

Specifications

■ General Specifications

Item		10-point I/O	20-point I/O	30-point I/O	40-point I/O
Power supply voltage/ frequency	AC power supply	100 to 240 VAC, 50/60 Hz			
	DC power supply	24 VDC			
Operating voltage range	AC power supply	85 to 264 VAC			
	DC power supply	20.4 to 26.4 VDC			
Power consumption	AC power supply	30 VAC max.		60 VAC max.	
	DC power supply	(See below.)			
Inrush current		30 A max.		60 A max.	
External power supply (AC only)	Power supply voltage	24 VDC			
	Power supply output capacity	200 mA		300 mA	
Insulation resistance		20 MΩ min. at 500 VDC between the AC terminals and the protective earth terminal.			
Dielectric strength		2,300 VAC at 50/60 Hz for one minute with a leakage current of 10 mA max. between all the external AC terminals and the protective earth terminal.			
Noise resistance		Conforms to IEC61000-4-4, 2 kV (power lines)			
Vibration resistance		10 to 57 Hz with an amplitude of 0.075 mm, and 57 to 150 Hz with an acceleration of 9.8 m/s ² in the X, Y, and Z directions for 80 minutes each (i.e. swept for 8 minutes, 10 times).			
Shock resistance		147 m/s ² in the X, Y and Z directions 3 times each.			
Ambient temperature (operating)		0° to 55°C			
Ambient humidity (operating)		10% to 90% (no condensation)			
Ambient environment (operating)		With no corrosive gas			
Ambient temperature (storage)		-20° to 75°C			
Terminal screw size		M3			
Power supply holding time		10 ms min. for AC models, and 2 ms min. for DC models			
Weight		AC model: 400 g max. DC model: 300 g max.	AC model: 500 g max. DC model: 400 g max.	AC model: 600 g max. DC model: 500 g max.	AC model: 700 g max. DC model: 600 g max.

Note: The specifications of the Expansion I/O Unit are the same as for the CPU except that the power is supplied from the CPU and the weight is 300 g.

■ Power Consumption for DC Models

The power consumptions for CPM1A CPU Units and Expansion I/O Units are given in the tables below. Use them to calculate the required power supply capacity. The CPM2C-PA201 provides a 15-W power supply. Any surplus power that is beyond that required for the PLC itself can be used for servicing devices such as sensors.

CPM1A CPU Unit	Power consumption	Expansion
CPM1A-10CDR-D-V1	3.5 W	Not supported
CPM1A-20CDR-D-V1	4.5 W	Not supported
CPM1A-30CDR-D-V1	5.5 W	Supported
CPM1A-40CDR-D-V1	6.5 W	Supported
CPM1A-10CDT-V1/T1-D-V1	3 W	Not supported
CPM1A-20CDT-V1/T1-D-V1	3.5 W	Not supported
CPM1A-30CDT-V1/T1-D-V1	4 W	Supported
CPM1A-40CDT-V1/T1-D-V1	4.5 W	Supported

CPM1A Expansion I/O Unit	Power consumption
CPM1A-20EDR1	2.5 W
CPM1A-20EDT/T1	1.5 W
CPM1A-8ED	1 W
CPM1A-8ER	2 W
CPM1A-8ET/T1	1 W
CPM1A-SRT21/DRT21	1 W
CPM1A-MAD01/MAD11	3.5 W
CPM1A-TS001/TS101	3 W
CPM1A-TS002/TS102	3 W

Note: The power consumption for CPU Units includes the power consumption of Programming Consoles and Units such as RS-232C Adapters

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■ Performance Specifications

