SIEMENS

*** SPARE PART*** 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, 64 KBYTE WORKING MEMORY, FRONT CONNECTOR
(1 X 40PIN) AND MICRO MEMORY CARD REQUIRED

General information	
Hardware product version	01
Firmware version	V2.6
Engineering with	
• Programming package	STEP 7 V5.3 SP2 or higher with HW update

Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
permissible range, lower limit (DC)	20.4 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
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
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)	900 mA
Current consumption (in no-load operation), typ.	100 mA
Inrush current, typ.	11 A
I²t	0.7 A²·s
Digital inputs	
• from load voltage L+ (without load), max.	70 mA
Digital outputs	

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● from load voltage L+, max.	100 mA

Power loss

Power loss, typ.	10 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 y

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 bit operations, max.	0.2 µs
for word operations, typ.	0.2 µs
for fixed point arithmetic, typ.	2 µs
for floating point arithmetic, typ.	3 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.	511; Number range: 1 to 511
● Size, max.	16 kbyte

FB

● Number, max.	1 024; Number range: 0 to 2047
● Size, max.	16 kbyte

FC

● Number, max.	1 024; Number range: 0 to 2047
● Size, max.	16 kbyte

OB

● Size, max.	16 kbyte
● Number of free cycle OBs	1; OB 1
● Number of time alarm OBs	1; OB 10
● Number of delay alarm OBs	1; OB 20
● Number of cyclic interrupt OBs	1; OB 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	8
• additional within an error OB	4

Counters, timers and their retentivity

S7 counter	
• Number	256
of which retentive without battery	
— can be set	Yes
— lower limit	0
— upper limit	255
— preset	8
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	255
— preset	8
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
of which retentive without battery	
— adjustable	Yes
— lower limit	0
— upper limit	255
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	255
— 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 in total	all

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.	511; Number range: 1 to 511
• Size, max.	16 kbyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes

Local data

• per priority class, max.	510 byte

Address area

I/O address area

• Inputs	1 kbyte
• Outputs	1 kbyte

of which distributed

— Inputs	1 006 byte; max.
— Outputs	1 006 byte; max.

Process image

• Inputs	128 byte
• Outputs	128 byte

Default addresses of the integrated channels

— Digital inputs	124.0 to 125.7
— Digital outputs	124.0 to 125.7

Digital channels

• Inputs	8 064
— of which central	1 008
• Outputs	8 064
— of which central	1 008

Analog channels

• Inputs	503
— of which central	248
• Outputs	503
— 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, point-to-point	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 clock)	Yes
• retentive and synchronizable	Yes
• Backup time	6 wk
• Deviation per day, max.	10 s
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
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

Digital inputs	
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
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	
• Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+15 to +30V
Input current	
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; 0.1 / 0.3 / 3 / 15 ms
— Rated value	3 ms
for counter/technological functions	
— at "0" to "1", max.	16 µs
Cable length	
• 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
— unshielded, max.	not allowed
Digital outputs	
Number of digital outputs	16
• of which high-speed outputs	4
integrated channels (DO)	16
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
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	
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 industrial Ethernet interfaces	0
Number of RS 485 interfaces	2; MPI and PROFIBUS DP
Number of RS 422 interfaces	0
MPI	
• Cable length, max.	50 m; without repeater

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
Functionality	
• MPI	Yes

● PROFIBUS DP master	No
● PROFIBUS DP slave	No
● Point-to-point connection	No

MPI	
● Number of connections	8
● 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
— S7 communication, as client	No
— 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
Number of connection resources	8

Functionality	
● MPI	No
● PROFINET IO Controller	No
● PROFINET CBA	No
● PROFIBUS DP master	Yes
● PROFIBUS DP slave	Yes
● Point-to-point connection	No

DP master	
● Number of connections, max.	8; For PG/OP communication
● Transmission rate, max.	12 Mbit/s
● Number of DP slaves, max.	32

Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	Yes; I blocks only
— S7 communication	Yes
— S7 communication, as client	No
— S7 communication, as server	Yes
— Equidistance	Yes
— Isochronous mode	No

— SYNC/FREEZE	Yes
— Activation/deactivation of DP slaves	Yes
— Direct data exchange (slave-to-slave communication)	Yes
— DPV1	Yes
Address area	
— Inputs, max.	1 kbyte
— Outputs, max.	1 kbyte
User data per DP slave	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
DP slave	
● Number of connections	8
● GSD file	The latest GSD file is available at: 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
— 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
Global data communication	
● supported	Yes
● Number of GD loops, max.	4
● Number of GD packets, max.	4
● Number of GD packets, transmitter, max.	4
● Number of GD packets, receiver, max.	4

● 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.	64 byte
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
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	20

Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	2
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.	100
— can be set	No

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; 3 channels (see "Technological Functions" manual)
Counting frequency (counter) max.	30 kHz
Frequency measurement	Yes
Number of frequency meters	3; 3 channels up to max. 30 kHz (see "Technological Functions" manual)
controlled positioning	No
integrated function blocks (closed-loop control)	PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	3; 3 channels pulse width modulation up to max. 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

Isolation	
Isolation tested with	600 V DC

Configuration	
Configuration software	
• STEP 7	Yes; V5.3 SP2 with HW update
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
— GRAPH	Yes
— HiGraph®	Yes
Know-how protection	
• User program protection/password protection	Yes

Dimensions	
Width	120 mm
Height	125 mm
Depth	130 mm

Weights	
Weight, approx.	566 g
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