Data sheet
CPU 313SC (313-5BF13)

Technical data

Order no.	313-5BF13
Type	CPU 313SC

General information

Note	-
Features	SPEED7 technology 24 x DI, 16 x DO, 4 x AI, 2 x AO, 1 x AI Pt100 128 kB work memory Memory extension (max. 512 kB) PtP interface Also configurable via TIA-Portal
SPEED-Bus	-

Technical data power supply

Power supply (rated value)	DC 24 V
Power supply (permitted range)	DC 20.4...28.8 V
Reverse polarity protection	yes
Current consumption (no-load operation)	240 mA
Current consumption (rated value)	700 mA
Inrush current	11 A
I^2t	0.7 A^2s
Max. current drain at backplane bus	3 A
Max. current drain load supply	-
Power loss	14 W

Technical data digital inputs

Number of inputs	24
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 24 V
Reverse polarity protection of rated load voltage	yes
Current consumption from load voltage L+ (without load)	70 mA
Rated value	DC 24 V
Input voltage for signal "0"	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	6 mA
Connection of Two-Wire-BEROs possible	yes
Max. permissible BERO quiescent current	1.5 mA
Input delay of "0" to "1"	0.1 / 0.35 ms
Input delay of "1" to "0"	0.1 / 0.35 ms
Number of simultaneously utilizable inputs horizontal configuration	24
Number of simultaneously utilizable inputs vertical configuration	24

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Input characteristic curve	IEC 61131-2, type 1
Initial data size	3 Byte

Technical data digital outputs

Number of outputs	16
Cable length, shielded	1000 m
Cable length, unshielded	600 m
Rated load voltage	DC 24 V
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	100 mA
Total current per group, horizontal configuration, 40°C	3 A
Total current per group, horizontal configuration, 60°C	2 A
Total current per group, vertical configuration	2 A
Output voltage signal "1" at min. current	L+ (-0.8 V)
Output voltage signal "1" at max. current	L+ (-0.8 V)
Output current at signal "1", rated value	0.5 A
Output current, permitted range to 40°C	5 mA to 0.6 A
Output current, permitted range to 60°C	5 mA to 0.6 A
Output current at signal "0" max. (residual current)	0.5 mA
Output delay of "0" to "1"	100 µs
Output delay of "1" to "0"	100 µs
Minimum load current	-
Lamp load	5 W
Parallel switching of outputs for redundant control of a load	possible
Parallel switching of outputs for increased power	not possible
Actuation of digital input	yes
Switching frequency with resistive load	max. 2.5 kHz
Switching frequency with inductive load	max. 0.5 Hz
Switching frequency on lamp load	max. 2.5 kHz
Internal limitation of inductive shut-off voltage	L+ (-52 V)
Short-circuit protection of output	yes, electronic
Trigger level	1 A
Number of operating cycle of relay outputs	-
Switching capacity of contacts	-
Output data size	2 Byte

Technical data analog inputs

Number of inputs	5
Cable length, shielded	200 m
Rated load voltage	DC 24 V
Reverse polarity protection of rated load voltage	yes
Current consumption from load voltage L+ (without load)	-
Voltage inputs	yes
Min. input resistance (voltage range)	100 kOhm
Input voltage ranges	0 V ... +10 V -10 V ... +10 V
Operational limit of voltage ranges	+/-0.3%
Operational limit of voltage ranges with SFU	-
Basic error limit voltage ranges	+/-0.2%
Basic error limit voltage ranges with SFU	-

Destruction limit voltage	max. 30V
Current inputs	yes
Max. input resistance (current range)	100 Ohm
Input current ranges	0 mA ... +20 mA -20 mA ... +20 mA +4 mA ... +20 mA
Operational limit of current ranges	+/-0.3%
Operational limit of current ranges with SFU	-
Basic error limit current ranges	+/-0.2%
Radical error limit current ranges with SFU	-
Destruction limit current inputs (electrical current)	max. 50mA
Destruction limit current inputs (voltage)	max. 30V
Resistance inputs	yes
Resistance ranges	0 ... 600 Ohm
Operational limit of resistor ranges	+/-0.4%
Operational limit of resistor ranges with SFU	-
Basic error limit	+/-0.2%
Basic error limit with SFU	-
Destruction limit resistance inputs	max. 15V
Resistance thermometer inputs	yes
Resistance thermometer ranges	Pt100
Operational limit of resistance thermometer ranges	+/-0.6%
Operational limit of resistance thermometer ranges with SFU	-
Basic error limit thermoresistor ranges	+/-0.4%
Basic error limit thermoresistor ranges with SFU	-
Destruction limit resistance thermometer inputs	max. 15V
Thermocouple inputs	-
Thermocouple ranges	-
Operational limit of thermocouple ranges	-
Operational limit of thermocouple ranges with SFU	-
Basic error limit thermoelement ranges	-
Basic error limit thermoelement ranges with SFU	-
Destruction limit thermocouple inputs	-
Programmable temperature compensation	-
External temperature compensation	-
Internal temperature compensation	-
Technical unit of temperature measurement	°C, °F, K
Resolution in bit	12
Measurement principle	successive approximation
Basic conversion time	1 ms
Noise suppression for frequency	80 dB
Initial data size	10 Byte

