



SIMATIC S7-300, CPU 313C, Compact CPU with MPI, 24 DI/16 DO, 4 AI, 2 AO, 1 Pt100, 3 high-speed counters (30 kHz), Integr. power supply 24 V DC, work memory 128 KB, Front connector (2x 40-pole) and Micro Memory Card required

General information	
HW functional status	01
Firmware version	V3.3
Engineering with	
<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> Mains/voltage failure stored energy time Repeat rate, min. 	5 ms 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)	650 mA
Current consumption (in no-load operation), typ.	150 mA
Inrush current, typ.	5 A
I ² t	0.7 A ² ·s
Digital inputs	
<ul style="list-style-type: none"> from load voltage L+ (without load), max. 	80 mA
Digital outputs	
<ul style="list-style-type: none"> from load voltage L+, max. 	50 mA
Power loss	
Power loss, typ.	12 W
Memory	
Work memory	
<ul style="list-style-type: none"> integrated expandable 	128 kbyte No
Load memory	

<ul style="list-style-type: none"> • Plug-in (MMC) • Plug-in (MMC), max. • Data management on MMC (after last programming), min. 	<p>Yes</p> <p>8 Mbyte</p> <p>10 y</p>
Backup	
<ul style="list-style-type: none"> • present • without battery 	<p>Yes; Guaranteed by MMC (maintenance-free)</p> <p>Yes; Program and data</p>
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. • Size, max. 	<p>1 024; Number range: 1 to 16000</p> <p>64 kbyte</p>
FB	
<ul style="list-style-type: none"> • Number, max. • Size, max. 	<p>1 024; Number range: 0 to 7999</p> <p>64 kbyte</p>
FC	
<ul style="list-style-type: none"> • Number, max. • Size, max. 	<p>1 024; Number range: 0 to 7999</p> <p>64 kbyte</p>
OB	
<ul style="list-style-type: none"> • Number, max. • Size, max. • Number of free cycle OBs • Number of time alarm OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of startup OBs • Number of asynchronous error OBs • Number of synchronous error OBs 	<p>see instruction list</p> <p>64 kbyte</p> <p>1; OB 1</p> <p>1; OB 10</p> <p>2; OB 20, 21</p> <p>4; OB 32, 33, 34, 35</p> <p>1; OB 40</p> <p>1; OB 100</p> <p>4; OB 80, 82, 85, 87</p> <p>2; OB 121, 122</p>
Nesting depth	
<ul style="list-style-type: none"> • per priority class • additional within an error OB 	<p>16</p> <p>4</p>
Counters, timers and their retentivity	
S7 counter	
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • present • Type • Number 	<p>Yes</p> <p>SFB</p> <p>Unlimited (limited only by RAM capacity)</p>
S7 times	
<ul style="list-style-type: none"> • Number 	256
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 (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	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 126.7
— Digital outputs	124.0 to 125.7
— Analog inputs	752 to 761
— Analog outputs	752 to 755
Digital channels	
• 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	none
• 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	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 h
• 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	24
• of which inputs usable for technological functions	12
integrated channels (DI)	24
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
horizontal installation	
— up to 40 °C, max.	24
— up to 60 °C, max.	12
vertical installation	
— up to 40 °C, max.	12
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• 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 technological functions	
— at "0" to "1", max.	16 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
for technological functions	
— shielded, max.	100 m; at maximum count frequency
— unshielded, max.	not allowed

Digital outputs	
Number of digital outputs	16
• 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
• 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	
Number of analog inputs	4
• For voltage/current measurement	4
• For resistance/resistance thermometer measurement	1
integrated channels (AI)	5; 4x current/voltage, 1x resistance
permissible input voltage for current input (destruction limit), max.	5 V; Permanent
permissible input voltage for voltage input (destruction limit), max.	30 V; Permanent
permissible input current for voltage input (destruction limit), max.	0.5 mA; Permanent
permissible input current for current input (destruction limit), max.	50 mA; Permanent
Electrical input frequency, max.	400 Hz
No-load voltage for resistance-type transmitter, typ.	3.3 V
Constant measurement current for resistance-type transmitter, typ.	1.25 mA
Technical unit for temperature measurement adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges	
• Voltage	Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ

