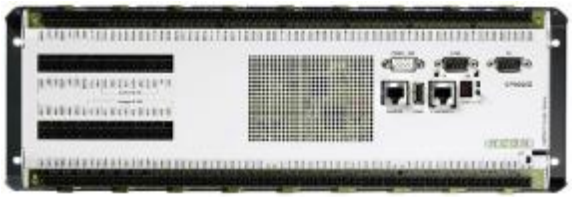
Automation by innovation.

KeControl C1

CP 031/Z, CP 033/Y, CP 033/Z CPU-Module



- Motorola PowerPC 400MHz
- Cost reduction through operation-optimized CPU type. Industry-specific I/O-Board type
- Availability and reliability through use of tried and tested components from the PC world.

Brief description

The module CP 03x is a central processor module from the K2-200 module system. They include a processor with a computing power of 400 MHz and an internal memory of 128 MB RAM. VXWorks is the used operating system.

Onboard the CP-module is equipped with interfaces for communication via CAN, RS-232-C or RS-485-A, USB and Ethernet.
The firmware- and application data are stored on a Compact Flash memory card. The connection of graphic panels from the extensive range of Kemro panels is realized via a LVDS graphic interface. The states during start-up and operation are displayed via a 7-segment display (Diagnosis display) and a Status-LED. The corresponding operating states are accessed via a switch.

The modules of the CP 03x-series are equipped with an industry-optimized I/O-Board. This I/O-Board enables connection of a host of different digital and analog input/output signals as well as the connection of temperature sensors with or without external temperature compensation.

The CAN interface can be used to decentralize module clusters with I/O modules from the K2-200 module system and/or transmit over distances to CANopen specification.

Technical data

General information

Rated supply voltage:	24 V DC from front
Supply voltage range:	19.2 V to 30 V, according to EN 61131-2
Max. power consumption CP 031/Z:	125 W
Max. power consumption CP 033/Y:	125 W
Max. power consumption CP 033/Z:	153 W
Overvoltage category:	II
Ingress protection rating:	III according to EN 61131-2
Galvanic isolation:	No
Ventilator:	Unit ventilator, replaceable from the outside

Environmental conditions

Operating temperature:	+5 °C to +55 °C
Storage temperature:	-40 °C to +70 °C
Relative humidity of air:	10 % to 95 % (non condensing)
Vibration resistance:	according to EN 61131-2
Shock resistance:	according to EN 61131-2

Computer kernel

Processor:	PowerPC 400MHz
Memory:	128 MB SDRAM
Battery-buffered SRAM:	512 kB

Digital inputs

Number of inputs:	CP 031/Z: 32 (DI/VI0, DI/VI1, DI2 – DI31) CP 033/Y: 32 (DI/VI0, DI/VI1, DI2 – DI31) CP 033/Z: 48 (DI/VI0, DI/VI1, DI2 – DI47)
Galvanic isolation:	No
Input type:	Type 1 (according to EN 61131-2)
Voltage range for "1":	15 V ≤ UH ≤ 30 V
Voltage range for "0":	-3 V ≤ UL ≤ 5 V
Status display:	Green LED
Min. update cycle:	1 ms

Velocity inputs (DI/VI0, DI/VI1)	
Minimum signal input frequency:	0.5 Hz
Maximum signal input frequency:	100 Hz
Counter resolution:	16 Bit

Digital outputs

Number of outputs:	CP 031/Z: 40 CP 033/Y, CP 033/Z: 56
Rated voltage:	24 V DC
Rated current:	2 A
Coincidence:	50 % per group
Status display:	Orange LED
Galvanic isolation:	No
Inductive load (energy):	A load of 1 J at 0.2 Hz can be applied to a maximum of 24 digital outputs. A load of 100 mJ at 0.2 Hz may be applied to the remaining outputs.
Short-circuit monitoring:	Yes
Sustained short-circuit proof:	Yes
Short-circuit diagnosis:	Yes
Overload-proof:	No

Analog input (single ended)

Number of inputs:	CP 031/Z: 3, each with U_{ref} CP 033/Y, CP 033/Z: 4, each with U_{ref}
Type:	Voltage input
Input range:	0 – U_{ref} (10 V)
Maximum measurement signal:	0 V to +10.3 V
Input type:	Single ended
Diagnosis:	Sensor failure detection
Galvanic isolation:	No
Reference voltage output:	10 V ± 2.5%, max. 20 mA
Scan repeat cycle:	1 ms
Input impedance at signal range:	≥ 1 MΩ
Input filter characteristic:	
Order:	First order
Transition frequency:	250 Hz
Resolution:	14 Bit
Transformation method:	Successive approximation
Monotonicity without error codes:	Yes
Value of the lowest-value Bit (LSB):	0.64 mV
Maximum permitted continuous load (without damage):	± 30 V
Measurement error:	
Temperature coefficient, type:	± 25 ppm of FSV* / °C
Temperature coefficient, max.:	± 50 ppm of FSV* / °C
Biggest error at 25 °C:	± 0.05 % of FSV*

FSV … Full-scale value

Analog inputs (differential)

