	70 °C; = Tmax; the rated temperature range of -25 ... +55 °C (T1) applies for the use on railway vehicles according to EN50155
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m

<ul style="list-style-type: none"> <li>• Ambient air temperature-barometric pressure-altitude</li> </ul>	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
<b>Relative humidity</b>	
<ul style="list-style-type: none"> <li>• With condensation, tested in accordance with IEC 60068-2-38, max.</li> </ul>	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
<b>Resistance</b>	
<b>Use in stationary industrial systems</b>	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
<b>Use on land craft, rail vehicles and special-purpose vehicles</b>	
— to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
— to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 50155 (ST2); *
— to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
<b>Remark</b>	
— Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!
<b>Conformal coating</b>	
<ul style="list-style-type: none"> <li>• Coatings for printed circuit board assemblies acc. to EN 61086</li> </ul>	Yes; Class 2 for high availability
<ul style="list-style-type: none"> <li>• Electronic equipment on rolling stock acc. to EN 50155</li> </ul>	Yes; Class PC2 protective coating acc. to EN 50155:2017
<ul style="list-style-type: none"> <li>• Military testing according to MIL-I-46058C, Amendment 7</li> </ul>	Yes; Discoloration of coating possible during service life
<ul style="list-style-type: none"> <li>• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A</li> </ul>	Yes; Conformal coating, Class A
<b>Configuration</b>	
<b>Configuration software</b>	
<ul style="list-style-type: none"> <li>• STEP 7</li> </ul>	Yes; STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203
<ul style="list-style-type: none"> <li>• STEP 7 Lite</li> </ul>	No
<b>Programming</b>	
<ul style="list-style-type: none"> <li>• Command set</li> </ul>	see instruction list
<ul style="list-style-type: none"> <li>• Nesting levels</li> </ul>	8
<ul style="list-style-type: none"> <li>• System functions (SFC)</li> </ul>	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>	
Width	80 mm
Height	125 mm
Depth	130 mm
<b>Weights</b>	
Weight, approx.	500 g
<b>last modified:</b>	11/28/2018