YASKAWA

Data sheet
CPU M13C (M13-CCF0000)

Technical data

Order no.	M13-CCF0000
Type	CPU M13C
Module ID	-
General information	
Note	-
Features	Powered by SPEED7 Work memory [KB]: 64...128 Integrated: PROFINET IO controller (8 Devices) / I-Device Optional: [2x RS485]: MPI, PROFIBUS slave, PtP: ASCII, STX/ETX, 3964 (R), USS master, Modbus master/slave Onboard: 16x DI / 12x DO / 2x AI [voltage 0...10 V] / 4x Counter / 2x [PWM/Pulse Train] Interface [2x RJ45]: active Ethernet PG/OP communication with DHCP support, Switch, ModbusTCP master/slave, openCommunication, I-Device, PROFINET IO controller OPC UA / Web server SD card slot with locking, up to 8 expansion modules, configurable via SPEED7 Studio, SIMATIC Manager and TIA Portal
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)	120 mA
Current consumption (rated value)	360 mA
Inrush current	3 A
I^2t	0.1 A^2s
Max. current drain at backplane bus	1 A
Max. current drain load supply	-
Power loss	7 W
Technical data digital inputs	
Number of inputs	16
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)	25 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	-
Signal logic input	Sinking input
Frequency range	-
Input resistance	-
Input current for signal "1"	3 mA
Connection of Two-Wire-BEROs possible	yes
Max. permissible BERO quiescent current	0.5 mA
Input delay of "0" to "1"	3 µs – 15 ms / 0.5 ms – 15 ms

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Input delay of "1" to "0"	3 µs – 15 ms / 0.5 ms – 15 ms
Number of simultaneously utilizable inputs horizontal configuration	16
Number of simultaneously utilizable inputs vertical configuration	16
Input characteristic curve	IEC 61131-2, type 1
Initial data size	16 Bit

Technical data digital outputs

Number of outputs	12
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)	20 mA
Total current per group, horizontal configuration, 40°C	6 A
Total current per group, horizontal configuration, 60°C	6 A
Total current per group, vertical configuration	6 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
Signal logic output	Sourcing output
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"	2 µs / 30 µs
Output delay of "1" to "0"	3 µs / 175 µs
Minimum load current	-
Lamp load	10 W
Parallel switching of outputs for redundant control of a load	not possible
Parallel switching of outputs for increased power	not possible
Actuation of digital input	yes
Switching frequency with resistive load	max. 1000 Hz
Switching frequency with inductive load	max. 0.5 Hz
Switching frequency on lamp load	max. 10 Hz
Internal limitation of inductive shut-off voltage	L+ (-45 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	12 Bit

Technical data analog inputs

Number of inputs	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 inputs	yes
Min. input resistance (voltage range)	100 kOhm
Input voltage ranges	0 V ... +10 V

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Operational limit of voltage ranges	+/-3.5%
Operational limit of voltage ranges with SFU	-
Basic error limit voltage ranges	+/-3.0%
Basic error limit voltage ranges with SFU	-
Destruction limit voltage	max. 30V
Current inputs	-
Max. input resistance (current range)	-
Input current ranges	-
Operational limit of current ranges	-
Operational limit of current ranges with SFU	-
Basic error limit current ranges	-
Radical error limit current ranges with SFU	-
Destruction limit current inputs (electrical current)	-
Destruction limit current inputs (voltage)	-
Resistance inputs	-
Resistance ranges	-
Operational limit of resistor ranges	-
Operational limit of resistor ranges with SFU	-
Basic error limit	-
Basic error limit with SFU	-
Destruction limit resistance inputs	-
Resistance thermometer inputs	-
Resistance thermometer ranges	-
Operational limit of resistance thermometer ranges	-
Operational limit of resistance thermometer ranges with SFU	-
Basic error limit thermoresistor ranges	-
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 thermocouple ranges	-
Basic error limit thermocouple 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	2 ms
Noise suppression for frequency	40 dB
Initial data size	4 Byte