Technical data analog outputs

Number of outputs	2
Cable length, shielded	200 m
Rated load voltage	-
Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Voltage output short-circuit protection	yes

Voltage outputs	yes
Min. load resistance (voltage range)	1 kOhm
Max. capacitive load (current range)	1 µF
Max. inductive load (current range)	25 mA
Output voltage ranges	-10 V ... +10 V 0 V ... +10 V
Operational limit of voltage ranges	+/-0.2%
Basic error limit voltage ranges with SFU	+/-0.1%
Destruction limit against external applied voltage	max. 16V (30V / 10s)
Current outputs	yes
Max. in load resistance (current range)	500 Ohm
Max. inductive load (current range)	100 µH
Typ. open circuit voltage current output	15 V
Output current ranges	-20 mA ... +20 mA 0 mA ... +20 mA +4 mA ... +20 mA
Operational limit of current ranges	+/-0.3%
Radical error limit current ranges with SFU	+/-0.2%
Destruction limit against external applied voltage	max. 16V (30V / 10s)
Settling time for ohmic load	0.5 ms
Settling time for capacitive load	0.5 ms
Settling time for inductive load	0.5 ms
Resolution in bit	12
Conversion time	1 ms
Substitute value can be applied	no
Output data size	4 Byte

Technical data counters

Number of counters	3
Counter width	32 Bit
Maximum input frequency	30 kHz
Maximum count frequency	30 kHz
Mode incremental encoder	yes
Mode pulse / direction	yes
Mode pulse	yes
Mode frequency counter	yes
Mode period measurement	yes
Gate input available	yes
Latch input available	yes
Reset input available	-
Counter output available	yes

Load and working memory

Load memory, integrated	512 KB
Load memory, maximum	512 KB
Work memory, integrated	128 KB
Work memory, maximal	512 KB
Memory divided in 50% program / 50% data	yes
Memory card slot	MMC-Card with max. 1 GB

Hardware configuration

Racks, max.	4
Modules per rack, max.	8
Number of integrated DP master	0
Number of DP master via CP	4
Operable function modules	8
Operable communication modules PtP	8
Operable communication modules LAN	8

Status information, alarms, diagnostics

Status display	yes
Interrupts	yes
Process alarm	yes
Diagnostic interrupt	yes
Diagnostic functions	no
Diagnostics information read-out	possible
Supply voltage display	green LED
Group error display	red SF LED
Channel error display	red LED per group

Isolation

Between channels	yes
Between channels of groups to	16
Between channels and backplane bus	yes
Between channels and power supply	-
Max. potential difference between circuits	DC 75 V/ AC 50 V
Max. potential difference between inputs (Ucm)	-
Max. potential difference between Mana and Mintern (Uiso)	-
Max. potential difference between inputs and Mana (Ucm)	-
Max. potential difference between inputs and Mintern (Uiso)	-
Max. potential difference between Mintern and outputs	-
Insulation tested with	DC 500 V

Command processing times

Bit instructions, min.	0.02 µs
Word instruction, min.	0.02 µs
Double integer arithmetic, min.	0.02 µs
Floating-point arithmetic, min.	0.12 µs

Timers/Counters and their retentive characteristics

Number of S7 counters	512
Number of S7 times	512

Data range and retentive characteristic

Number of flags	8192 Byte
Number of data blocks	4095
Max. data blocks size	64 KB
Max. local data size per execution level	510 Byte

Blocks

Number of OBs	15

Number of FBs	2048
Number of FCs	2048
Maximum nesting depth per priority class	8
Maximum nesting depth additional within an error OB	4

