



SIMATIC S7-300,
 CPU 313C-2DP COMPACT CPU WITH MPI,
 16 DI/16 DO, 3 FAST COUNTERS (30 KHZ),
 INTEGRATED DP INTERFACE,
 INTEGRATED 24V DC POWER SUPPLY,
 128 KBYTE WORKING MEMORY,
 FRONT CONNECTOR (1 X 40PIN) AND MICRO MEMORY
 CARD REQUIRED

General information	
Hardware product version	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	
24 V DC	Yes
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
External protection for supply cables (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
Digital inputs	
Load voltage L+	
Rated value (DC)	24 V
Reverse polarity protection	Yes

Digital outputs	
Load voltage L+	
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 ² ·s
Digital inputs	
from load voltage L+ (without load), max.	80 mA
Digital outputs	
from load voltage L+, max.	50 mA
Power losses	
Power loss, typ.	9 W
Memory	
Work memory	
integrated	128 kbyte
expandable	No
Size of retentive memory for retentive data blocks	64 kbyte
Load memory	
pluggable (MMC)	Yes
pluggable (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.	0.07 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)	1024 ; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB	
Number, max.	1024 ; Number range: 1 to 16000
Size, max.	64 kbyte

FB	
Number, max.	1024 ; Number range: 0 to 7999
Size, max.	64 kbyte
FC	
Number, max.	1024 ; Number range: 0 to 7999
Size, max.	64 kbyte
OB	
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 time interrupt OBs	4 ; OB 32, 33, 34, 35
Number of process alarm OBs	1 ; OB 40
Number of DPV1 alarm OBs	3 ; OB 55, 56, 57
Number of startup OBs	1 ; OB 100
Number of asynchronous error OBs	5 ; OB 80, 82, 85, 86, 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
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

Retentivity	
adjustable	Yes
lower limit	0
upper limit	255
preset	No retentivity
Time range	
lower limit	10 ms
upper limit	9990 s
IEC timer	
present	Yes
Type	SFB
Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area, total	All, max. 64 KB
Flag	
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
Data blocks	
Number, max.	1024 ; Number range: 1 to 16000
Size, max.	64 kbyte
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	2048 byte
Outputs	2048 byte
of which, distributed	
Inputs	2030 byte
Outputs	2030 byte
Process image	
Inputs	2048 byte
Outputs	2048 byte
Inputs, adjustable	2048 byte
Outputs, adjustable	2048 byte

Inputs, default	128 byte
Outputs, default	128 byte
Default addresses of the integrated channels	
Digital outputs	124.01 to 125.7
Digital channels	
Inputs	16256
Outputs	16256
Inputs, of which central	1008
Outputs, of which central	1008
Analog channels	
Inputs	1015
Outputs	1015
Inputs, of which central	248
Outputs, of which central	248
Hardware configuration	
Racks, max.	4
Modules per rack, max.	8 ; In rack 3 max. 7
Expansion devices, max.	3
Number of DP masters	
integrated	1
via CP	4
Number of operable FMs and CPs (recommended)	
FM	8
CP, point-to-point	8
CP, LAN	6
Time of day	
Clock	
Hardware clock (real-time clock)	Yes
battery-backed and synchronizable	Yes
Deviation per day, max.	10 s ; Typ.: 2 s
Backup time	6 wk ; (at 40 °C ambient temperature)
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 ³¹ hours (when using SFC 101)
Granularity	1 hour