Item		10-point I/O	20-point I/O	30-point I/O	40-point I/O
Control method		Stored program method			
I/O control method		Combination of the cyclic scan and immediate refresh processing methods.			
Programming language		Ladder diagram			
Instruction word		1 step per instruction, 1 to 5 words per instruction			
Types of instructions	Basic instructions	14 types			
	Special instructions	79 types, 139 instructions			
Instruction execution time	Basic instructions	0.72 to 16.2 μ s			
	Special instructions	MOV instruction = 16.3 μ s			
Program capacity		2,048 words			
Maximum I/O points	CPU only	10 points (6 input/ 4 output points)	20 points (12 input/ 8 output points)	30 points (18 input/ 12 output points)	40 points (24 input/ 16 output points)
	With Expansion I/O Unit	---	---	90 points (54 input/ 36 output points)	100 points (60 input/ 40 output points)
Input bits		00000 to 00915 (Words 0 to 9)			
Output bits		01000 to 01915 (Words 10 to 19)			
Work bits (IR Area)		512: IR 20000 to IR 23115 (IR 200 to IR 231)			
Special bits (SR Area)		384: SR 23200 to SR 25515 (SR 232 to SR 255)			
Temporary bits (TR Area)		8: TR 0 to TR 7			
Holding bits (HR Area)		320: HR 0000 to HR 1915 (HR 00 to HR 19)			
Auxiliary bits (AR Area)		256: AR 0000 to AR 1515 (AR 00 to AR 15)			
Link bits (LR Area)		256: LR 0000 to LR 1515 (LR 00 to LR 15)			
Timers/Counters		128: TIM/CNT 000 to 127 100-ms timer: TIM 000 to TIM 127 10-ms timer: TIM 000 to TIM 127 Decremental counter, reversible counter			
Data memory	Read/Write	1,024 words (DM 0000 to DM 1023)			
	Read only	512 words (DM 6144 to DM 6655)			
Interrupt processing: External interrupt		2 points (Response time of 0.3 ms max.)	4 points (Response time of 0.3 ms max.)		
Memory protection		Maintains the contents of the HR, AR, Counter and Data Memory Areas.			
Memory backup		Flash memory: User program, data memory (Read only) (Non-battery powered storage) Super capacitor: Data memory (Read/Write), holding bits, auxiliary memory bits, counter (20-day storage at an ambient temperature of 25°C)			
Self-diagnostic function		CPU error (watchdog timer), memory errors, I/O bus errors			
Program check		No END instruction programming errors (constantly checked during operation)			
Pulse output		1 point: 2 kHz			
High-speed counter		1 point: Single phase at 5 kHz or two-phase at 2.5 kHz (linear counting method) Incremental mode: 0 to 65535 (16-bit) Decremental mode: -32767 to 32767 (16-bit) 1 point: Single phase at 5 kHz or two-phase at 2.5 kHz (linear counting method) Incremental mode: 0 to 65535 (16-bit) Decremental mode: -32767 to 32767 (16-bit)			
Quick-response inputs		Together with the external interrupt input (minimum pulse width of 0.2 ms)			
Input time constant		Can be set at 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, or 128 ms.			
Analog settings		2 points: (0 to 200)			

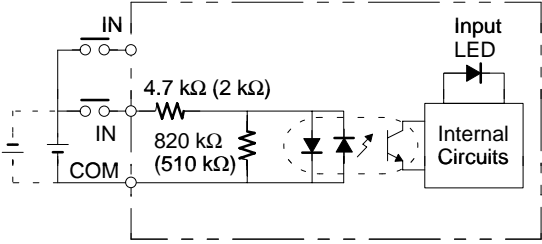
Note: Bits that are not used for the I/O bits can be used as work bits.