<ul style="list-style-type: none"> • Current 	Yes; ± 20 mA / 100 Ω ; 0 mA to 20 mA / 100 Ω ; 4 mA to 20 mA / 100 Ω
<ul style="list-style-type: none"> • Resistance thermometer 	Yes; Pt 100 / 10 M Ω
<ul style="list-style-type: none"> • Resistance 	Yes; 0 Ω to 600 Ω / 10 M Ω
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> • 0 to +10 V 	Yes
— Input resistance (0 to 10 V)	100 k Ω
Input ranges (rated values), currents	
<ul style="list-style-type: none"> • 0 to 20 mA 	Yes
— Input resistance (0 to 20 mA)	100 Ω
<ul style="list-style-type: none"> • -20 mA to +20 mA 	Yes
— Input resistance (-20 mA to +20 mA)	100 Ω
<ul style="list-style-type: none"> • 4 mA to 20 mA 	Yes
— Input resistance (4 mA to 20 mA)	100 Ω
Input ranges (rated values), resistance thermometer	
<ul style="list-style-type: none"> • Pt 100 	Yes
— Input resistance (Pt 100)	10 M Ω
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> • 0 to 600 ohms 	Yes
— Input resistance (0 to 600 ohms)	10 M Ω
Thermocouple (TC)	
Temperature compensation	
— parameterizable	No
Characteristic linearization	
<ul style="list-style-type: none"> • parameterizable 	Yes; by software
— for resistance thermometer	Pt 100
Cable length	
<ul style="list-style-type: none"> • shielded, max. 	100 m
Analog outputs	
Number of analog outputs	2
integrated channels (AO)	2
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	55 mA
Current output, no-load voltage, max.	14 V
Output ranges, voltage	
<ul style="list-style-type: none"> • 0 to 10 V 	Yes
<ul style="list-style-type: none"> • -10 V to +10 V 	Yes
Output ranges, current	
<ul style="list-style-type: none"> • 0 to 20 mA 	Yes
<ul style="list-style-type: none"> • -20 mA to +20 mA 	Yes
<ul style="list-style-type: none"> • 4 mA to 20 mA 	Yes
Connection of actuators	
<ul style="list-style-type: none"> • for voltage output two-wire connection 	Yes; Without compensation of the line resistances
<ul style="list-style-type: none"> • for voltage output four-wire connection 	No
<ul style="list-style-type: none"> • for current output two-wire connection 	Yes
Load impedance (in rated range of output)	
<ul style="list-style-type: none"> • with voltage outputs, min. 	1 k Ω
<ul style="list-style-type: none"> • with voltage outputs, capacitive load, max. 	0.1 μ F
<ul style="list-style-type: none"> • with current outputs, max. 	300 Ω
<ul style="list-style-type: none"> • with current outputs, inductive load, max. 	0.1 mH
Destruction limits against externally applied voltages and currents	
<ul style="list-style-type: none"> • Voltages at the outputs towards MANA 	16 V; Permanent
<ul style="list-style-type: none"> • Current, max. 	50 mA; Permanent
Cable length	
<ul style="list-style-type: none"> • shielded, max. 	200 m
Analog value generation for the inputs	
Measurement principle	Actual value encryption (successive approximation)
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. 	12 bit

<ul style="list-style-type: none"> • Integration time, parameterizable • Interference voltage suppression for interference frequency f_1 in Hz • Time constant of the input filter • Basic execution time of the module (all channels released) 	<p>Yes; 16.6 / 20 ms</p> <p>50 / 60 Hz</p> <p>0.38 ms</p> <p>1 ms</p>
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. • Conversion time (per channel) 	<p>12 bit</p> <p>1 ms</p>
Settling time	
<ul style="list-style-type: none"> • for resistive load • for capacitive load • for inductive load 	<p>0.6 ms</p> <p>1 ms</p> <p>0.5 ms</p>
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> • for voltage measurement • for current measurement as 2-wire transducer • for current measurement as 4-wire transducer • for resistance measurement with two-wire connection • for resistance measurement with three-wire connection • for resistance measurement with four-wire connection 	<p>Yes</p> <p>Yes; with external supply</p> <p>Yes</p> <p>Yes; Without compensation of the line resistances</p> <p>No</p> <p>No</p>
Connectable encoders	
<ul style="list-style-type: none"> • 2-wire sensor <ul style="list-style-type: none"> — permissible quiescent current (2-wire sensor), max. 	<p>Yes</p> <p>1.5 mA</p>
Errors/accuracies	
Temperature error (relative to input range), (+/-)	0.006 %/K
Crosstalk between the inputs, min.	60 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.06 %
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.1 %
Linearity error (relative to output range), (+/-)	0.15 %
Temperature error (relative to output range), (+/-)	0.01 %/K
Crosstalk between the outputs, min.	60 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.06 %
Operational error limit in overall temperature range	
<ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) 	<p>1 %</p> <p>1 %</p> <p>1 %</p> <p>1 %</p> <p>1 %</p>
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) 	<p>0.8 %; Linearity error ± 0.06 %</p> <p>0.8 %; Linearity error ± 0.06 %</p> <p>0.8 %; Linearity error ± 0.2 %</p> <p>0.8 %</p> <p>0.8 %</p> <p>0.8 %</p>
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency	
<ul style="list-style-type: none"> • Series mode interference (peak value of interference < rated value of input range), min. • Common mode interference, min. 	<p>30 dB</p> <p>40 dB</p>
Interfaces	

