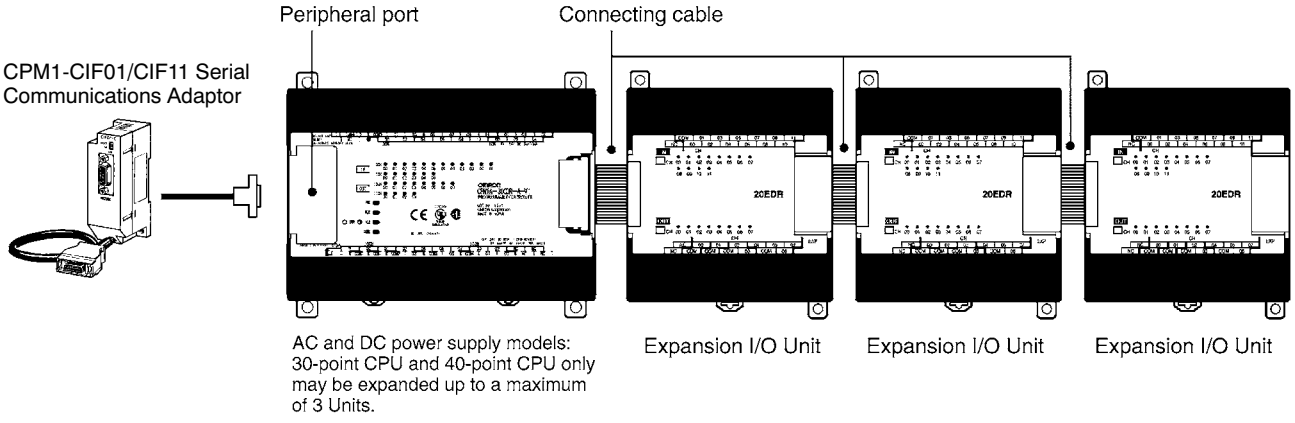
Micro Programmable Controller

CPM1A

The CPM1A series micro controllers solve both basic and semi-complex applications. The brick style models include DC inputs/transistor or relay outputs to meet your design requirements. The base I/O for the CPUs ranges from 10, 20, 30, and 40 I/O points with maximum expansion to 100 I/O. Specialized expansion modules include mixed analog I/O, temperature sensor inputs and serial communications.

- 10, 20, 30 and 40 point I/O CPUs
- Expandable up to 100 I/O points
- Peripheral communications port built in
- DC input models
- Analog expansion modules available
- Temperature sensor input expansion modules available
- Auxiliary 24 VDC supply (AC type only)
- Relay or Transistor outputs
- UL, CSA, CE approvals

Basic Configuration



Ordering Information

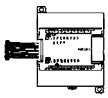
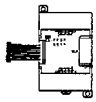
■ CPU

Stock Note: Shaded models are normally stocked.

Number of I/O terminals	Inputs	Outputs	Power supply	Part number		
				Relay output	Transistor output	
					Sink type	Source type
10	6 DC points	4 points	AC	**CPM1A-10CDR-A-V1**	**CPM1A-10CDT-A-V1**	**CPM1A-10CDT1-A-V1**
			DC	**CPM1A-10CDR-D-V1**	**CPM1A-10CDT-D-V1**	**CPM1A-10CDT1-D-V1**
20	12 DC points	8 points	AC	**CPM1A-20CDR-A-V1**	**CPM1A-20CDT-A-V1**	**CPM1A-20CDT1-A-V1**
			DC	**CPM1A-20CDR-D-V1**	**CPM1A-20CDT-D-V1**	**CPM1A-20CDT1-D-V1**
30	18 DC points	12 points	AC	**CPM1A-30CDR-A-V1**	**CPM1A-30CDT-A-V1**	**CPM1A-30CDT1-A-V1**
			DC	**CPM1A-30CDR-D-V1**	**CPM1A-30CDT-D-V1**	**CPM1A-30CDT1-D-V1**
40	24 DC points	16 points	AC	**CPM1A-40CDR-A-V1**	**CPM1A-40CDT-A-V1**	**CPM1A-40CDT1-A-V1**
			DC	**CPM1A-40CDR-D-V1**	**CPM1A-40CDT-D-V1**	**CPM1A-40CDT1-D-V1**

■ EXPANSION I/O MODULES

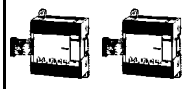
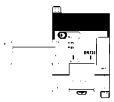
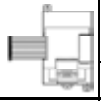
Stock Note: Shaded models are normally stocked.

Description	Max. number of modules	Inputs	Outputs	Part number
20 I/O points 12 inputs, 8 outputs 	3 max. (See Note.)	24 VDC	Relays	**CPM1A-20EDR1**
		24 VDC	Sinking transistors	**CPM1A-20EDT**
		24 VDC	Sourcing transistors	**CPM1A-20EDT1**
8 inputs 		24 VDC	—	**CPM1A-8ED**
8 outputs 		—	Relays	**CPM1A-8ER**
		—	Sinking transistors	**CPM1A-8ET**
		—	Sourcing transistors	**CPM1A-8ET1**

Note: A maximum of 3 expansion modules can be used with the following CPUs: 30-point and 40-point with DC inputs.

■ DEDICATED I/O MODULES

Stock Note: Shaded models are normally stocked.

Description		Max. number of modules	Inputs	Outputs	Part number
Analog I/O Module 2 analog inputs (2 words) 1 analog output (1 word) 		3 max.	2 analog inputs	1 analog output	**CPM1A-MAD01**
					CPM1A-MAD11
Temperature Sensor Input Modules 	Thermocouple inputs	3 max.	2 inputs (Types J and K)	—	**CPM1A-TS001**
		1 max. (See Note.)	4 inputs (Types J and K)		**CPM1A-TS002**
	Platinum resistance thermometer inputs	3 max.	2 inputs (Pt100, JPt100)		**CPM1A-TS101**
		3 max.	2 inputs (Pt100, JPt100)	1 analog output	**CPM1A-TS101-DA**
		1 max. (See Note.)	4 inputs (Pt100, JPt100)	—	**CPM1A-TS102**
CompoBus/S I/O Link Module 8 inputs and 8 outputs 		3 max.	8 bits (Inputs from the Master.)	8 bits (Outputs to the Master.)	**CPM1A-SRT21**
		Flat cable, 4-core, 0.75 mm^2; 100 m length			**SCA1-4F10**
		Twisted pair cable, 2-core, 0.75 mm^2; available commercially			Belden #9409 cable
DeviceNet I/O Link Module 32 inputs and 32 outputs 		3 max.	32 bits (Inputs from the Master.)	32 bits (Outputs to the Master.)	**CPM1A-DRT21**
		Omron connector with screws (included with DeviceNet I/O Link Module).			**XW4B-05C1-H1-D**
		Omron Connector for multidrop connections using thick cables.			**XW4B-05C4-TF-D**
Profibus-DP Slave Module 16 inputs and 16 outputs 		3 max.	16 bits (Inputs from the Master.)	16 bits (Outputs to the Master.)	**CPM1A-PRT21**
		Shielded twisted pair cable, available commercially			Belden #3079A cable

Note: Only one CPM1A-TS002/TS102 Temperature Sensor Input Module can be connected to the CPU. If a CPM1A-TS002/102 is connected to the CPU, only one additional Special I/O Module (other than a CPM1A-TS002/102) or one Expansion I/O Module can be connected to the CPU.

■ PERIPHERAL DEVICES

Stock Note: Shaded models are normally stocked.

Product	Description	Part number
Programming console	Hand-held programming console with cable attached, 2 m length	**CQM1-PRO01-E**
	Hand-held programming console with back light (cable not included)	**C200H-PRO27-E**
Connecting cable	Connects C200H programming console to peripheral port, 2 m length	**C200H-CN222**
	Connects C200H programming console to peripheral port, 4 m length	**C200H-CN422**

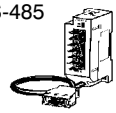
■ SUPPORT SOFTWARE

Stock Note: Shaded models are normally stocked.

Product	Functions	Part number
CX-Programmer Jr.	Windows-based programming software; reduced instruction set and networking commands.	**WS02-CXPC1-EJ-V__**
CX-Programmer	Full programming software package programs micro, small and larger controllers.	**WS02-CXPC1-E-V__**

■ COMMUNICATIONS ADAPTERS AND CABLES

Stock Note: Shaded models are normally stocked.

