

Technical Data

CPU 313SC

Module name	313-5BF03
Dimensions and weight	
Dimensions W x H x D	120 x 125 x 120mm
Weight	590g
Voltages, Currents, Potentials	
Power supply (rated value)	DC 24V
- Permitted range	20.4 ... 28.8V
- Reverse polarity protection	yes
Current consumption (no-load operation)	240mA
Inrush current typ.	11A
Power consumption (nominal value)	700mA
I^2t	0.7A ² s
External fusing of power supply lines (recommended)	2A
Power loss	14W
Accumulator	Lithium
- Clock back-up period	30 days
Memory	
Work memory	
- integrated	64kByte
- expandable	up to 512kByte
Processing times	
Processing times for	
- Bit instructions	0.021μs
- Word instructions	0.021μs
- Double integer arithmetic	0.021μs
- Floating-point arithmetic	0.125μs
Timers/Counters and their retentive characteristics	
S7 counters	512
- Retentivity	adjustable
- Preset	up C0 to C7
- Counting value	0 up to 999
IEC counters	yes
- Type	SFB
- Number	unlimited (limited only by RAM size)
S7 timers	512
- Retentivity	adjustable
- Preset	not retentive
- Time range	10ms to 9990ms
ICE timers	yes
- Type	SFB
- Number	unlimited (limited only by RAM size)
Data areas and their retentive characteristics	
Bit memories	8192Byte
- Adjustable retentivity	adjustable
- Preset	up MB0 to MB15
Clock memories	8 (1 flag byte)
Data blocks	max. 4095
- Size	64kByte
Local data	
- per priority class	510Byte

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Module name	313-5BF03
Blocks	
OBs	see the instruction list
- Size	64kByte
Nesting dept	
- per priority class	8
- additional levels within an error OB	4
FBs	2048
- Size	64kByte
FCs	2048
- Size	64kByte
Address areas (I/O)	
Total address areas	1024Byte/1024Byte
I/O Process image	128Byte/128Byte
Digital channels	1016/1008
- centralized	1016/1008
- integrated channels	24DI/16DO
Analog channels	253/250
- centralized	253/250
- integrated channels	4+1AI/2AO
Configuration	
Number of racks	max. 4
Modules per rack	max. 8; max. 7 in rack 3
Time	
Real-time clock	yes (HW clock)
- Backed-up	yes
- buffered period	6 Weeks
- Accuracy	Deviation per day < 10s
Operating hours counter	1
- Number	0
- Value range	2 ¹⁵
- Selectivity	1hour
- Retentive	yes, must be manually restarted after every restart
Testing and commissioning functions	
Status/Modify Variables	yes
- Variable	E, A, M, DB, T, Z
- Number of variables	30
of those as status variable	30
of those as control variable	14
Force	yes
- Variable	I, O
- Number of Variables	10
Block status	yes
Single step	yes
Break points	3
Diagnostic buffer	yes
- Number of entries (not configurable)	100

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Module name	313-5BF03
Communication functions	
PG/OP communication	yes
Global Data communication	yes
- Number of GD circuit	4
- Number of GD circuit	4
Sending stations	4
Receiving stations	4
- Length of GD packets	22Byte
S7 basic communication	yes
- User data per job	76Byte
consistent data	76Byte (for X_SEND or X_RCV)
	64Byte (for X-PUT or X_GET as the Server)
Interfaces	
Hardware description 1. interface	
Physics	RS 485
electrically isolated	no
Interface power supply (15 up to 30V DC)	200mA
Functionality 1. interface	
MPI	yes
Profibus DP	no
Point-to-Point connection	no
MPI 1. interface	
Services	
- PG-/OP communication	yes
- Global data communication	yes
- S7 basis communication	yes
- S7 Communication	
as Server	yes
as Client	no
- Transmission rates	187.5 kbit/s
Hardware description 2. interface	
Physics	RS 485
Electrically isolated	yes
Interface power supply (15 up to 30V DC)	200mA
Functionality 2. interface	
MPI	no
Profibus DP master	no
Profibus DP slave	no
Point-to-Point connection	yes
- Transmission rate half duplex	max. 115.2kbit/s
- Protocols	
- ASCII	yes
- STX/ETX	yes
- 3964(R)	yes
- USS	yes
- Modbus Master	yes
Hardware description 3. interface	
Physics	RJ 45
Functionality 3. interface	
Profinet	Ethernet
Services	
- PG/OP communication	yes