Time

Real-time clock buffered	yes
Clock buffered period (min.)	6 w
Accuracy (max. deviation per day)	10 s
Number of operating hours counter	8
Clock synchronization	yes
Synchronization via MPI	Master/Slave
Synchronization via Ethernet (NTP)	no

Address areas (I/O)

Input I/O address area	1024 Byte
Output I/O address area	1024 Byte
Input process image maximal	128 Byte
Output process image maximal	128 Byte
Digital inputs	1016
Digital outputs	1008
Digital inputs central	1016
Digital outputs central	1008
Integrated digital inputs	24
Integrated digital outputs	16
Analog inputs	253
Analog outputs	250
Analog inputs, central	253
Analog outputs, central	250
Integrated analog inputs	5
Integrated analog outputs	2

Communication functions

PG/OP channel	yes
Global data communication	yes
Number of GD circuits, max.	4
Size of GD packets, max.	22 Byte
S7 basic communication	yes
S7 basic communication, user data per job	76 Byte
S7 communication	yes
S7 communication as server	yes
S7 communication as client	-
S7 communication, user data per job	160 Byte
Number of connections, max.	32

PWM data

PWM channels	3
PWM time basis	0.1 ms / 1 ms
Period length	4...65535 / 1...65535 * time base
Minimum pulse width	0...0.5 * Period duration

Type of output	Highside with 1.1kOhm pulldown

Functionality Sub-D interfaces

Type	X2
Type of interface	RS485
Connector	Sub-D, 9-pin, female
Electrically isolated	-
MPI	yes
MP²I (MPI/RS232)	-
DP master	-
DP slave	-
Point-to-point interface	-
5V DC Power supply	max. 90mA, non-isolated
24V DC Power supply	max. 100mA, non-isolated

Type	X3
Type of interface	RS485
Connector	Sub-D, 9-pin, female
Electrically isolated	yes
MPI	-
MP²I (MPI/RS232)	-
DP master	-
DP slave	-
Point-to-point interface	yes
5V DC Power supply	max. 90mA, isolated
24V DC Power supply	max. 100mA, non-isolated

Functionality MPI

Number of connections, max.	32
PG/OP channel	yes
Routing	-
Global data communication	yes
S7 basic communication	yes
S7 communication	yes
S7 communication as server	yes
S7 communication as client	-
Transmission speed, min.	19.2 kbit/s
Transmission speed, max.	187.5 kbit/s

Functionality PROFIBUS master

PG/OP channel	-
Routing	-
S7 basic communication	-
S7 communication	-
S7 communication as server	-
S7 communication as client	-
Activation/deactivation of DP slaves	-
Direct data exchange (slave-to-slave communication)	-
DPV1	-

Transmission speed, min.	-
Transmission speed, max.	-
Number of DP slaves, max.	-
Address range inputs, max.	-
Address range outputs, max.	-
User data inputs per slave, max.	-
User data outputs per slave, max.	-

Functionality PROFIBUS slave

PG/OP channel	-
Routing	-
S7 communication	-
S7 communication as server	-
S7 communication as client	-
Direct data exchange (slave-to-slave communication)	-
DPV1	-
Transmission speed, min.	-
Transmission speed, max.	-
Automatic detection of transmission speed	-
Transfer memory inputs, max.	-
Transfer memory outputs, max.	-
Address areas, max.	-
User data per address area, max.	-

Point-to-point communication

PtP communication	yes
Interface isolated	yes
RS232 interface	-
RS422 interface	-
RS485 interface	yes
Connector	Sub-D, 9-pin, female
Transmission speed, min.	150 bit/s
Transmission speed, max.	115.5 kbit/s
Cable length, max.	500 m

Point-to-point protocol

ASCII protocol	yes
STX/ETX protocol	yes
3964(R) protocol	yes
RK512 protocol	-
USS master protocol	yes
Modbus master protocol	yes
Modbus slave protocol	-
Special protocols	-

Functionality RJ45 interfaces

Type	X5
Type of interface	Ethernet 10/100 MBit
Connector	RJ45
Electrically isolated	yes

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PG/OP channel	yes
Number of connections, max.	4
Productive connections	-

Housing

Material	PPE
Mounting	Rail System 300

Mechanical data

Dimensions (WxHxD)	120 mm x 125 mm x 120 mm
Weight	590 g

Environmental conditions

Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C

Certifications

UL certification	yes
KC certification	yes

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