Description	Function		Part number
RS-232C adapter 	Converts data communications from peripheral port for RS-232C devices.		**CPM1-CIF01**
RS-232C cable	RS-232C to RS-232C; PC connection for program download; cable length 2 m		**C200H-CN229-EU**
			CBL-202*
	RS-232C to RS-232C for PLC communication; cable length 2 m		**C200H-CN320-EU**
			CBL-804*
	Communication cable for NT31C (port B only)	50 cm	**NT31C-CN510-EU**
		3 m	**NT31C-CN320-EU**
		5 m	**NT31C-CN520-EU**
RS-422/RS-485 adapter 	Converts data communications from peripheral port for RS-422/RS-485 devices.		**CPM1-CIF11**

* Available in Canada only.

■ PROGRAM TRANSFER EQUIPMENT

Stock Note: Shaded models are normally stocked.

Product	Description	Part number
Expansion Memory Unit	Uploads and downloads program and setup memory areas to and from the controller.	**CPM1-EMU01-V1**
EEPROM (256 kbits)	Used with the Expansion Memory Unit	**EEPROM-CPM1-EMU01**

■ MANUALS

Product	Description	Part number
Operation manual	CPM1A programmable controllers operation manual	**W317**
Programming manual	CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) programming manual	**W353**

Specifications

■ GENERAL SPECIFICATIONS

Input type		DC input			
CPU type		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 VA max.		60 VA max.	
	DC power supply	6 W max.		20 W max.	
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) 1500 Vp-p, pulse width 0.1 to 1 μs, rise time: 1 ns (via noise simulation)			
Vibration resistance		10 to 57 Hz with an amplitude of 0.075 mm, and 57 to 150 Hz with an acceleration of 1.5 G in the X, Y, and Z directions for 10 sweeps of minutes each.			
Shock resistance		147 m/s^2 in the X, Y and Z directions 3 times each.			
Ambient temperature	Operating	0°C to 55°C (32°F to 131°F)			
	Storage	−20°C to 75°C (−4°F to 167°F)			
Ambient humidity	Operating	10% to 90% RH no condensation			
Ambient environment	Operating	With no corrosive gas			
Terminal screw size		M3			
Power supply holding time		10 ms min. for AC models, and 2 ms min. for DC models			
CPU Weight	AC models	400 g max.	500 g max..	600 g max..	700 g max.
	DC models	300 g max.	400 g max.	500 g max.	600 g max.
Expansion Weight		Units with 20 I/O points:			300 g max.
		Units with 8 output points:			250 g max.
		Units with 8 input points:			200 g max.
		MAD01 Analog I/O unit:			150 g max.
		MAD11 Analog I/O unit:			250 g max.
		Temperature sensor units:			250 g max.
		CompoBus/S I/O link unit:			200 g max.
		DeviceNet I/O link unit:			200 g max.
		Profibus-DP slave unit:			125 g

■ CHARACTERISTICS

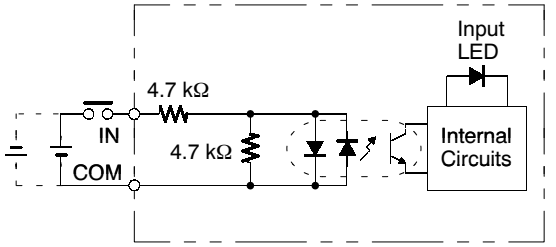
Input type		DC input			
CPU type		10-point I/O	20-point I/O	30-point I/O	40-point I/O
Control method		Stored program method			
I/O control method		Combination of the cyclic scan and immediate refresh processing methods.			
Programming language		Ladder diagram			
Instruction word		1 step per instruction, 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 μs			
	Special instructions	MOV instruction = 16.3 μs			
Program capacity		2,048 words			
User data memory		1,024 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 Module	—	—	Up to 90 points (54 input/ 36 output points)	Up to 100 points (60 input/ 40 output points)
Memory protection		Maintains the contents of the HR, AR, Counter and Data Memory Areas.			
Memory backup		Flash memory: User program, data memory (Read only) and PLC setup area are backed up without a battery. Super capacitor: Data memory (Read/Write), holding bits, auxiliary memory bits, counter values, error log area are backed up by a capacitor for 20-days 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)			
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.			
Interrupt processing: External interrupt		2 points (Response time of 0.3 ms max.)	4 points (Response time of 0.3 ms max.)		
Analog settings		2 points: (0 to 200 BCD)			

■ I/O ALLOCATION

Input bits		00000 to 00915; words not used for input or output bits can be used for work bits.
Output bits		01000 to 01915; words not used for input or output bits can be used for work bits.
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)

■ I/O SPECIFICATIONS

CPU DC Input

Item	Specifications	Circuit
Input voltage	24 VDC $^{+10\%}/_{-15\%}$	
Input impedance	IN0000 to IN0002: 2 kΩ Others: 4.7 kΩ	
Input current (typical)	IN0000 to IN0002: 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)	

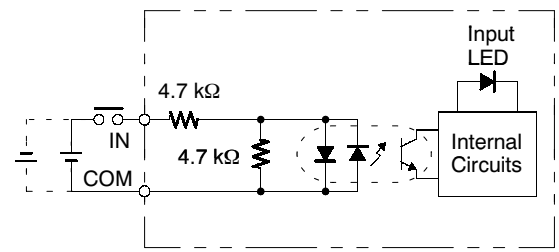
Note: The polarity of the input power supply can be either positive or negative.

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. When IN0000 to IN0006 are used for the high-speed counter inputs, the delays are as shown below:

Input	Increment mode	Differential phase mode
IN0000 (A-phase)	5 kHz	2.5 kHz
IN0001 (B-phase)	Normal input	
IN0002 (Z-phase)	ON: 100 μs max. OFF: 500 μs max.	
IN0003 to IN0006	0.3 ms max. (From the time of input ON until the interrupt subroutine is executed.)	

Expansion I/O Unit

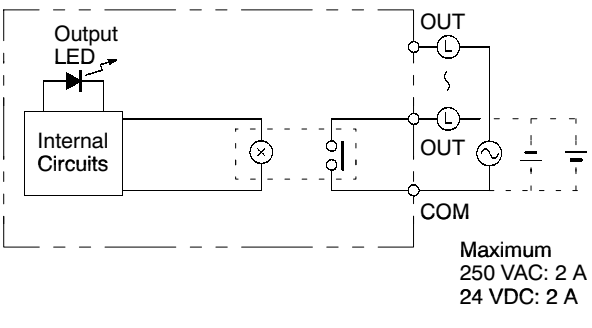
Item	Specifications	Circuit
Input voltage	24 VDC, $^{+10\%}/_{-15\%}$	
Input impedance	4.7 kΩ	
Input current (typical)	5 mA	
ON voltage	14.4 VDC min.	
OFF voltage	5.0 VDC max.	
ON delay	1 to 128 ms max. (default: 8 ms) (See Note)	
OFF delay	1 to 128 ms max. (default: 8 ms) (See Note)	

Note: The polarity of the input power supply can be either positive or negative.

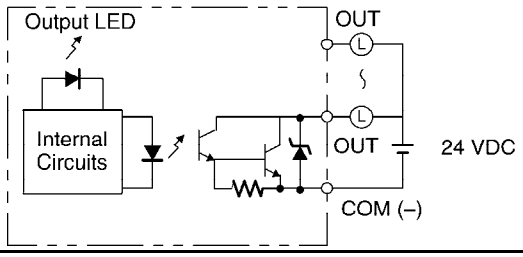
Note: The actual ON/OFF delay includes an input constant of 1, 2, 4, 8, 16, 32, 64, or 128 ms (default: 8 ms).

■ OUTPUT SPECIFICATIONS (CPU AND EXPANSION I/O MODULES)

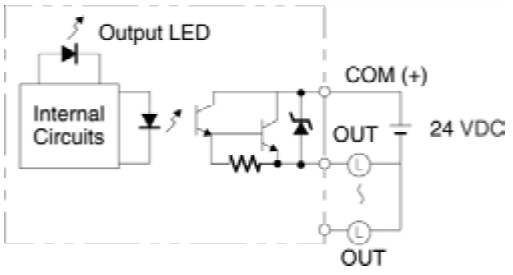
Relay Output

Item			Specifications	Circuit
Maximum switching capacity			2 A, 250 VAC (cos ϕ =1) 2 A, 24 VDC (4 A/common)	
Minimum switching capacity			10 mA, 5 VDC	
Relay service life	Electrical	Resistance load	150,000 times	
		Inductive load	100,000 times	
	Mechanical		20 million times	
ON delay			15 ms max.	
OFF delay			15 ms max.	