Specifications

■ I/O Specifications

Input Circuit

CPU

Item	Specifications	Circuit
Input voltage	24 VDC $+10\%$ / -15%	 <p>Note The polarity of the input power supply can be either positive or negative. Resistance values in parentheses are for inputs IN00000 to IN00002.</p>
Input impedance	IN00000 to IN00002: 2 kΩ Others: 4.7 kΩ	
Input current (typical)	IN00000 to IN00002: 12 mA Others: 5 mA	
ON voltage	14.4 VDC min.	
OFF voltage	5.0 VDC max.	
ON delay (see note 1)	1 to 128 ms max. (default: 8 ms) (see note 1)	
OFF delay (see note 1)	1 to 128 ms max. (default: 8 ms) (see note 1)	

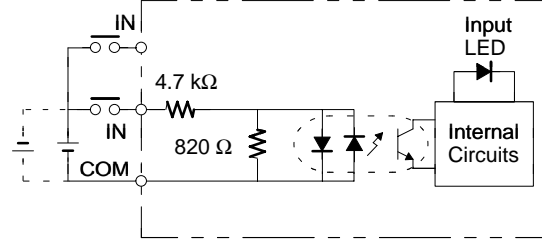
- Note:** 1. The actual ON/OFF delay includes an input constant of 1, 2, 4, 8, 16, 32, 64, or 128 ms (default: 8 ms).
2. The delays for IN00000 to IN00002 are as follows when used for the high-speed counter.

Input	Increment mode	Differential phase mode
IN00000 (A-phase)	5 kHz	2.5 kHz
IN00001 (B-phase)	Normal input	
IN00002 (Z-phase)	ON: 100 μs max. OFF: 500 μs max.	

3. The delays for IN00003 to IN00006 are as follows when used for the high-speed counter.

Delay	0.3 ms max. (From the time of input ON until the interrupt subroutine is executed.)
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Expansion I/O Unit

Item	Specifications	Circuit
Input voltage	24 VDC, $+10\%$ / -15%	 <p>Note The polarity of the input power supply can be either positive or negative.</p>
Input impedance	4.7 kΩ	
Input current (typical)	5 mA	
ON voltage	14.4 VDC min.	
OFF voltage	5.0 VDC max.	
ON delay	1 to 128 ms max. (default: 8 ms) (see note)	
OFF delay	1 to 128 ms max. (default: 8 ms) (see note)	

- Note:** The actual ON/OFF delay includes an input constant of 1, 2, 4, 8, 16, 32, 64, or 128 ms (default: 8 ms).

Specifications

Output Circuit

CPU and Expansion I/O Unit

Relay Output

Item		Specifications	Circuit	
Maximum switching capacity		250 VAC/2 A (cos ϕ =1) 24 VDC/2 A (4 A/common)		
Minimum switching capacity		5 VDC, 10 mA		
Relay service life	Electrical	Resistance load		150,000 times (at 24 VDC)
		Inductive load		100,000 times (at 220 VAC, cos ϕ =0.4)
	Mechanical			10 million times
ON delay		15 ms max.		
OFF delay		15 ms max.		

Transistor Output (Sink Type/Source Type) (CPU/Expansion I/O Unit)

Item		Specifications	Circuit
Maximum switching capacity		24 VDC $+10\%/ -15\%$, 300 mA (see note 1)	
Leakage current		0.1 mA max.	
Residual voltage		1.5 V max.	
ON delay		0.1 ms max.	
OFF delay		1 ms max. (see note 2)	

Note: 1. The maximum switching capacity of the CPM1A with transistor outputs (sink type and source type) are limited to the currents shown in the following table for the common and for the Unit.

Item	10CDT-V1/ 10CDT1-A-V1/D-V1	20CDT-D-V1/ 20CDT1-A-V1/D-V1	30CDT-D-V1/ 30CDT1-A-V1/D-V1	40CDT-D-V1/ 40CDT1-A-V1/D-V1	20EDT/ 20EDT1	CPM1A-8ET/ 8ET1
Max. switching capacity	0.9 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 2.7 A/Unit	0.9 A/common 3.6 A/Unit	0.9 A/common 1.8 A/Unit	

2. When using the pulse output function of the CPM1A with transistor outputs (sink type and source type):
The output current must be within a range from 100 to 200 mA when using the output 01000 or 01001 as a pulse output with the maximum frequency of 2 kHz. The outputs 01000 and 01001 will vary depending on the output current.

Load current	OFF delay
100 to 200 mA	0.2 ms max.
0 to 300 mA except for the above range	0.5 ms max.