Number of industrial Ethernet interfaces	0
Number of PROFINET interfaces	0
Number of RS 485 interfaces	1; MPI
Number of RS 422 interfaces	0
1. Interface	
Interface type	Integrated RS 485 interface
Isolated	No
Interface types	
<ul style="list-style-type: none"> • RS 485 • Output current of the interface, max. 	<ul style="list-style-type: none"> Yes 200 mA
Protocols	
<ul style="list-style-type: none"> • MPI • PROFIBUS DP master • PROFIBUS DP slave • Point-to-point connection 	<ul style="list-style-type: none"> Yes No No No
MPI	
<ul style="list-style-type: none"> • Transmission rate, max. 	187.5 kbit/s
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 	<ul style="list-style-type: none"> Yes No Yes Yes Yes; Only server, configured on one side No; but via CP and loadable FB Yes
Protocols	
PROFIsafe	No
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 • Variables • Number of variables, max. <ul style="list-style-type: none"> — of which status variables, max. — of which control variables, max. 	<ul style="list-style-type: none"> Yes Inputs, outputs, memory bits, DB, times, counters 30 30 14
Forcing	
<ul style="list-style-type: none"> • Forcing • Forcing, variables • Number of variables, max. 	<ul style="list-style-type: none"> Yes Inputs, outputs 10
Diagnostic buffer	
<ul style="list-style-type: none"> • present • Number of entries, max. <ul style="list-style-type: none"> — adjustable — of which powerfail-proof • Number of entries readable in RUN, max. <ul style="list-style-type: none"> — adjustable — preset 	<ul style="list-style-type: none"> Yes 500 No 100; Only the last 100 entries are retained 499 Yes; From 10 to 499 10
Service data	
<ul style="list-style-type: none"> • can be read out 	Yes
Interrupts/diagnostics/status information	
Diagnostics indication LED	

<ul style="list-style-type: none"> • Status indicator digital input (green) 	Yes
<ul style="list-style-type: none"> • Status indicator digital output (green) 	Yes
Integrated Functions	
Frequency measurement	Yes
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Potential separation digital inputs 	Yes
<ul style="list-style-type: none"> • between the channels 	No
<ul style="list-style-type: none"> • between the channels and backplane bus 	Yes
Potential separation digital outputs	
<ul style="list-style-type: none"> • Potential separation digital outputs 	Yes
<ul style="list-style-type: none"> • between the channels 	Yes
<ul style="list-style-type: none"> • between the channels, in groups of 	8
<ul style="list-style-type: none"> • between the channels and backplane bus 	Yes
Potential separation analog inputs	
<ul style="list-style-type: none"> • Potential separation analog inputs 	Yes; common for analog I/O
<ul style="list-style-type: none"> • between the channels 	No
<ul style="list-style-type: none"> • between the channels and backplane bus 	Yes
Potential separation analog outputs	
<ul style="list-style-type: none"> • Potential separation analog outputs 	Yes; common for analog I/O
<ul style="list-style-type: none"> • between the channels 	No
<ul style="list-style-type: none"> • between the channels and backplane bus 	Yes
Isolation	
Isolation tested with	600 V DC
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • min. 	0 °C
<ul style="list-style-type: none"> • max. 	60 °C
configuration / header	
Configuration software	
<ul style="list-style-type: none"> • STEP 7 	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"> • STEP 7 Lite 	No
Know-how protection	
<ul style="list-style-type: none"> • User program protection/password protection 	Yes
<ul style="list-style-type: none"> • Block encryption 	Yes; With S7 block Privacy
Dimensions	
Width	120 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	660 g
last modified:	8/24/2021 