SIEMENS

SIMATIC S7-300, CPU 312C COMPACT CPU WITH MPI, 10 DI/6 DO, 2 FAST COUNTERS (10 KHZ), INTEGRATED 24V DC POWER SUPPLY, 64 KBYTE WORKING MEMORY, FRONT CONNECTOR (1 X 40PIN) AND MICRO MEMORY CARD REQUIRED

Product type designation

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

Rated value (DC)	
● 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 outputs	
Load voltage L+	
— Rated value (DC)	24 V
— Reverse polarity protection	No

Input current

Current consumption (rated value)	570 mA
Current consumption (in no-load operation), typ.	90 mA

Inrush current, typ.	5 A
I²t	0.7 A²·s
Digital outputs	
• from load voltage L+, max.	25 mA

Power losses

Power loss, typ.	8 W

Memory

Work memory	
• Integrated	64 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 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 word operations, typ.	0.24 µs
for fixed point arithmetic, typ.	0.32 µs
for floating point arithmetic, typ.	1.1 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.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
• Number, max.	1 024; 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 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
Nesting depth	
• per priority class	16
• additional within an error OB	4

Counters, timers and their retentivity

S7 counter	
• Number	256
Retentivity	
— can be set	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	
— can be set	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

Total retentive data area	All, max. 64 KB

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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.	1 024; 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	1 024 byte
● Outputs	1 024 byte
of which, distributed	
— Inputs	none
— Outputs	none
Process image	
● Inputs	1 024 byte
● Outputs	1 024 byte
● Inputs, adjustable	1 024 byte
● Outputs, adjustable	1 024 byte
● Inputs, default	128 byte
● Outputs, default	128 byte
Default addresses of the integrated channels	
— Digital inputs	124.0 to 125.1
— Digital outputs	124.0 to 124.5
Digital channels	
● Inputs	266
— Inputs, of which central	266
● Outputs	262
— Outputs, of which central	262
Analog channels	
● Inputs	64
— Inputs, of which central	64
● Outputs	64
— Outputs, of which central	64

Hardware configuration

Expansion devices, max.	0

Number of DP masters	
• Integrated	none
• Via CP	4
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, point-to-point	8
• CP, LAN	4
Rack	
• Racks, max.	1
• Modules per rack, max.	8

Time of day

Clock	
• Software clock	Yes
• battery-backed and synchronizable	No; Buffered: No, Can be synchronized: Yes
• Deviation per day, max.	10 s; Typ.: 2 s
• Behavior of the clock following POWER-ON	The clock continues at the time of day it had when power was switched off
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
• in AS, master	Yes
• in AS, slave	No

Digital inputs

Number of digital inputs	10
• of which, inputs usable for technological functions	8
integrated channels (DI)	10
Input characteristic curve in accordance with IEC 61131, type 1	Yes
horizontal installation	
— up to 40 °C, max.	10
— up to 60 °C, max.	5
vertical installation	
— up to 40 °C, max.	5

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Input voltage	
● Rated value (DC)	24 V
● for signal "0"	-3 to +5V

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.)
— nominal	3 ms
for counter/technological functions	
— at "0" to "1", max.	48 µs; Minimum pulse width/minimum pause between pulses at maximum counting frequency

Cable length	
● shielded, max.	1 000 m; 100 m for technological functions
● Unshielded, max.	600 m; For technological functions: No
Technological functions	
— shielded, max.	100 m; at maximum count frequency
— Unshielded, max.	not allowed

Digital outputs

Number of digital outputs	6
● of which high-speed outputs	2; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	6
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

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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
horizontal installation	
— up to 40 °C, max.	2 A
— up to 60 °C, max.	1.5 A
vertical installation	
— up to 40 °C, max.	1.5 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
Connectable encoders	
• 2-wire sensor	Yes
— Permissible quiescent current (2-wire sensor), max.	1.5 mA

Interfaces	
Number of USB interfaces	0
Number of 20 mA interfaces (TTY)	0
Number of RS 232 interfaces	0
Number of RS 422 interfaces	0
Number of parallel interfaces	0
Number of other interfaces	0

1st 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
• 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	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
Communication functions	
PG/OP communication	Yes
Data record routing	No
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 byte; (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	6
• usable for PG communication	5
— reserved for PG communication	1
— Adjustable for PG communication, min.	1

— Adjustable for PG communication, max.	5
• usable for OP communication	5
— reserved for OP communication	1
— adjustable for OP communication, min.	1
— adjustable for OP communication, max.	5
• usable for S7 basic communication	2
— Reserved for S7 basic communication	0
— adjustable for S7 basic communication, min.	0
— adjustable for S7 basic communication, max.	2

S7 message functions

Number of login stations for message functions, max.	6; 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
— can be set	No
— Of which powerfail-proof	100; Only the last 100 entries are retained
• Number of entries readable in RUN, max.	499
— can be set	Yes; From 10 to 499
— preset	10

Service data

• Can be read out	Yes

Diagnostics indication LED

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

Integrated Functions	
Number of counters	2; See "Technological Functions" manual
Counter frequency (counter) max.	10 kHz
Frequency measurement	Yes
Number of frequency meters	2; up to 10 kHz (see "Technological Functions" manual)
controlled positioning	No
Integrated function blocks (closed-loop control)	No
PID controller	No
Number of pulse outputs	2; 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	No
• between the channels and the backplane bus	Yes

Permissible potential difference	
between different circuits	75V DC/60V AC

Isolation	
Isolation checked with	600 V DC

Ambient conditions	
Ambient temperature in 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
— 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.	410 g

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