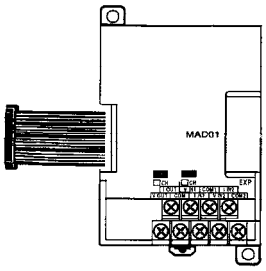
Transistor Outputs (Sinking)

Item	Specifications					
	CPM1A-10CDT-□(-V1)	CPM1A-20CDT-□(-V1)	CPM1A-30CDT-□(-V1)	CPM1A-40CDT-□(-V1)	CPM1A-20EDT	CPM1A-8ET
Max. switching capacity	24 VDC $^{+10\%}/_{-15\%}$, 0.3 A/point (See note)					4.5 to 30 VDC 0.2 A (See note 2.) 0.3 A (See note 3.)
	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	
Leakage current	0.1 mA max.					
Residual voltage	1.5 V max.					
ON delay	0.1 ms max.					
OFF delay	OUT01000/01001: 0.2 ms max. (load current: 100 to 300 mA) 0.5 ms max. (load current: 5 to 100 mA) Other than OUT01000/01001: 1 ms max. (load current 5 to 300 mA)				1 ms max. (24 VDC $^{+10\%}/_{-15\%}$, 5 to 300 mA)	
Fuse	V1 CPUs: No fuse Expansion I/O Units and Pre-V1 CPUs. 1.25 A/common (cannot be replaced by the user)					
Circuit configuration						

Transistor Outputs (Sourcing)

Item	Specifications					
	CPM1A-10CDT1-□(-V1)	CPM1A-20CDT1-□(-V1)	CPM1A-30CDT1-□(-V1)	CPM1A-40CDT1-□(-V1)	CPM1A-20EDT1	CPM1A-8ET1
Max. switching capacity	24 VDC $^{+10\%}/_{-15\%}$, 0.3 A/point (See note)					4.5 to 30 VDC 0.2 A (See note 2.) 0.3 A (See note 3.)
	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	
Leakage current	0.1 mA max.					
Residual voltage	1.5 V max.					
ON delay	0.1 ms max.					
OFF delay	OUT01000/01001: 0.2 ms max. (load current: 100 to 300 mA) 0.5 ms max. (load current: 5 to 100 mA) Other than OUT01000/01001: 1 ms max. (load current 5 to 300 mA)				1 ms max. (24 VDC $^{+10\%}/_{-5\%}$, 5 to 300 mA)	
Fuse	V1 CPUs: No fuse Expansion I/O Units and Pre-V1 CPUs. 1.25 A/common (cannot be replaced by the user)					
Circuit configuration						

Note: When using the OUT01000 or OUT01001 as a pulse output, connect dummy resistors as required to set the load current to 0.1 to 0.2 A. If the load current is below 0.1 A, the ON-to-OFF response time will become longer and high-speed pulse will not be output. On the other hand, if the load current is above 0.2 A, the transistor may generate heat and components may be damaged.

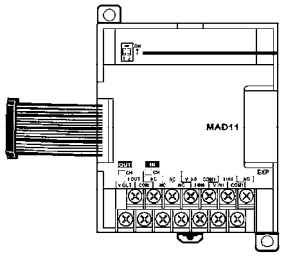


■ ANALOG I/O MODULE

CPM1A-MAD01 Specifications

Item		Specification	
Model		CPM1A-MAD01	
I/O type		Voltage	Current
Analog inputs	Number of inputs	2	
	Input signal range	0 to 10 V or 1 to 5 V	4 to 20 mA
	Maximum rated input	±15 V	±30 mA
	External input impedance	1 MΩ min.	250 Ω rated
	Resolution	1/256	
	Overall precision	1.0% of full scale	
	Converted A/D data	8-bit binary	
Analog output (See Note 1.)	Number of outputs	1	
	Output signal range	0 to 10 V or −10 to 10 V	4 to 20 mA
	External output max. current	5 mA	—
	External output allowed load resistance	—	350 Ω
	Resolution	1/256 (1/512 when the output signal range is −10 to 10 V.)	
	Overall precision	1.0% of full scale	
	Data setting	8-bit binary with sign bit	
Conversion time (See Note 2.)		10 ms/Unit max.	
Isolation method		Photocoupler isolation between I/O terminals and PC (There is no isolation between the analog I/O signals.)	

Note: 1. The voltage output and current output can be used at the same time, but the total output current cannot exceed 21 mA.
2. The conversion time is the total time for 2 analog inputs and 1 analog output.

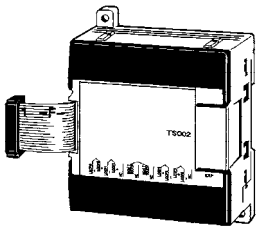


CPM1A-MAD11 Specifications

Item			Specification	
Model			CPM1A-MAD11	
I/O type			Voltage	Current
Analog inputs	Number of inputs		2 inputs (2 words allocated)	
	Input signal range		0 to 5 VDC, 1 to 5 VDC 0 to 10 VDC, -10 to 10 VDC	0 to 20 mA or 4 to 20 mA
	Maximum rated input		±15 V	±30 mA
	External input impedance		1 MΩ min.	250 Ω
	Resolution		1/6000 (full scale)	
	Overall accuracy	25°C	0.3% full scale	0.4% full scale
		0 to 55°C	0.6% full scale	0.8% full scale
	Converted A/D data		16-bit binary (4-digit hexadecimal) Full scale for -10 to 10 V: F448 to 0BB8 Hex Full scale for other ranges: 0000 to 1770 Hex	
	Averaging function		Supported (Settable for individual inputs via DIP switch)	
	Open-circuit detection function		Supported	
Analog output	Number of outputs		1 output (1 word allocated)	
	Output signal range		1 to 5 VDC, 0 to 10 VDC, or -10 to 10 VDC	0 to 20 mA or 4 to 20 mA
	Allowable external output load resistance		1 kΩ min.	600 Ω max.
	External output impedance		0.5 Ω max.	—
	Resolution		1/6000 (full scale)	
	Overall accuracy	25°C	0.4% full scale	
		0 to 55°C	0.8% full scale	
	Set data (D/A conversion)		16-bit binary (4-digit hexadecimal) Full scales for -10 to 10 V: F448 to 0BB8 Hex Full scale for other ranges: 0000 to 1770 Hex	
Conversion time			2 ms/point (6 ms/all points)	
Isolation method			Photocoupler isolation between analog I/O terminals and internal circuits. No isolation between analog I/O signals.	

■ TEMPERATURE SENSOR MODULES

By connecting a Temperature Sensor Module (CPM1A-TS001/TS002/TS101/TS101A/TS102) to the CPM1A, inputs can be received from thermocouples or temperature-resistance thermometers. Inputs converted to binary data (4-digit hexadecimal) and stored in the IR area.



Specifications

Item	Specification		
Model	CPM1A-TS001/TS002	CPM1A-TS101/TS102	CPM1A-TS101-DA
Number of inputs	TS001: 2; TS002: 4	TS101: 2; TS102: 4	2
Input types (See Note 1)	Thermocouple types K or J, selectable	Platinum resistance thermometer types Pt100 and JPt1100, selectable	
Input resolution	0.1°C in 2's complement format	0.1°C in 2's complement format	
Input accuracy	±0.5% or ±2% of the stored value whichever is larger ±1 digit max. (See Note 2)	±0.5% or ±1% of the stored value whichever is larger ±1 digit max. (See Note 2)	1.0% max. full scale
Number of outputs	None	None	1
Output types	—	—	Voltage or current output
Output resolution	—	—	1/256 (0 to 10 V) 1/512 (−10 to +10 V) 1/256 (4 to 20 mA)
Output accuracy	—	—	1.0% max. full scale
Conversion cycle	250 ms for all points		60 ms max. for all points
Converted temperature data	Binary data (4-digit hexadecimal)		Binary data (8-digit hexadecimal)
Isolation method	Photocoupler isolation between I/O terminals and the PLC		

Note: 1. The same input type must be used for all inputs.
2. Accuracy for K thermocouples at temperatures less than −100°C: ±4°C ± 1 digit max.

