

Data sheet

CPU 313SC (313-5BF13)

Technical data

Order no.	313-5BF13
Туре	CPU 313SC
O-mark information	
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 20.428.8 V
Reverse polarity protection	✓
Current consumption (no-load operation)	240 mA
Current consumption (rated value)	700 mA
Inrush current	11 A
I ² t	0.7 A ² s
Max. current drain at backplane bus	3 A
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	✓
Current consumption from load voltage L+ (without load)	70 mA
Rated value	DC 24 V
Input voltage for signal "0"	DC 05 V
Input voltage for signal "1"	DC 1528.8 V
Input voltage hysteresis	-
Frequency range	-
Input resistance	-
Input current for signal "1"	6 mA
Connection of Two-Wire-BEROs possible	✓
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



Input characteristic curve	IEC 61131-2, type 1	A YASKAWA COMPANY
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 <i>μ</i> s	
Output delay of "1" to "0"	100 <i>μ</i> s	
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	✓	
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	✓	
Current consumption from load voltage L+ (without load)	-	
Voltage inputs	✓	
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	-	A YASKAWA COMPANY
Destruction limit current	-	
Current inputs	✓	
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)	-	
Destruction limit current inputs (voltage)	-	
Resistance inputs	✓	
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	-	
Resistance thermometer inputs	✓	
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	-	
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	-	
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)	A YASKAWA COMPA
Voltage output short-circuit protection	√
Voltage outputs	✓
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	-
Current outputs	✓
Max. in load resistance (current range)	500 Ohm
Max. inductive load (current range)	100 μH
Max. inductive load (current range)	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	-
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	✓
Mode pulse / direction	✓
Mode pulse	✓
Mode frequency counter	✓
Mode period measurement	✓
Gate input available	✓
Latch input available	✓
Reset input available	-
Counter output available	✓
Load and working memory	
Load memory, integrated	512 KB
Load memory, maximum	512 KB
Work memory, integrated	128 KB



Memory divided in 50% program / 50% data Memory cand slot Marchavare confliguration Racks, max. 4 Modules per rack, max. 8 Number of integrated DP master Number of DP master via CP Operable function modules Operable communication modules LAN Status information, alarms, diagnostics Status display yes Process alarm yes Diagnostic informupt Diagnostic information read-out possible Supply voltage display red d ED per group Command processing times Bit instructions, min. 0,02 μs Coulde integer arithmetic, min. 1,042 μs Number of 57 tenes 1512 Number of 57 tenes Bit locks Max. data blocks are Max. deat blocks Max. deat blocks are Max. deat block are Max. deat	Work memory, maximal	512 KB	A YASKAWA COMPANY
### MmC-Card with max. 1 GB ### Hardware configuration Facks, max.	Memory divided in 50% program / 50% data	✓	
Hardware configuration Racks, max. 4 Modules per rack, max. 8 Number of integrated DP master 0 Number of integrated NP Poperable function modules 8 Operable communication modules PtP 8 Operable communication modules LAN 8 Status information, alarms, diagnostics Status display yes Interrupts Process alarm yes Diagnostic interrupt	Memory card slot	200.00	
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Number of data blocks 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 Maximum nesting depth additional within an error OB Time Real-time clock buffered 4095	Data range and retentive characteristic		
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Max. local data size per execution level 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 510 Byte	Number of data blocks	4095	
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 ✓	Max. data blocks size	64 KB	
Number of OBs15Number of FBs2048Number of FCs2048Maximum nesting depth per priority class8Maximum nesting depth additional within an error OB4TimeReal-time clock buffered✓	Max. local data size per execution level	510 Byte	
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Maximum nesting depth per priority class 8 Maximum nesting depth additional within an error OB 4 Time Real-time clock buffered	Number of FBs	2048	
Maximum nesting depth additional within an error OB 4 Time Real-time clock buffered ✓	Number of FCs	2048	
Time Real-time clock buffered	Maximum nesting depth per priority class	8	
Real-time clock buffered	Maximum nesting depth additional within an error OB	4	
	Time		
	Real-time clock buffered	✓	
	Clock buffered period (min.)		



Accuracy (max. deviation per day)	10 s	A YASKAWA COMPANY
Number of operating hours counter	8	
Clock synchronization	√	
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 inputs central	1008	
<u> </u>	24	
Integrated digital inputs		
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	✓	
Global data communication	✓	
Number of GD circuits, max.	4	
Size of GD packets, max.	22 Byte	
S7 basic communication	✓	
S7 basic communication, user data per job	76 Byte	
S7 communication	✓	
S7 communication as server	✓	
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	-	
Period length	-	
Minimum pulse width	-	
PtP communication	-	
Functionality Sub-D interfaces		
Type	X2	
Type of interface	RS485	
Connector	Sub-D, 9-pin, female	
Connoctor	Gab-D, a-pin, lettidie	



Electrically isolated	_ A YASKAWA COMPANY
MPI	✓
MP²l (MPI/RS232)	-
DP master	-
DP slave	-
Point-to-point interface	-
Time	Va
Type of interface	X3 RS485
Type of interface Connector	
	Sub-D, 9-pin, female
Electrically isolated	✓
MPI	-
MP²I (MPI/RS232)	-
DP master	-
DP slave	-
Point-to-point interface	✓
Functionality MPI	
Number of connections, max.	32
PG/OP channel	✓
Routing	-
Global data communication	✓
S7 basic communication	✓
S7 communication	✓
S7 communication as server	✓
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	A YASKAWA COMPAN
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	✓
Interface isolated	✓
RS232 interface	-
RS422 interface	-
RS485 interface	✓
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	✓
STX/ETX protocol	√
3964(R) protocol	✓
RK512 protocol	
USS master protocol	
·	✓
Modbus master protocol	✓
Modbus slave protocol	-
Special protocols	-
Functionality RJ45 interfaces	
Туре	X5
Type of interface	Ethernet 10/100 MBit
Connector	RJ45
Electrically isolated	V
PG/OP channel	√
Number of connections, max.	4
Productive connections	

Housing



Material	PPE	A YASKAWA COMPANY
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		
UL508 certification	yes	