Specifications

■ Analog I/O Unit

		CPM1A-MAD01		CPM1A-MAD11	
		Voltage I/O	Current I/O	Voltage I/O	Current I/O
Analog inputs	Number of inputs	2		2 (2 words allocated)	
	Input signal range	0 to 10 V/1 to 5 V	4 to 20 mA	0 to 5 V/1 to 5 V/0 to 10 V/-10 to 10 V	0 to 20 mA/ 4 to 20 mA
	Maximum rated input	±15 V	±30 mA	±15 V	±30 mA
	External input impedance	1 MΩ min.	250 Ω rated	1 MΩ min.	250 Ω
	Resolution	1/256		1/6,000 (full scale)	
	Overall precision	1.0% of full scale		25°C: ±0.3% of full scale	25°C: ±0.4% of full scale
				0 to 55°C: ±0.6% of full scale	0 to 55°C: ±0.8% of full scale
Converted A/D data	8-bit binary		Binary data (hexadecimal, 4 digits) -10 to 10 V input range: Full scale = F448 to 0BB8 Hex Other input ranges: Full scale = 0000 to 1770 Hex		
Analog outputs (See note 2.)	Averaging	---		Supported (Set for each input using a DIP switch.)	
	Disconnection detection	---		Supported	
	Number of outputs	1		1 (1 word allocated)	
	Output signal range	0 to 10 V/ -10 to 10 V	4 to 20 mA	1 to 5 V/0 to 10 V/ -10 to 10 V	0 to 20 mA/ 4 to 20 mA
	External output max. current	5 mA	---	---	---
	External output allowed load resistance	---	350 Ω	1 kΩ min.	600 Ω max.
	External output impedance	---		0.5 Ω max.	---
	Resolution	1/256 (1/512 for output signal range -10 to 10 V)		1/6,000 (full scale)	
	Overall precision	1.0% of full scale		25°C: ±0.4% of full scale	
				0 to 55°C: ±0.8% of full scale	
Data setting	8-bit binary with sign bit		---		
Set D/A data	---		Binary data (hexadecimal, 4 digits) -10 to 10 V input range: Full scale = F448 to 0BB8 Hex Other input ranges: Full scale = 0000 to 1770 Hex		
Conversion time	10 ms/Unit max. (See note 1.)		2 ms/point (6 ms for all points)		
Isolation method	Photocoupler isolation between I/O terminals and PLC (There is no isolation between the analog I/O signals.)		Photocoupler isolation between analog I/O and internal circuits (There is no isolation between the analog I/O signals.)		

Note 1. The conversion time is the total time for 2 analog inputs and 1 analog output.

2. The voltage output and current output can be used at the same time, but the total output current cannot exceed 21 mA.

■ CompoBus/S I/O Link Unit

Specifications

Item	Specification
Model number	CPM1A-SRT21
Master/Slave	CompoBus/S Slave
Number of I/O bits	8 input bits, 8 output bits
Number of words occupied in CPM1A I/O memory	1 input word, 1 output word (Allocated in the same way as other Expansion Units)
Node number setting	Set using the DIP switch.

Note: See the *CompoBus/S Catalog (Q103)* for more details on CompoBus/S communications.

Specifications

■ CPM1A-DRT21 DeviceNet I/O Link Unit

By connecting the DeviceNet I/O Link Unit (CPM1A-DRT21), the CPM2A can function as the slave of a DeviceNet D Master Unit. In this configuration, I/O links for up to 32 inputs and 32 outputs can be created.

Specifications

Item	Specification
Master/slave	DeviceNet slave
Model number	CPM1A-DRT21
Number of I/O points between Unit and Master	Input: 32 points Output: 32 points
Number of words allocated from CPM2A's I/O memory	Input: 2 words Output: 2 words (Allocated in the same way as other Expansion Units.)
Node address setting method	Set using DIP switch.
Maximum number of connectable nodes	63 (CS1) 32 (CVM1/CV) 25 (C200HX/HG/HE) 16 (C200HS) (The series names in parentheses are for the CPU Unit to which the Master Unit is mounted.)