Input Temperature Ranges for CPM1A-TS001/TS002

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

Thermocouple input	Range (°C)	Range (°F)
Type K	−200 to 1300	−300 to 2300
	0.0 to 500.0	0.0 to 900.0
Type J	−100 to 850	−100 to 1500
	0.0 to 400.0	0.0 to 750.0

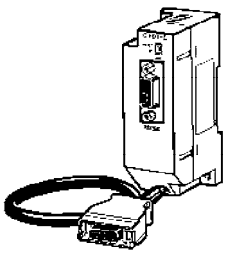
Input Temperature Ranges for CPM1A-TS101/TS101DA/TS102

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

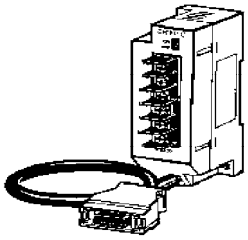
Platinum RTD input	Range (°C)	Range (°F)
Pt100	−200.0 to 650.0	−300 to 1200.0
JPt100	−200.0 to 650.0	−300 to 1200.0

■ COMMUNICATIONS ADAPTER

RS-232C Adapter and RS-422 Adapter



CPM1-CIF01

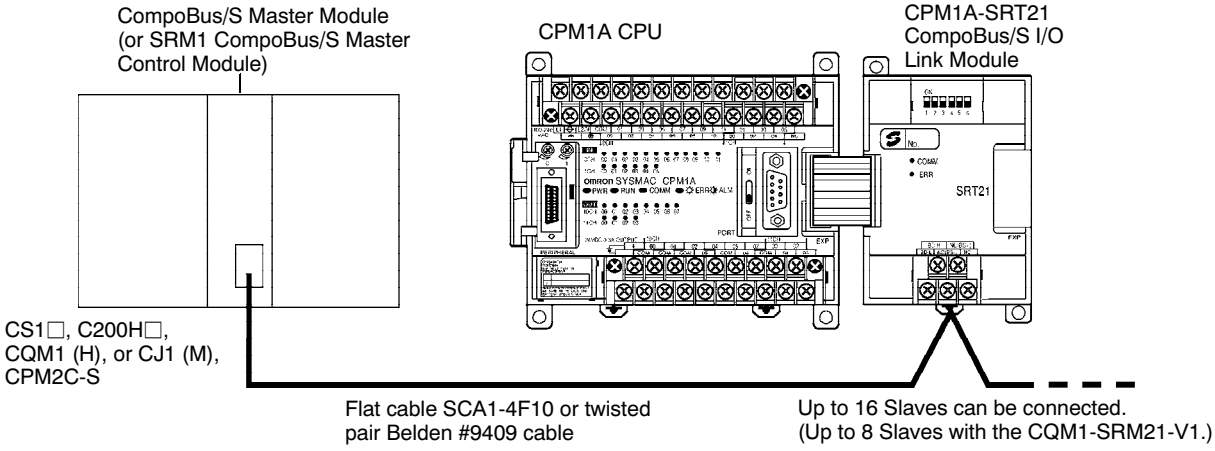


CPM1-CIF11

Model		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 1 G in the X, Y and Z directions for 80 minutes each (i.e. for 8 minutes each, 10 times).	
Shock resistance		1.5 G in the X, Y and Z directions 3 times each.	
Ambient temperature	Operating	0°C to 55°C (32°F to 131°F)	0°C to 55°C (32°F to 131°F)
	Storage	−20°C to 75°C (−4°F to 167°F)	−20°C to 75°C (−4°F to 167°F)
Ambient humidity	Operating	10% to 90% RH (with no condensation)	
Ambient environment	Operating	With no corrosive gas	
Weight		200 g max.	

■ COMPOBUS/S I/O LINK MODULE

The CPM1A controller can function as a Slave to a CompoBus/S Master Module (or SRM1 CompoBus/S Master Control Module) when a CPM1A-SRT21 CompoBus/S I/O Link Module is connected. The CompoBus/S I/O Link Module establishes an I/O link of 8 inputs and 8 outputs between the Master Module and the CPM1A. Up to 3 Expansion I/O Modules or Expansion Modules can be connected to a CPM1A CPU.



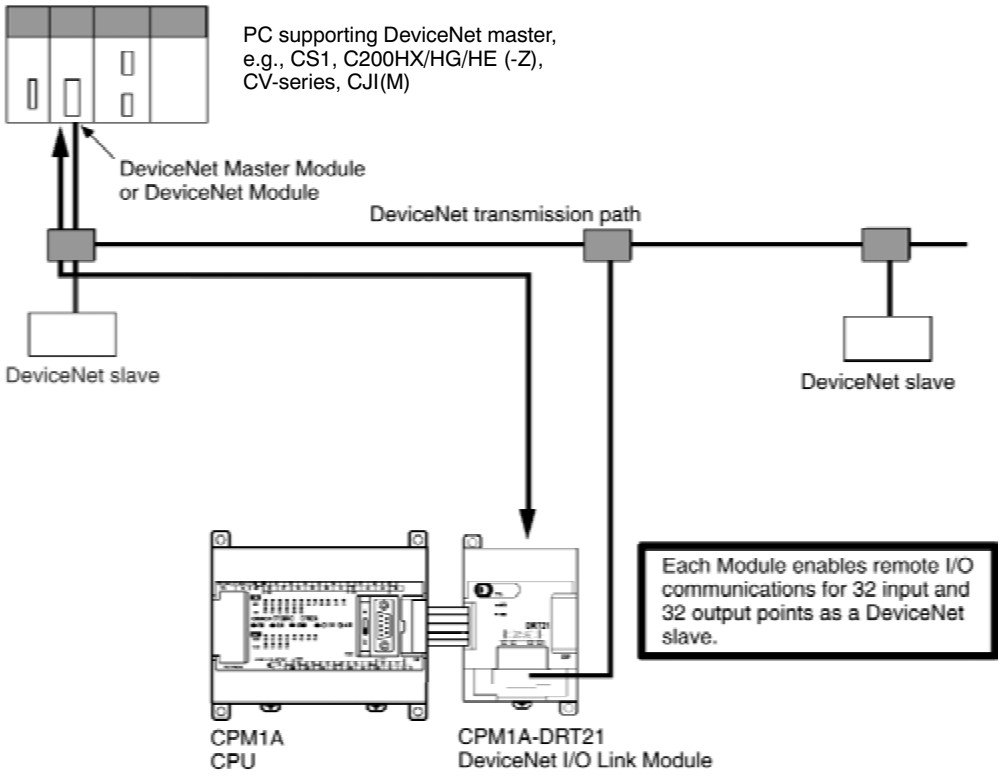
Specifications

Model	CPM1A-SRT21
Master/Slave	CompoBus/S Slave
Number of I/O bits	8 input bits, 8 output bits
Number of words occupied in CPM2A I/O memory	1 input word, 1 output word (Allocated in the same way as other Expansion I/O Modules or Expansion Modules)
Node number setting	Set using the DIP switch.

Note: See the CompoBus/S section of Omron's *Remote I/O and Wiring Solutions Catalog (GC RIO1*) for more details on CompoBus/S communications.

■ DEVICENET I/O LINK MODULE

The CPM1A controller can function as slaves to a DeviceNet Master when a DeviceNet I/O Link Module is connected. The DeviceNet I/O Link Module establishes an I/O link of 32 inputs and 32 outputs between the master and the controller. A maximum of 3 DeviceNet I/O Link Modules can be connected to a CMP1A to create I/O Links for up to 192 points (96 inputs and 96 outputs).