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Integrated functions	
Number of counters	3
- Counter frequency max.	30kHz
Programming	
Programming language	KOP/FUP/AWL
Instruction set	see the instruction list
Nesting levels	8
System functions (SFC)	see the instruction list
System function blocks (SFB)	see the instruction list
User program protection	yes

Digital Input	313-5BF03
Data for specific module	
Number of inputs	24
Length of cable	
- unshielded	600m
- shielded	1000m
Voltages, Currents, Potentials	
Rated load voltage L+	DC 24V
Reverse polarity protection	yes
Isolation	
- between channels and backplane bus	yes
- between channels	no
permitted potential difference	
- between the different circuits	DC 75V / AC 60V
Isolation tested with	DC 500V
Current consumption	
- from the power supply L+	70mA
Status, Interrupts, Diagnostics	
Status display	green LED per channel
Interrupts	none
Diagnostic functions	none
Data for selecting a Sensor	
Input voltage	
- Rated value	DC 24V
- for Signal "1"	15V to 28.8V
- for Signal "0"	0V to 5V
Input current	
- for Signal "1"	6mA
Input delay (at nominal value of the input voltage range)	
- Inputs parameterizable	0.1ms-0.35ms
Input characteristic curve according	to IEC 1131, Type 1
Connection of 2-wire-BEROs	possible
- permitted bias current	max. 1.5mA

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Digital Output	313-5BF03
Data for specific module	
Number of outputs	16
Length of cable	
- unshielded	600m
- shielded	1000m
Voltages, Currents, Potentials	
Rated load voltage L+	DC 24V
Reverse polarity protection	no
Total current of the outputs	
- horizontal configuration up to 40°C	3A
- horizontal configuration up to 60°C	2A
- vertical configuration up to 40°C	2A
Isolation	
- Between the channels and backplane bus	yes
- Between the channels	no
in groups of 8	yes
Permitted potential difference	
- between the different circuits	DC 75V / AC 60V
Insulation tested with	DC 500V
Current consumption	
- from load voltage L+	100mA
Status, Interrupts, Diagnostics	
Status display	green LED per channel
Interrupts	none
Diagnostic functions	
- Group error display	red F-LED per group
- supply voltage display	green LED per group
- Channel error display	none
Data for selecting an actuator	
Output voltage	
- for Signal "1"	min. L+ (-0.8V)
Output current	
- at Signal "1"	0.5A
Rated value	5mA to 0.6A
- at Signal "0"	0.5mA
Load resistor range	48Ω to 4kΩ
Lamp load	5W
Parallel connection of 2 outputs	
- for redundant triggering of a load	possible
- to increase performance	not possible
Actuation of digital input	possible
Switch rate	
- for resistive load	2.5kHz
- for inductive load (IEC 947-5 DC 13)	0.5Hz
- for lamp load	2.5kHz
Limitation (internal) voltage induced on circuit interruption at	typ. L+ (-52V)
Short-circuit protection of the outputs	yes, electronic
- Threshold on	typ. 1A

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Analog Input	313-5BF03		
Data for specific Module			
Number of inputs	4 channels with current/voltage input 1 channel with Pt100		
Length - shielded	200m		
Programming specifications			
Input data	10Byte (1Word per channel)		
Parameter data	13Byte		
Voltages, Currents, Potentials			
Resistance input - no-load voltage - Measuring current	2.5V 1.8mA to 3.3mA		
Isolation - Between channels and backplane bus - Between channels and power supply - Between channels	yes yes no		
Permitted potential difference - between the inputs (U_{CM}) - between M_{ANA} and M_{intern} (U_{CM})	DC 8V DC 75V / AC 60V		
Insulation tested with	DC 500V		
Analog value generation			
Measuring principle	gradual approximation		
Integration time-/Conversion time/Resolution (per Channel) - parameterizable - Conversion rate in Hz - Integration time in ms - Resolution incl. overrange - Noise suppression for frequency f1 in Hz	400 2.5 400	yes 60 16.6 12Bit 60	50 20 50
Basic execution time	1ms		
Smoothing of the measured values	none		
Suppression of interference, Limits of error			
Noise suppression for $f=n \times (f1 \pm 1\%)$ ($f1$ = interference frequency, $n=1,2,\dots$) - Common mode interference ($U_{CM} < 8V$) - Series mode noise (peak value of noise < Nominal value of input range)	> 80dB > 80dB		
Crosstalk between the inputs	> 50dB		
Optional limit (in the entire temperature range, with reference to the input range) - Voltage input - Current input - Resistors - Resistance thermometer	0...10V $\pm 10V$ $\pm 20mA$ 0...20mA 4...20mA 0 ... 600 Ω Pt100	$\pm 0.4\%$ $\pm 0.3\%$ $\pm 0.3\%$ $\pm 0.6\%$ $\pm 0.8\%$ $\pm 0.4\%$ $\pm 0.6\%$	