Number of inputs:	CP 031/Z: 2 (AI4, AI5 with I_{ref}) CP 033/Y, CP 033/Z: 4 (AI4 and AI5 with I_{ref} , AI6, AI7)
Type:	Voltage input
Input range:	0 – 10 V
Maximum measurement signal:	0 V to +10.3 V
Input type:	Differential
Galvanic isolation:	No
Diagnosis:	Sensor failure detection
Scan repeat cycle:	1 ms
Input impedance at signal range:	≥ 1 MΩ
Input filter characteristic:	
Order:	First order
Transition frequency:	250 Hz
Resolution:	14 Bit
Transformation method:	Successive approximation
Monotonicity without error codes:	Yes
Common-mode characteristics:	
Synchroneity control:	± 11 V
Synchroneity suppression:	Type 60 dB
Value of the lowest-value Bit (LSB):	0.64 mV
Maximum permitted continuous load (without damage):	± 30 V
Measurement error:	
Temperature coefficient, typical:	± 25 ppm of FSV* / °C
Temperature coefficient, max.:	± 50 ppm of FSV* / °C
Biggest error at 25 °C:	± 0.05 % of FSV*
** FSV … Full-scale value*	

Analog voltage outputs

Number of outputs:	CP 031/Z: 5 CP 033/Y, CP 033/Z: 6
Type:	Single ended
Output range:	± 10 V
Galvanic isolation:	No
Conversion cycle:	1 ms
Resolution:	12 Bit
Value of the lowest-value Bit (LSB):	5.02 mV
Monotonicity:	Yes
Minimum load resistance:	1 kΩ
Highest capacitive load:	≤ 10 nF
Differential non-linearity:	≤ ± 1 LSB
Settling time at change over the full range:	≤ 200 s µs
Min. Update cycle:	1 ms
Analog output error:	
Temperature coefficient, type:	± 20 ppm of FSV* / °C
Temperature coefficient, max.:	± 30 ppm of FSV* / °C
Biggest error at 25 °C:	± 0.15 % of FSV*
** FSV … Full-scale value*	

Analog current outputs

Number of outputs:	CP 031/Z, CP 033/Y: 3 CP 033/Z: 4
Type:	PWM, two-position control with dynamically controlled hysteresis
PWM output voltage:	38 V ± 5 %
Maximum switch frequency:	20 kHz
Typical switch frequency:	5 kHz; load-dependent, target frequency through dynamically controlled current hysteresis.
Output current:	1 A ± 5 %
Current hysteresis:	Min. 80 mA
Ripple current:	Max. 230 mA
Power output:	25 W
Total power output of all 4 current outputs:	90 W
Minimum inductance of load:	20 mH
Max. resistance of load:	100 Ω

** FSV … Full-scale value*

Temperature inputs

Number of inputs:	CP 031/Z: 7 CP 033/Y, CP 033/Z: 8	
Galvanic isolation:	Yes, for control electronics and between inputs electric strength: 707 V DC	
Diagnosis:	Sensor failure detection (maximum value corresponds to sensor failure)	
Thermocouple types:	J, K, L	
Measurement ranges:	Type J (Fe-CuNi):	($T_{environment}$ -32 °C) to +500 °C
		Linearization acc. to IEC 548-1
	Type K (NiCr-Ni):	($T_{environment}$ -60 °C) to +1200 °C
		Linearization acc. to IEC 548-1
	Type L (Fe-CuNi):	($T_{environment}$ -40 °C) to +850 °C
		Linearization acc. to DIN 43710/1977
Measurement principle:	Integrating	
Measuring time:	100 ms	
Input resistance:	≥ 10 kΩ	
Resolution:	14 Bit	
Connections:	Plug-in connection terminals RM 5.08, gold-plated contacts	
Intrinsic deviation:	± 1,5 °C max. absolute measurement deviation at 25 °C	
	Ambient temp. at the module[1)] via the entire	
	measuring range (± 1 °C typical)	
Operational deviation:	± 1% of measurement, or ± 25 °C absolute.±	
	The higher value applies in each case.	
	Abs. measurement deviations under reference conditions:	
	Ambient temperature of the module: between 0 °C and 55 °C	
Precision of terminal temperature sensor:	± 1 °C max. absolute measurement deviation at 0 °C to 70 °C Ambient temperature (± 0,5 °C typical)	
Precision at internal terminal temperature compensation:	± 2 °C after 30 minutes at natural convection	
Precision at external compensation with TE 220/A	With the optimized positioning of the sensor TE 220/A, the error can be minimized to ± 0,5 °C (typical) through terminal temperature compensation	
Thermal settling time of the measuring system:	30 minutes	

[1)] discounting external interference

Interfaces

CAN interface:	
CAN bus Baud rates:	To be set via software
Serial interface:	
Type:	Switchable between RS-232-C and RS-485-A
Baud rates:	To be set via software
Ethernet interface:	
Data transmission rate:	10/100 Mbit/s
USB:	
Type:	USB 2.0; full speed, high power
Compact Flash:	
Type:	Type 1
Sensor interface for TE 220/A: (option)	
Rated voltage:	5 V of CP 033/Z
Transmission range:	Max. 10 m
Measurement ranges:	0 °C to 125 °C
Error:	± 1 °C on a temperature range from 0 °C to 70 °C
Thermal time constant:	τ = 10 min in air

Casing, dimensions

Dimensions:	
Module height:	140 mm
Mounting width:	410 mm
Module depth:	50 mm
Type of assembly:	Mounting horizontally on the rear wall of the switch cabinet via
	retaining holes on the base cover
Connecting plug for power supply:	2-core male connector, grid 5.08 mm
Ingress protection rating:	IP20
Weight:	1778 g