Technical data analog outputs

Number of outputs	-
Cable length, shielded	-
Rated load voltage	-

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Reverse polarity protection of rated load voltage	-
Current consumption from load voltage L+ (without load)	-
Voltage output short-circuit protection	-
Voltage outputs	-
Min. load resistance (voltage range)	-
Max. capacitive load (current range)	-
Max. inductive load (current range)	-
Output voltage ranges	-
Operational limit of voltage ranges	-
Basic error limit voltage ranges with SFU	-
Destruction limit against external applied voltage	-
Current outputs	-
Max. in load resistance (current range)	-
Max. inductive load (current range)	-
Typ. open circuit voltage current output	-
Output current ranges	-
Operational limit of current ranges	-
Radical error limit current ranges with SFU	-
Destruction limit against external applied voltage	-
Settling time for ohmic load	-
Settling time for capacitive load	-
Settling time for inductive load	-
Resolution in bit	-
Conversion time	-
Substitute value can be applied	-
Output data size	-
Technical data counters	
Number of counters	4
Counter width	32 Bit
Maximum input frequency	100 kHz
Maximum count frequency	400 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	128 KB
Load memory, maximum	128 KB
Work memory, integrated	64 KB
Work memory, maximal	128 KB
Memory divided in 50% program / 50% data	yes
Memory card slot	SD/MMC-Card with max. 2 GB
Hardware configuration	

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Racks, max.	1
Modules per rack, max.	8
Number of integrated DP master	-
Number of DP master via CP	-
Operable function modules	-
Operable communication modules PtP	-
Operable communication modules LAN	-
Status information, alarms, diagnostics	
Status display	yes
Interrupts	yes, parameterizable
Process alarm	yes, parameterizable
Diagnostic interrupt	yes, parameterizable
Diagnostic functions	yes, parameterizable
Diagnostics information read-out	possible
Supply voltage display	green LED
Group error display	red 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
S7 counter remanence	adjustable 0 up to 256
S7 counter remanence adjustable	C0 .. C7
Number of S7 times	512
S7 times remanence	adjustable 0 up to 256
S7 times remanence adjustable	not retentive
Data range and retentive characteristic	
Number of flags	8192 Byte
Bit memories retentive characteristic adjustable	adjustable 0 up to 256
Bit memories retentive characteristic preset	MB0 .. MB15
Number of data blocks	1024
Max. data blocks size	64 KB

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Max. local data size per execution level	4096 Byte
Blocks	
Number of OBs	22
Number of FBs	1024
Number of FCs	1024
Maximum nesting depth per priority class	16
Maximum nesting depth additional within an error OB	4
Time	
Real-time clock buffered	yes
Clock buffered period (min.)	30 d
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	2048 Byte
Output I/O address area	2048 Byte
Input process image maximal	2048 Byte
Output process image maximal	2048 Byte
Digital inputs	144
Digital outputs	140
Digital inputs central	144
Digital outputs central	140
Integrated digital inputs	16
Integrated digital outputs	12
Analog inputs	2
Analog outputs	0
Analog inputs, central	2
Analog outputs, central	0
Integrated analog inputs	2
Integrated analog outputs	0
Communication functions	
PG/OP channel	yes
Global data communication	yes
Number of GD circuits, max.	8
Size of GD packets, max.	54 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	2
PWM time basis	1 µs / 0.1 ms / 1 ms
Period length	-

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Minimum pulse width	0...0.5 * Period duration
Type of output	Highside
Functionality Sub-D interfaces	
Type	X1
Type of interface	RS422/485 isolated
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	-
Type	X2
Type of interface	RS485 isolated
Connector	Sub-D, 9-pin, female
Electrically isolated	yes
MPI	yes
MP²I (MPI/RS232)	-
DP master	-
DP slave	optional
Point-to-point interface	-
5V DC Power supply	max. 90mA, isolated
24V DC Power supply	-
Functionality MPI	
Number of connections, max.	32
PG/OP channel	yes
Routing	yes
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.	12 Mbit/s
Functionality PROFIBUS slave	
Number of connections, max.	32
PG/OP channel	yes
Routing	yes
S7 communication	yes
S7 communication as server	yes
S7 communication as client	-
Direct data exchange (slave-to-slave communication)	-
DPV1	yes
Transmission speed, min.	9.6 kbit/s
Transmission speed, max.	12 Mbit/s