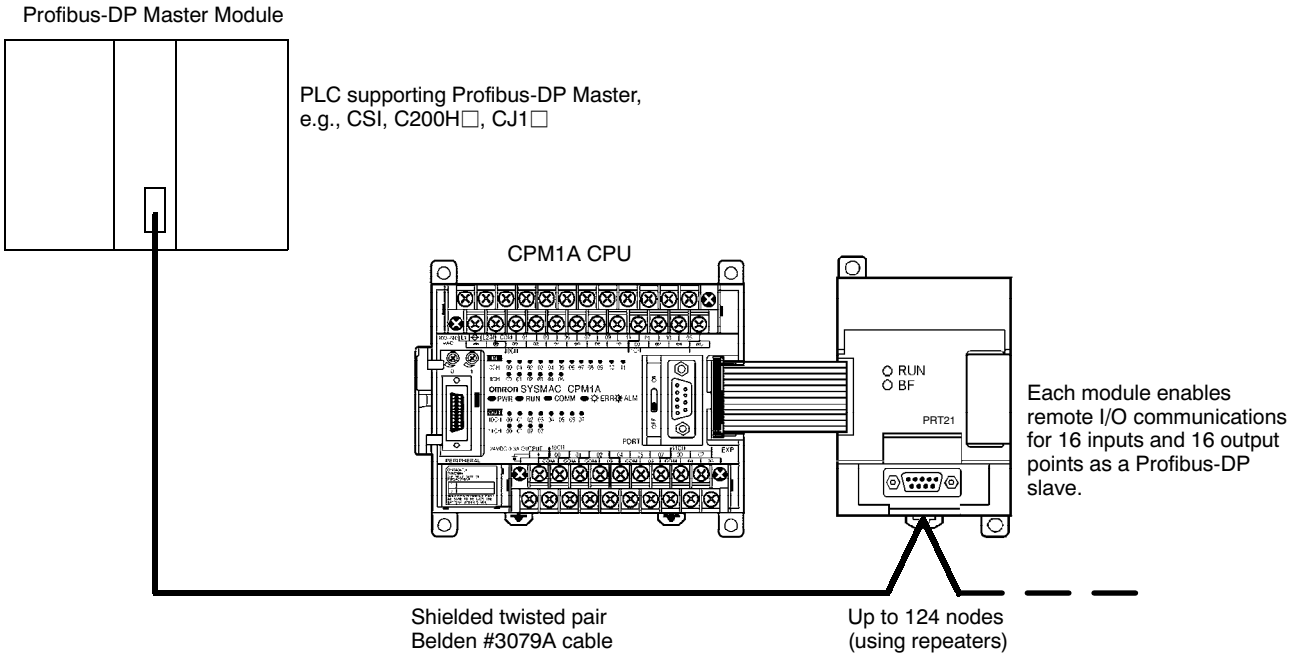


Specifications

Item	Specification
Model number	CPM1A-DRT21
Master/slave	DeviceNet Slave
Number of I/O points	32 input points, 32 output points
Number of words allocated in CPU Unit I/O memory	2 input words, 2 output words (Allocated in the same way as Expansion I/O Units and other Expansion Units)
Node number setting	Set using the rotary switches (Set before turning ON the CPU's power supply.)

■ PROFIBUS-DP SLAVE MODULE

The CPM1A-V1 controller can function as a slave to a Profibus-DP Master Module when a CMP1A-PRT Profibus-DP Slave Module is connected. The Profibus-DP Slave Module establishes an I/O link of 16 inputs and 16 outputs between the master and the controller. A maximum of 3 Profibus-DP Slave Modules can be connected to a CPM1A or CPM2A to create I/O links for up to 96 points (48 inputs and 48 outputs).



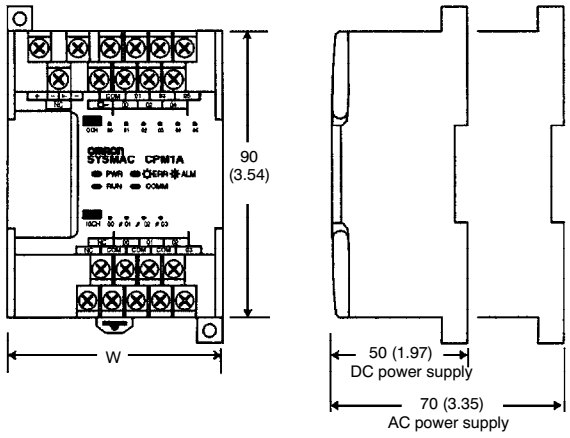
Specifications

Storage temperature	−20 to +75°C
Ambient temperature	0 to +55°C
Ambient humidity	10 to 90% (non-condensing)
EMC compliance	EN 50081-2, EN 61131-2
Current consumption	100 mA from the PLC I/O bus
Weight	125 g (typical)
Control data	From CPU to unit: none
Status data	From unit to CPU: none
I/O data (in bytes)	2 bytes input, 2 bytes output

Dimensions

Unit: mm (inch)

■ CPU, EXPANSION I/O AND SPECIAL I/O MODULES

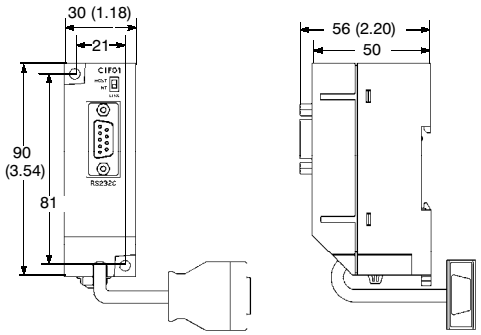


Model	W
CPM1A-10CD□-A/D-V1	66 (2.60)
CPM1A-20CD□-A/D-V1	86 (3.39)
CPM1A-30CD□-A/D-V1	130 (5.12)
CPM1A-40CD□-A/D-V1	150 (5.91)
CPM1A-20ED□	86 (3.39)
CPM1A-8E□	66 (2.60)
CPM1A-SRT21	66 (2.60)
CPM1A-MAD01	66 (2.60)
CPM1A-TS□□□	86 (3.39)
CPM1A-MAD11	86 (3.39)
CPM1A-DRT21	66 (2.60)
CPM1A-PRT21	66 (2.60)

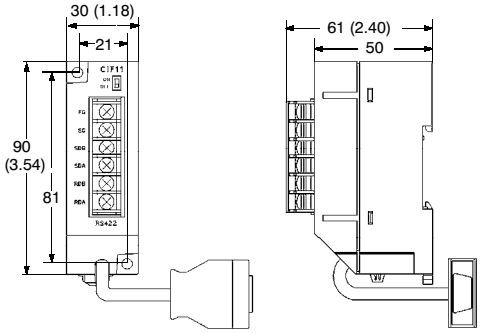
Unit: mm (inch)

■ COMMUNICATION ADAPTER MODULES

CPM1-CIF01

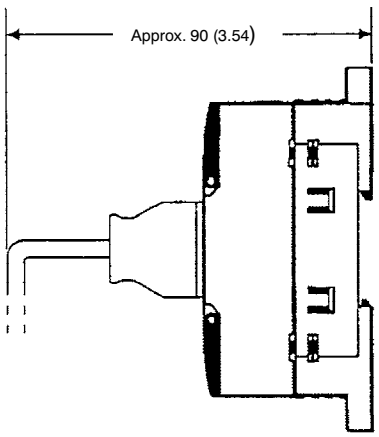


CPM1-CIF11

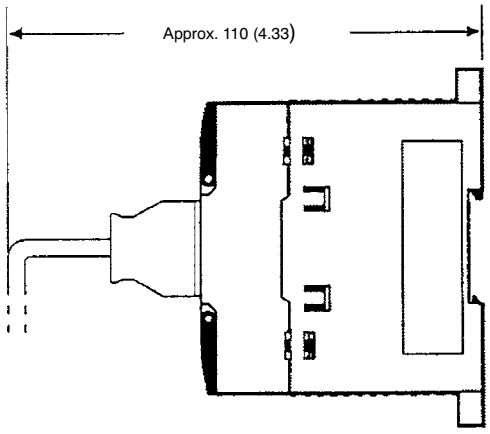


■ DIMENSIONS WITH PERIPHERAL DEVICES ATTACHED

CPU with DC Power Supply



CPU with AC Power Supply



Functions

■ CONFIGURATION

The CPM1A CPUs feature a compact, one-piece construction that includes 10, 20, 30 or 40 built-in I/O terminals. Three output models are available: Relay outputs, sinking (NPN) transistor output and sourcing (PNP) transistor output.

Expansion

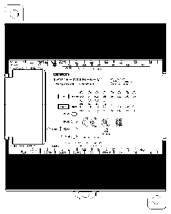
Up to three Expansion I/O Modules can be connected to a 30-point or 40-point CPU to add an extra 8 or 20 I/O points for each, for a maximum of up to 100 I/O points.

Dedicated I/O Modules

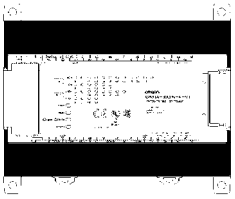
Up to 3 Analog I/O Modules or Temperature Sensor Input Modules can be used with 30-point and 40-point CPUs. Each analog I/O module provides 2 analog inputs and 1 analog output, so a maximum of 6 analog inputs and 3 analog outputs can be achieved by connecting 3 Analog I/O Modules. Each Temperature Sensor Module provides two temperature sensor inputs from either thermocouples or platinum resistance thermometers. Up to 6 inputs can be connected.