■ Temperature Sensor Units

By mounting a Temperature Sensor Unit (CPM1A-TS001/TS002/TS101/TS102) to the PC, input can be obtained from a thermocouple or platinum resistance thermometer, and temperature measurements can be converted to binary data (4-digit hexadecimal) and stored in the input area of the CPU Unit. For details on the maximum number of connectable Units, refer to 7.

Specifications

Item	Specification	
Model number	CPM1A-TS001/002	CPM1A-TS101/102
Number of inputs	2 (TS001), 4 (TS002)	2 (TS101), 4 (TS102)
Input types	K, J switchable (Note: Same input for all input points.)	Pt100, JPt100 switchable (Note: Same input for all input points.)
Indication accuracy	[The larger of the indicated value $\pm 0.5\%$ and $\pm 2^{\circ}\text{C}$] ± 1 digit max.	[The larger of the indicated value $\pm 0.5\%$ and $\pm 1^{\circ}\text{C}$] ± 1 digit max.
Conversion time	250 ms/2 points (TS001, TS101); 250 ms/4 points (TS002, TS102)	
Converted temperature data	Binary (4-digit hexadecimal)	
Isolation method	Photocoupler isolation between the temperature input signals.	

Note: The indication accuracy when using a K-type thermocouple for temperatures less than -100°C is $\pm 4^{\circ}\text{C} \pm 1$ digit max.

Input Temperature Ranges for CPM1A-TS001/002

The rotary switch can be used to make of the following range and input type settings for CPM1A-TS001/002 models.

Input type	Range ($^{\circ}\text{C}$)	Range ($^{\circ}\text{F}$)
K	-200 to 1300	-300 to 2300
	0.0 to 500.0	0.0 to 900.0
J	-100 to 850	-100 to 1500
	0.0 to 400.0	0.0 to 750.0

Input Temperature Ranges for CPM1A-TS101/102

The rotary switch can be used to make of the following range and input type settings for CPM1A-TS101/102 models.

Input type	Range ($^{\circ}\text{C}$)	Range ($^{\circ}\text{F}$)
Pt100	-200.0 to 650.0	-300 to 1200.0
JPt100	-200.0 to 650.0	-300 to 1200.0

Specifications

■ Communications Adapter Specifications CPM1-CIF01/CIF11

RS-232C Adapter and RS-422 Adapter

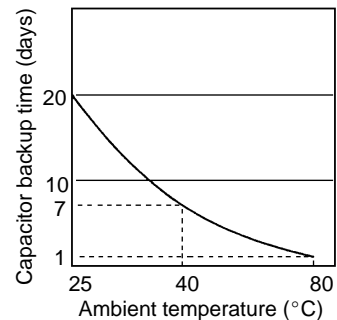
Item	Specifications	
	CPM1-CIF01	CPM1-CIF11
Functions	Level conversion between the CMOS level (CPU side) and the RS-232C (peripheral device side)	Level conversion between the CMOS level (CPU side) and the RS-422 (peripheral device side)
Insulation	The RS-232C (peripheral device side) is insulated by a DC/DC converter and photocoupler.	The RS-422 (peripheral device side) is insulated by a DC/DC converter and photocoupler.
Power supply	Power is supplied by the CPU.	
Power consumption	0.3 A max.	
Transmission speed	38.4 Kbits/s max.	
Vibration resistance	10 to 57 Hz with an amplitude of 0.075 mm, and 57 to 150 Hz with an acceleration of 9.8 m/s ² in the X, Y and Z directions for 80 minutes each in accordance (i.e. swept for 8 minutes, 10 times).	
Shock resistance	147 m/s ² in the X, Y and Z directions 3 times each.	
Ambient temperature (operating)	0° to 55°C	
Ambient humidity (operating)	10% to 90% (with no condensation)	
Ambient environment (operating)	With no corrosive gas	
Ambient temperature (storage)	-20° to 75°C	
Weight	200 g max.	