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Automatic detection of transmission speed	yes
Transfer memory inputs, max.	244 Byte
Transfer memory outputs, max.	244 Byte
Address areas, max.	32
User data per address area, max.	32 Byte
Functionality RJ45 interfaces	
Type	X3/X4
Type of interface	Ethernet 10/100 MBit Switch
Connector	2 x RJ45
Electrically isolated	yes
PG/OP channel	yes
Number of connections, max.	4
Productive connections	yes
Fieldbus	-
Type	-
Type of interface	-
Connector	-
Electrically isolated	-
PG/OP channel	-
Number of connections, max.	-
Productive connections	-
Fieldbus	-
Point-to-point communication	
PtP communication	yes
Interface isolated	yes
RS232 interface	-
RS422 interface	yes
RS485 interface	yes
Connector	Sub-D, 9-pin, female
Transmission speed, min.	1200 bit/s
Transmission speed, max.	115.2 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	yes
Special protocols	-
Properties PROFINET I/O-Controller via PG/OP	
Realtime Class	-
Conformance Class	PROFINET IO
Number of PN IO devices	8
IRT support	-
Shared Device supported	yes

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MRP Client supported	yes
Prioritized start-up	-
Number of PN IO lines	1
Address range inputs, max.	2 KB
Address range outputs, max.	2 KB
Transmitting clock	1 ms
Update time	1 ms .. 512 ms
Isochronous mode	-
Parallel operation as controller and I-Device	yes
Properties PROFINET I/O controller	
Realtime Class	-
Conformance Class	-
Number of PN IO devices	-
IRT support	-
Prioritized start-up	-
Number of PN IO lines	-
Address range inputs, max.	-
Address range outputs, max.	-
Transmitting clock	-
Update time	-
Isochronous mode	-
Properties PROFINET I-Device via PG/OP	
I/O Data range, max.	768 Byte
Update time	1 ms .. 512 ms
Mode as Shared I-Device	-
Management & diagnosis via PG/OP	
Protocols	ICMP DCP LLDP / SNMP NTP
Web based diagnosis	yes
NCM diagnosis	-
Ethernet communication via PG/OP	
Number of productive connections via PG/OP, max.	2
Number of productive connections by Siemens NetPro, max.	2
S7 connections	BSEND, BRCV, GET, PUT, Connection of active and passive data handling
User data per S7 connection, max.	64 KB
TCP-connections	FETCH PASSIV, WRITE PASSIV, Connection of passive data handling
User data per TCP connection, max.	8 KB
ISO on TCP connections (RFC 1006)	FETCH PASSIV, WRITE PASSIV, Connection of passive data handling
User data per ISO connection, max.	8 KB
Ethernet open communication via PG/OP	
Number of configurable connections, max.	2
ISO on TCP connections (RFC 1006)	TSEND, TRCV, TCON, TDISCON
User data per ISO on TCP connection, max.	32 KB
TCP-Connections native	TSEND, TRCV, TCON, TDISCON
User data per native TCP connection, max.	32 KB
User data per ad hoc TCP connection, max.	1460 Byte

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UDP-connections	TUSEND, TURCV
User data per UDP connection, max.	1472 Byte
WebVisu via PG/OP	
WebVisu is supported	yes
Max. number of connections WebVisu	4
WebVisu supports HTTP	yes
WebVisu supports HTTPS	yes
OPC UA server via PG/OP	
OPC UA server is supported	yes
Max. number of connections per interface	4
Services	Data Access (Read, Write, Subscribe)
Security policies	None, Basic128Rsa15, Basic256, Basic256Sha256
Authentication	Anonymous, username and password
Housing	
Material	PPE / PPE GF10
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	72 mm x 88 mm x 71 mm
Net weight	230 g
Weight including accessories	230 g
Gross weight	250 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	yes
KC certification	yes
UKCA certification	-
ChinaRoHS certification	-

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