CPM1A-10CD□-□-V1
(10 I/O terminals)

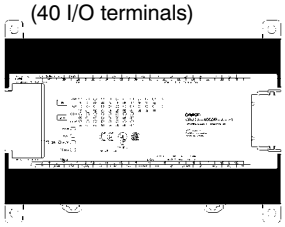
CPM1A-20CD□-□-V1
(20 I/O terminals)



CPM1A-30CD□-□-V1
(30 I/O terminals)



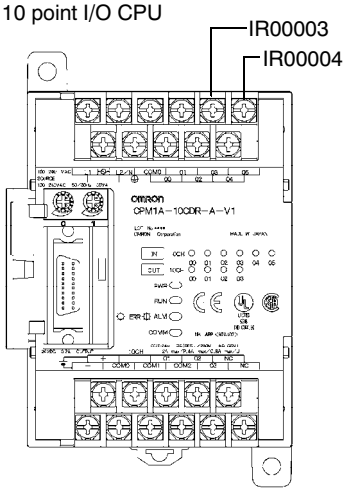
CPM1A-40CD□-□-V1
(40 I/O terminals)



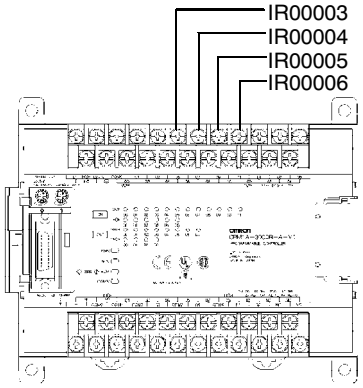
■ INTERRUPT INPUTS

There are two input interrupts in the CPM1A 10-point I/O CPU and four in the 20-, 30-, and 40-point I/O CPUs. Input interrupts are available in two modes. In addition to normal interrupt inputs, the CPM1A has a counter mode that counts high-speed input signals and triggers interrupts at fixed count multiples.

10 point I/O CPU



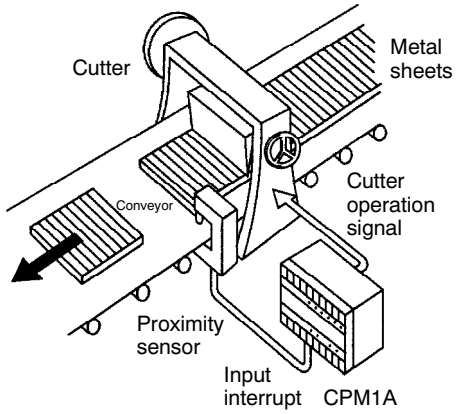
20, 30, and 40 point I/O CPU



Application Example:

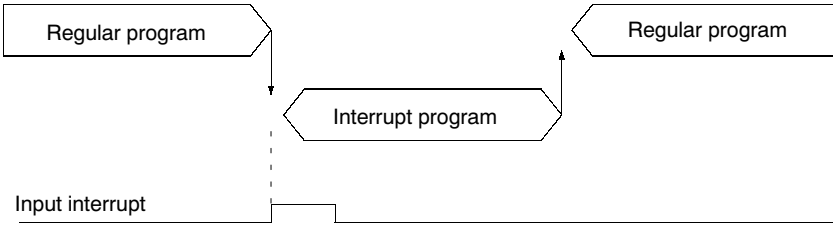
Cutting Metal Sheets to Specified Lengths

The proximity sensor detects the edge of a metal plate to operate the cutter. Metal sheets can be cut continuously to the specified lengths at a high speed.



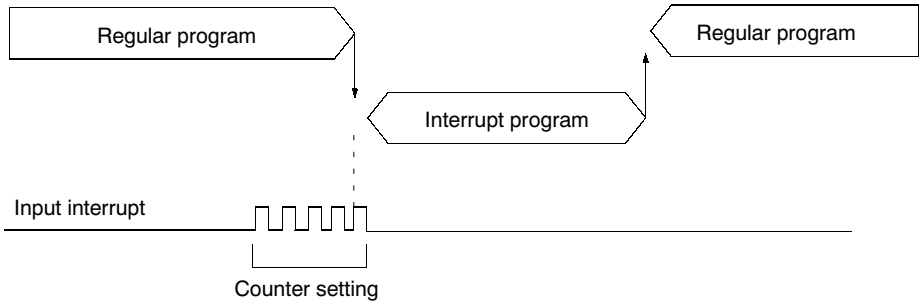
Input Interrupt Mode

If an input interrupt occurs, the regular program shuts down irrelevant of the cycle time, and the interrupt processing program is executed immediately.



Counter Mode

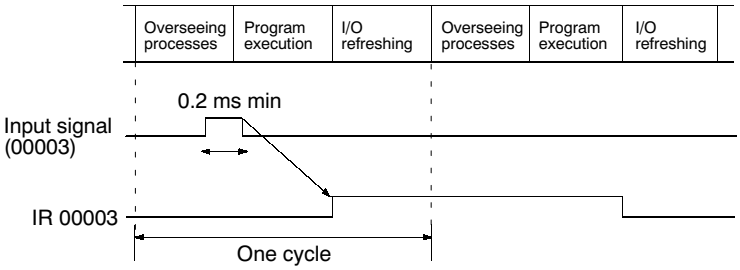
When the number of external signals counted at high speed reaches a specified number of counts, the regular program shuts down, and the interrupt processing program is executed at fixed counts. The count can be set between 0 and 65535.



■ QUICK-RESPONSE INPUTS

Quick-response inputs can detect input signals with a pulse width as short as 0.2 ms regardless of their timing during the scan cycle. Quick-response inputs and interrupt inputs use the same input terminals.

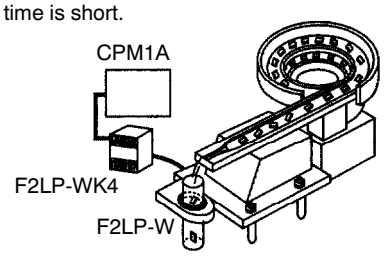
CPU	Input no.	Minimum input pulse width
10 point I/O CPU	00003 to 00004	0.2 ms
20 point, 30 point, 40 point I/O CPU	00003 to 00006	



Application Example:

Calculating the Number of Chips

The metal sensor counts the number of parts that have passed. Steady counting can be achieved even when the input-ON time is short.

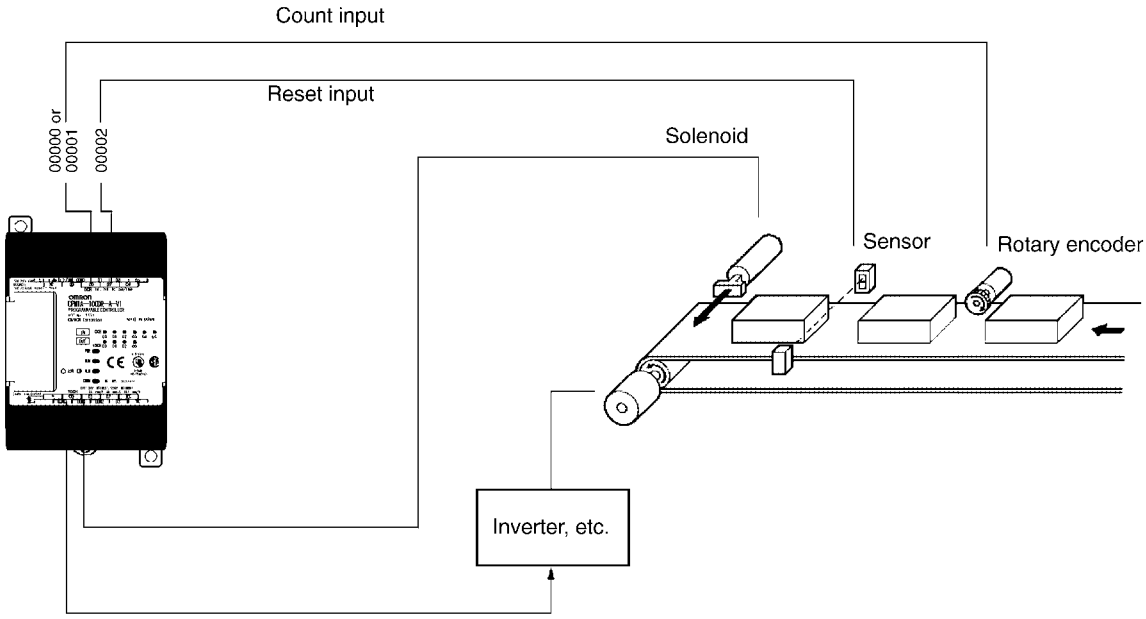


■ HIGH-SPEED COUNTER

The CPM1A has a high-speed counter function that can be used in the incrementing and up/down mode. Using this function together with the input interrupts enables zone comparison control or target value control irrelevant of the cycle time.