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Analog Input	313-5BF03	
Basic error (operational limit at 25°C, referred to input range)		
- Voltage	0...10V	±0.3%
	±10V	±0.2%
	±20mA	±0.2%
- Current	0...20mA	±0.4%
	4...20mA	±0.5%
- Resistors	0 ... 600Ω	±0.2%
- Resistance thermometer	Pt100	±0.4%
Linearity error (with reference to the input range)	±0.05%	
Linearity error at resistor measurement	±0.2%	
Temperature error (with reference to the input range)	±0.005%/K	
Repeatability (in steady state at 25°C, referred to input range)	±0.05%	
Status, Interrupt, Diagnostics		
Interrupts	none	
Diagnostics functions	none	
Data for selecting an sensor		
- Voltage	Input range ±10V, 0...10V	Input resistance 100kΩ
- Current	±20mA, 0...20mA, 4...20mA	100Ω
- Resistors	0 ... 600Ω	10MΩ
- Resistance thermometer	Pt100	10MΩ
Maximum input voltage for voltage input (destruction limit)	30V	
Maximum input current for current input (destruction limit)	50mA	
Connection of the sensor		
- for measuring voltage	possible	
- for measuring current	possible, with external power supply	
as 2-wire transmitter	possible	
as 4-wire transmitter	possible	
- for measuring resistance	possible	
as 2-conductor connection	not possible	
as 3-conductor connection	not possible	
as 4-conductor connection	not possible	
Characteristic linearization		
- for RDT	Pt100	
Temperature compensation	no	
Technical unit for temperature measurement	°C / °F / °K	

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Analog Output	313-5BF03	
Data for specific Module		
Number of the outputs	2	
Length of cable - shielded	200m	
Programming data		
Output data	4Byte (1Word per channel)	
Parameter data	13Byte	
Voltages, currents, potentials		
Load voltage	internal via CPU	
Isolation - between channels and backplane bus - between channels and power supply of the electronics - between channels	yes yes no	
Permitted potential difference - between M _{ANA} and M _{INTERN} (U _{ISO})	DC 75V / AC 60V	
Insulation tested with	DC 500V	
Analog value generation		
Resolution - Voltage - Current	±10V11Bit + Sign 0...10V11Bit ±20mA11Bit + Sign 0...20mA, 4...20mA11Bit	
Conversion time (per channel)	1ms	
Settling time - for resistive load - for capacitive load - for inductive load	0.5ms 0.5ms 0.5ms	
Suppression of interference, Limits of error		
Crosstalk between outputs	> 40dB	
Operational limit (in the entire temperature range, with reference of the output range) - Voltage - Current	0...10V±0.4% ±10V±0.2% ±20mA±0.3% 0...20mA±0.6% 4...20mA±0.8%	
Basic error (Operational limit, at 25°C, with reference of the output range) - Voltage - Current	0...10V±0.2% ±10V±0.1% ±20mA±0.2% 0...20mA±0.4% 4...20mA±0.5%	
Temperature error (with reference to the output range)	±0.01%/K	
Linearity error (with reference to the output range)	±0.05%	
Repeatability (in steady state at 25°C, (with reference to the output range)	±0.05%	
Output ripple; Range 0 to 50kHz (with reference to the output range)	±0.05%	

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Analog Output	313-5BF03
Status, Interrupts, Diagnostics	
Interrupts	no
Diagnostics functions	no
Substitute value can be applied	no
Data for selecting an actuator	
Output value (rated values) - Voltages - Interrupts	±10V 0 ... 10V ±20mA 0 ... 20mA 4 ... 20mA
Load resistance (in the nominal range of the outputs) - for voltage outputs capacitive load - for current outputs inductive load	min. 1kΩ max. 1μF max. 500Ω max. 100μH
Voltage outputs - Short-circuit protection - Short-circuit current	yes max. 25mA
Data for selecting an actuator	
Current outputs - No-load voltage	max. 16V
Destruction limit against voltages/currents - Voltages at outputs to M _{ANA} - Current	max. 16V (30V for 10s) max. 30V internal limited
Connection of actuators - for voltage output 2-conductor connection 4-conductor connection - for current output 2-conductor connection	possible not possible possible