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/binary inputs	16
of which, inputs usable for technological functions	12
integrated channels (DI)	16
Input characteristic curve acc. to 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
Technological functions	
shielded, max.	100 m ; at maximum count frequency
Unshielded, max.	not allowed
Standard DI	
shielded, max.	1000 m
Unshielded, max.	600 m
Input voltage	
Rated value, DC	24 V
for signal "0"	-3 to +5 V
for signal "1"	15 to 30 V
Input current	
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 counter/technological functions	
at "0" to "1", max.	16 μ s ; Minimum pulse width/minimum pause between pulses at maximum counting frequency
Cable length	
Cable length, shielded, max.	1000 m ; 100 m for technological functions
Cable length unshielded, max.	600 m ; For technological functions: No
Digital outputs	
Number/binary outputs	16
of which high-speed outputs	4 ; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	16
Functionality/short-circuit strength	Yes ; Clocked electronically
Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
Lamp load, max.	5 W
Load resistance range	
lower limit	48 Ω
upper limit	4 k Ω
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 2 outputs	
for increased power	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
Aggregate current of 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	
Cable length, shielded, max.	1000 m
Cable length unshielded, max.	600 m
Analog inputs	
Integrated channels (AI)	0
Number of analog inputs	0
Analog outputs	
Integrated channels (AO)	0
Number of analog outputs	0
Encoder	
Connectable encoders	
2-wire sensor	Yes
Permissible quiescent current (2-wire sensor), max.	1.5 mA
Interfaces	
Number of USB interfaces	0
Number of parallel interfaces	0
Number of 20 mA interfaces (TTY)	0
Number of RS 232 interfaces	0
Number of RS 422 interfaces	0
Number of other interfaces	0
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
MPI	Yes
DP master	No
DP slave	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 FBs)
S7 communication, as server	Yes
2nd interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
MPI	No
DP master	Yes
DP slave	Yes
PROFINET IO Controller	No
PROFINET IO Device	No
PROFINET CBA	No
DP master	
Transmission rate, max.	12 Mbit/s
Number of DP slaves, max.	124
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 mode support	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
Address area	
Inputs, max.	2 kbyte
Outputs, max.	2 kbyte

User data per DP slave	
Inputs, max.	244 byte
Outputs, max.	244 byte
DP slave	
GSD file	The latest GSD file is available on the Internet (http://www.siemens.com/profibus-gsd)
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
Services	
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
Transfer memory	
Inputs	244 byte
Outputs	244 byte
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	
supported	Yes
Number of GD loops, max.	8
Number of GD packets, max.	8
Number of GD packets, transmitter, max.	8
Number of GD packets, receiver, max.	8
Size of GD packets, max.	22 byte
Size of GD packet (of which consistent), max.	22 byte
S7 basic communication	
supported	Yes
User data per job, max.	76 byte
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	
supported	Yes
as server	Yes
as client	Yes ; Via CP and loadable FB
User data per job, max.	180 kbyte ; With PUT/GET
User data per job (of which consistent), max.	240 byte ; as server
S5-compatible communication	
supported	Yes ; via CP and loadable FC
Number of connections	
overall	8
usable for PG communication	7
reserved for PG communication	1
Adjustable for PG communication, min.	1
Adjustable for PG communication, max.	7
usable for OP communication	7
reserved for OP communication	1
adjustable for OP communication, min.	1
adjustable for OP communication, max.	7
usable for S7 basic communication	4
Reserved for S7 basic communication	0
adjustable for S7 basic communication, min.	0
adjustable for S7 basic communication, max.	4
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	
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
Force, 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 output (green)	Yes
Status indicator digital input (green)	Yes
Integrated Functions	
Number of counters	3 ; See "Technological Functions" manual
Counter 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
Galvanic isolation	
Galvanic isolation digital inputs	
Galvanic isolation digital inputs	Yes
between the channels	No
between the channels and the backplane bus	Yes
Galvanic isolation digital outputs	
Galvanic isolation digital outputs	Yes
between the channels	Yes
between the channels, in groups of	8
between the channels and the backplane bus	Yes
Permissible potential difference	

between different circuits	75 VDC / 60 VAC
Isolation	
Isolation checked with	600 V DC
Ambient conditions	
Operating temperature	
Min.	0 °C
max.	60 °C
Configuration	
Configuration software	
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
Weight	
Weight, approx.	500 g
Status	Jul 31, 2013