Counting mode		Incrementing mode	Up/Down mode
Input no.	00000	Count input	A-phase input
	00001	—	B-phase input
	00002	Reset input	Z-phase input
Input method		Single-phase input	Phase-difference, 4× inputs
Count frequency		5.0 kHz	2.5 kHz
Count range		0 to 65535	−32767 to 32767

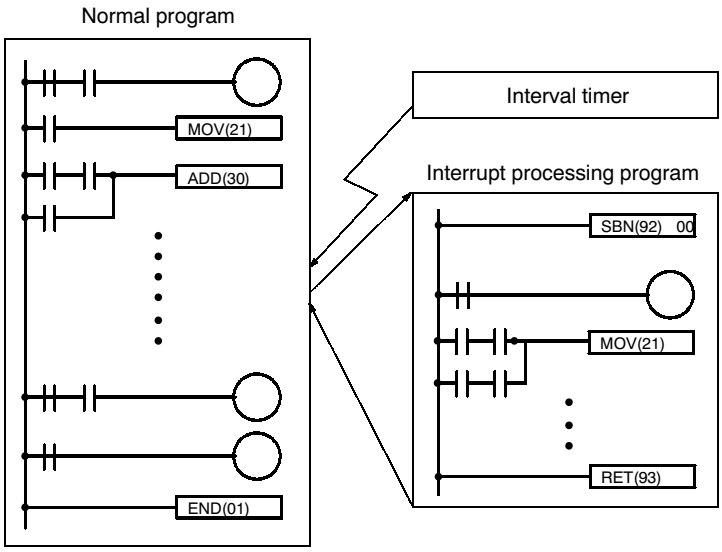
Note: When using in the incrementing mode, the input 00001 can be used as an input contact.



■ INTERVAL TIMER INTERRUPTS

The CPM1A has one interval timer. The interval timer shuts down the regular program regardless of the point in the cycle once the time is up, and immediately executes an interrupt processing program. Interval timers are used in the following two modes.

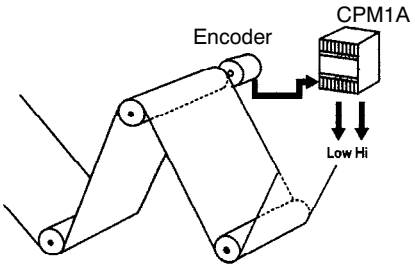
Item	One-shot mode	Scheduled interrupt mode
Operation	An interrupt is executed only once when the time is up.	Interrupts are executed repeatedly at fixed periods.
Setting time	0.5 ms to 319,968 ms (0.1-ms units)	



Application Example:

Computing the Sheet Speed

The number of pulse inputs is computed in the interrupt mode at a fixed time to calculate the speed.

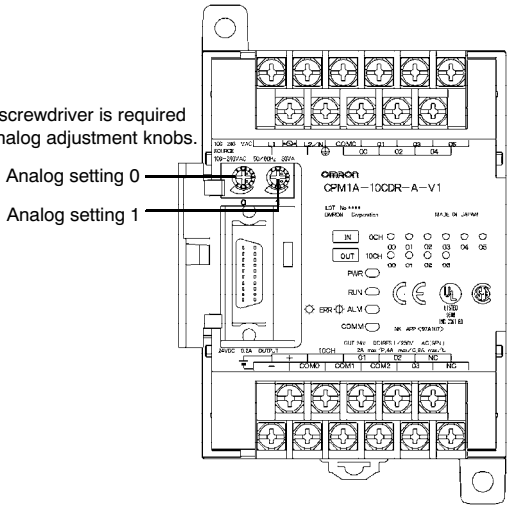


■ ANALOG SETTING

The CPM1A contains two analog setting controls that can be used for a broad range of analog timer and counter settings. Turning the setting control stores values of 0 to 200 (BCD data) in the SR area.

Analog setting	Storage area	Setting value (BCD)
Analog setting 0	SR 250	0000 to 0200
Analog setting 1	SR 251	

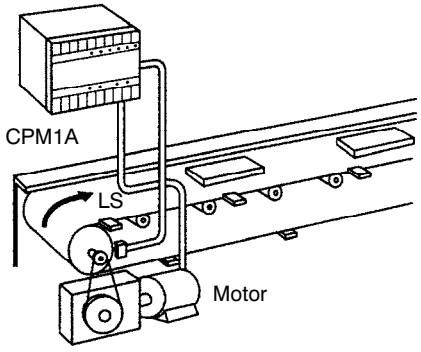
*Phillips screwdriver is required to turn analog adjustment knobs.



Application Example:

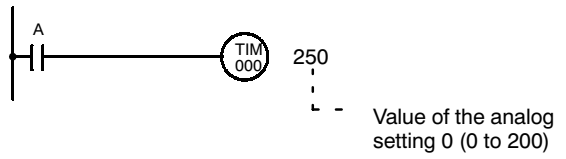
Tact Operation Control of Conveyor Lines

A conveyor can be stopped temporarily as required for assembly processes. When the timer function and limit switches are used in a combination, conveyors can be stopped for a fixed time or can be run at a constant speed for a fixed distance. Fine adjustment of the stopping time can be easily done by using the analog setting controls.

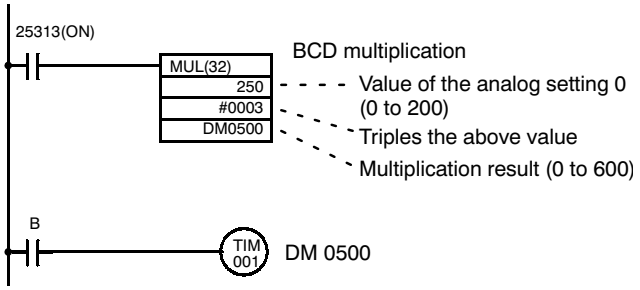


Program Example

1. Analog timer for 0.0 to 20.0 seconds



2. Analog timer for 0.0 to 60.0 seconds



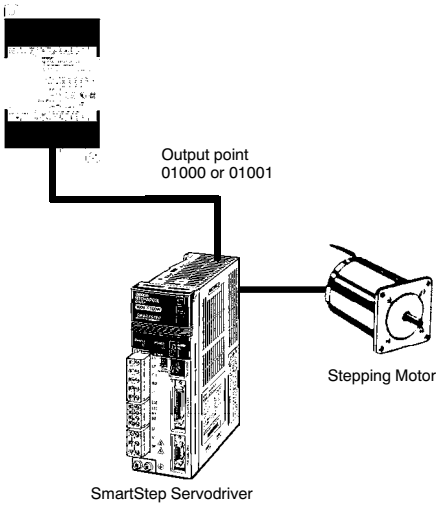
■ PULSE OUTPUT FUNCTION

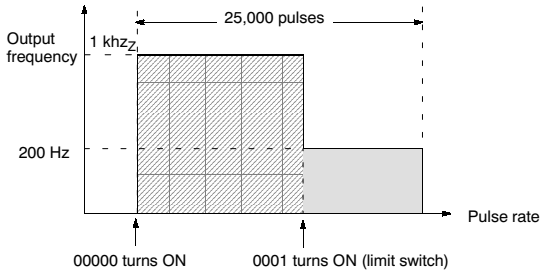
The CPM1A transistor output models have an output function capable of outputting a pulse of 20 Hz to 2 kHz (single-phase output).

When used in combination with a Stepping Driver or SmartStep Servodriver, positioning can be easily performed.

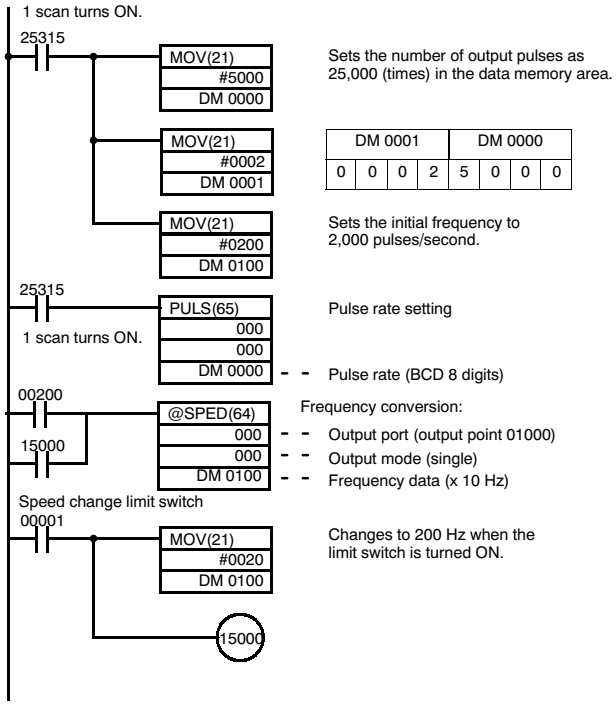
Application Example

Changing the speed of the Stepping Motor.