■ Memory Backup

The user program and memory area data in the CPU Unit are backed up by either one of the following methods.

- Flash Memory:
User program, read-only DM area (DM 6144 to DM 6599), and PC Setup area (DM 6600 to DM 6655).
- Internal Capacitor:
DM areas other than the above, HR area, AR area, and Counter area.

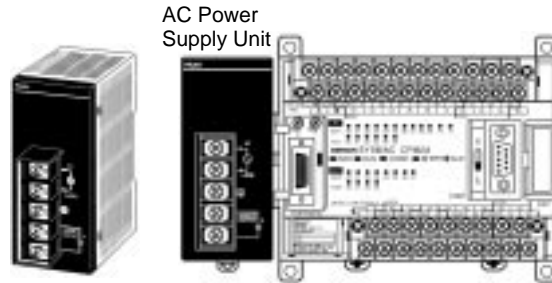
The capacitor provides backup for a power interruption lasting 20 days at room temperature. If the power is expected to remain OFF for a period exceeding this data backup period, consideration must be given to the design of the system so that no problems will occur when the set values become undefined ones. For further details, refer to *CPM1A Operation Manual (W317)*.



Specifications

■ CPM2C-PA201 AC Power Supply Unit

The CPM2C-PA201 is a compact, streamlined Unit that can be used as the power supply for PCs, such as the CPM1A and CPM2A, and indicators. (When using the CPM2C-PA201, connection must be performed by the user.)



Specifications

Item		Specification	
Rated output		15 W	
Output voltage		24 VDC	
Output current		600 mA	
Efficiency		75% min. (at rated output)	
Input conditions	Rated voltage	100 to 240 VAC	
	Allowable voltage range	85 to 264 VAC	
	Frequency	47 to 63 Hz	
	Current	100 V	0.4 A
		200 V	0.2 A
	Leakage current	100 V	0.5 mA max. (at rated output)
		200 V	1 mA max. (at rated output)
Inrush current	100 V	15 A (at 25°C cold start)	
	200 V	30 A (at 25°C cold start)	
Output characteristics	Output voltage accuracy	5%/–10% max.; 10%/–15% max. (including input, load, and temperature fluctuations)	
	Minimum output current	30 mA	
	Ripple noise voltage	2% (p-p) max.	
	Input fluctuation	0.75% max.	
	Load fluctuation	4% max.	
	Temperature fluctuation	0.05%/°C max.	
	Startup time	300 ms max. (at input voltage of 100 VAC or 200 VAC and the rated output)	
Output hold time	10 ms (at input voltage of 100 VAC or 200 VAC and the rated output)		
Overcurrent protection		Self-resetting, operates at 105% to 335% of the rated current, suspended and intermittent operation	
Overvoltage protection		None	
Ambient operating temperature		0 to 55°C	
Ambient storage temperature		–20 to 70°C (no condensation or icing)	
Ambient operating humidity		10% to 90%	
Dielectric strength		2,000 V for 1 min between all inputs and GR Detection current: 10 mA 3,000 V for 1 min between all inputs and all outputs Detection current: 10 mA 1,000 V for 1 min between all outputs and GR Detection current: 10 mA	
Insulation resistance		100 MΩ min. at 500 VDC between all outputs and any input, and between all outputs and GR	
Vibration resistance		10 to 57 Hz, double amplitude of 0.075 mm, 57 to 150 Hz, acceleration: 9.8 m/s ² in X, Y, and Z directions for 80 minutes according (Time coefficient: 8 minutes × coefficient factor 10 = total time 80 min.)	
Shock resistance		147 m/s ² 3 times each in X, Y, and Z directions	
Noise terminal voltage		FCC class A	
Weight		250 g max.	
External dimensions		40 × 65 × 90 mm (W × H × D)	