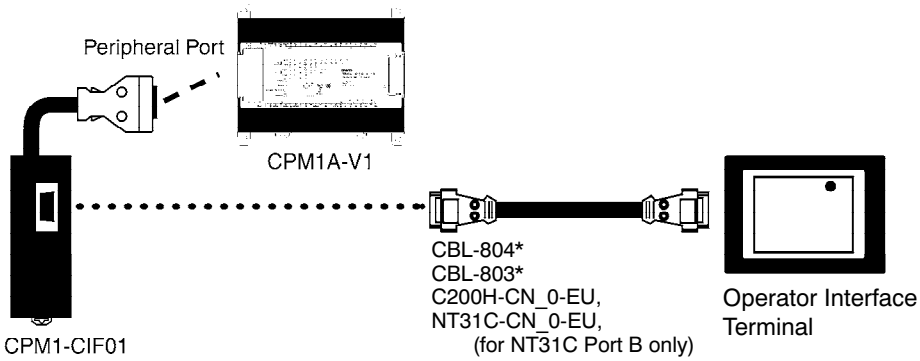
Program Example



Communications

■ NT LINK FOR PROGRAMMABLE TERMINALS

Use Omron's high-speed NT Link for real-time communications between the CPM1A and a Programmable Terminal.

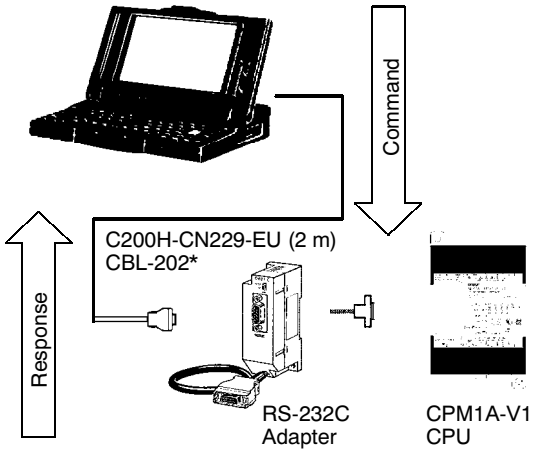


* Available in Canada only.

■ HOST LINK COMMUNICATIONS

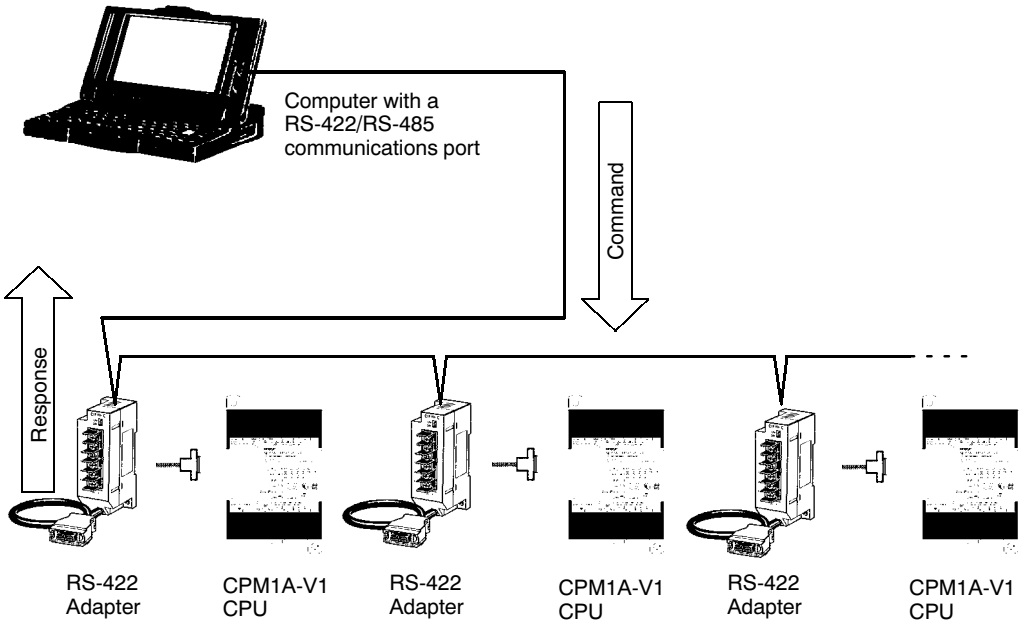
CPM1A Host Link communications consist of interactive procedures whereby the CPM1A returns a response to a command sent from the IBM PC/AT or compatible computer. These communications allow the IBM PC/AT or compatible computer to read and write in the CPM1A's I/O Areas and Data Memory Areas as well as in areas containing the status of various settings.

1:1 Host Link Communications



* Available in Canada only.

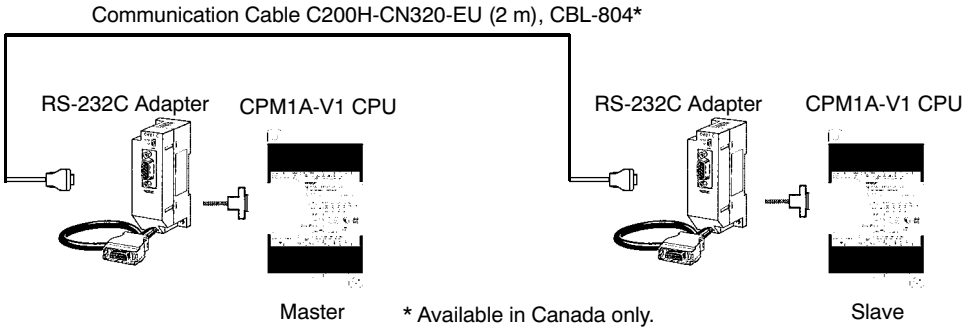
1:N Host Link Communications

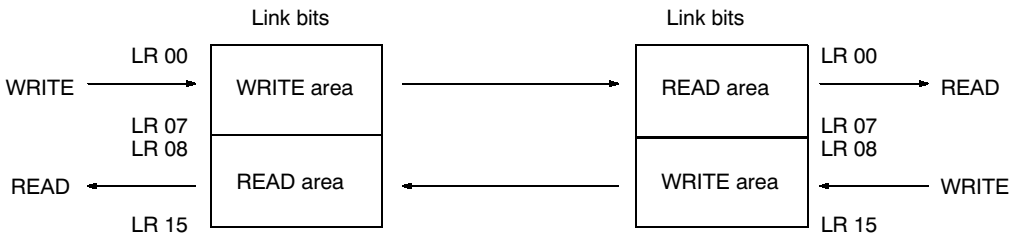


■ 1:1 CONNECTIONS FOR DATA EXCHANGE

With a 1:1 Link, two CPM1As or a CPM1A and CQM1 or C200H□ are connected 1:1 with one side as the Master and the other as the Slave to provide an I/O link of a maximum of 256 points (LR 0000 to LR 1515).

Example of a 1:1 Link between CPM1As



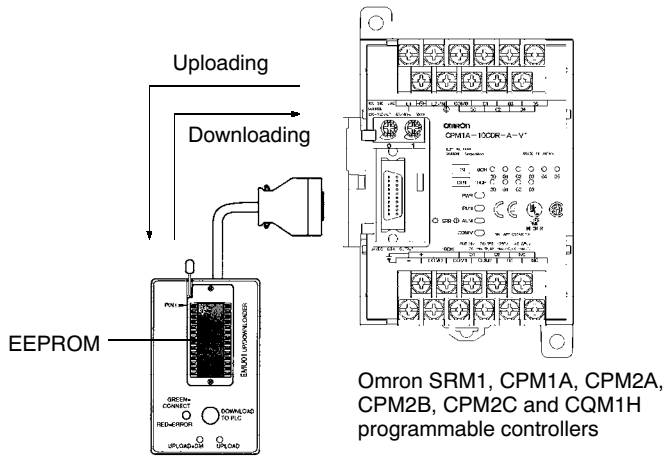


Limitations of the CPM1A 1:1 Link

CPM1A I/O links are limited to 16 words (LR 00 to LR 15). Therefore, use these 16 words (LR 00 to LR 15) on the CQM1 or C200H□ side when forming 1:1 links with a CQM1 or C200H□.

■ PROGRAM TRANSFER UNIT

Use Omron's EEPROM program transfer unit to update programs in machines or program multiple controllers with the same program. The CPM1-EMU01-V1 Expansion Memory Unit connects to the peripheral port of micro and small PLCs.



Omron SRM1, CPM1A, CPM2A, CPM2B, CPM2C and CQM1H programmable controllers

OMRON

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