OMRON ®

| Micro Programmable Controller	CPM2C

Omron's powerful CPM2C packs the speed, power and communications of a larger programmable controller into a modular system with CPUs measuring just 33 mm wide. The CPM2C fits into small spaces, offers 119 instructions and has processing speeds rivaling many "small" PLCs. Multiple communication options and position control features enable the CPM2C to provide a powerful solution to virtually any small-scale control application.

- Ultra compact design with 33 mm width

- Combination RS-232C/peripheral port

- Connector output for relay or screw terminal blocks provides ease of wiring, choice of I/O style, and easy troubleshooting

- Expandable to 192 I/O (CPU + 5 modules)

- Temperature sensor modules available

- Synchronized pulse control coordinates input devices with control devices

- 4K program memory, 2K data memory

- 10 kHz pulse outputs

- Optional real-time clock

- Multiple high-speed counter inputs

Basic Configuration

Up to five Expansion Modules or Expansion I/O Modules can be connected to a CPM2C CPU Unit. The AC Power Supply Unit and the CPM2C-CIF01 or CPM2C-CIF11 Serial Communications Adapters can also be used with the CPU Unit.
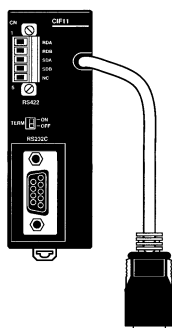
CPM2C-CIF01/CIF11 Serial Communications Adapters for the Peripheral Port (optional)
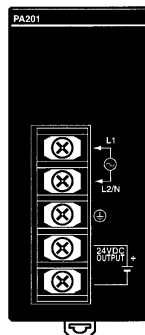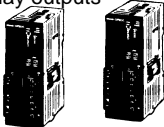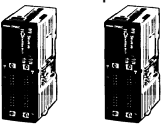
AC Power Supply Unit
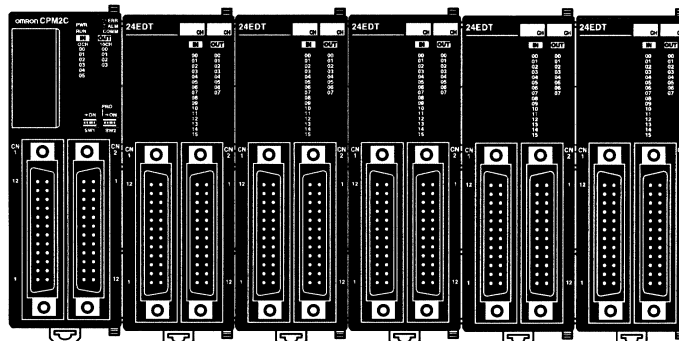
CPU Unit   Up to 5 Expansion Modules or Expansion I/O Modules

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Ordering Information ————————————————

■ CPU UNITS

Description	Input points	Output points	Internal clock	Part number		
				Relay outputs	**Transistor outputs**	
					NPN	**PNP**
CPU Units with relay outputs	6 points	4 points	—	**CPM2C-10CDR-D**	—	—
	12 points	8 points	—	**CPM2C-20CDR-D**	—	—
	6 points	4 points	Yes	**CPM2C-10C1DR-D**	—	—
	12 points	8 points	Yes	**CPM2C-20C1DR-D**	—	—
CPU Units with transistor outputs	6 points	4 points	—	—	**CPM2C-10CDTC-D**	**CPM2C-10CDT1C-D**
			Yes	—	**CPM2C-10C1DTC-D**	**CPM2C-10C1DT1C-D**
	12 points	8 points	—	—	**CPM2C-20CDTC-D**	**CPM2C-20CDT1C-D**
			Yes	—	**CPM2C-20C1DTC-D**	**CPM2C-20C1DT1C-D**
	16 points	16 points	—		**CPM2C-32CDTC-D**	**CPM2C-32CDT1C-D**

■ POWER SUPPLY UNIT

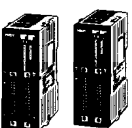| Description		Input	Output	**Part number**
Power Supply		100 to 240 VAC	24 VDC/600 mA	**CPM2C-PA201**

■ EXPANSION I/O MODULES

Description			Inputs	Outputs	**Part number**
Inputs only		I/O connector	8 input points	—	**CPM2C-8EDC**
			16 input points	—	**CPM2C-16EDC**
Outputs only		I/O terminal block	—	8 relay outputs	**CPM2C-8ER**
		I/O connector	—	8 NPN transistor outputs	**CPM2C-8ETC**
			—	8 PNP transistor outputs	**CPM2C-8ET1C**
			—	16 NPN transistor outputs	**CPM2C-16ETC**
			—	16 PNP transistor outputs	**CPM2C-16ET1C**
10 I/O points		I/O terminal block	6 input points	4 relay outputs	**CPM2C-10EDR**
24 I/O points		I/O connectors	16 input points	8 NPN transistor outputs	**CPM2C-24EDTC**
				8 PNP transistor outputs	**CPM2C-24EDT1C**
32 I/O points		I/O connectors	16 input points	16 NPN output transistor outputs	**CPM2C-32EDTC**
				16 PNP output transistor outputs	**CPM2C-32EDT1C**

■ DEDICATED I/O MODULES
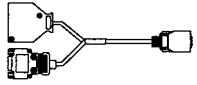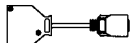
Description		Specifications	Part number
Analog I/O module		2 analog inputs and 1 analog output Voltage I/O: 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, or –10 to +10 VDC Current I/O: 0 to 20 mA or 4 to 20 mA	**CPM2C-MAD11**
Temperature sensor input module		Two thermocouple inputs (Type K or Type J)	**CPM2C-TS001**
		Two platinum resistance thermometer inputs (Pt100 or JPt100)	**CPM2C-TS101**
CompoBus/S I/O Link Module		Operates as a CompoBus/S Slave and provides 8 inputs and 8 outputs to the Master.	**CPM2C-SRT21**
		Flat cable, 4-core , 0.75 mm^2; 100 m length	**SCA1-4F10**
		Twisted pair cable, 2-core x 0.75 mm^2; available commercially	Belden #9409 cable

■ I/O CONNECTORS (OMRON)

Connectors are not provided with transistor output CPM2C CPU Units. Each CPU Unit requires two sets of Connectors.

Description		Part number
	24-pin soldered connector with cover	**C500-CE241**
	24-crimp connector with cover	**C500-CE242**
	24-pin pressure connector	**C500-CE243**

■ COMMUNICATIONS PORT CONNECTING CABLES

Connector	Description	Cable length	Part number
	Converts the CPM2C CPU Unit's communications port to a peripheral port and RS-232C port.	0.15 m (about 4 in)	**CPM2C-CN111**
	Converts the CPM2C CPU Unit's communications port to a peripheral port.	0.05 m (about 2 in)	**CS1W-CN114**
	Converts the CPM2C CPU Unit's communications port to an RS-232C port.	0.1 m (about 2 in)	**CS1W-CN118**

■ PROGRAMMING CONSOLES AND CABLES

Product		Part number
Programming Console with 2 m (6.56 ft) cable attached; connects directly to the peripheral port.		**CQM1-PRO01-E**
Programming Console (Requires separate cable. See below.)		**C200H-PRO27-E**
Connecting Cable for C200H-PRO27-E connects directly to a Peripheral port.	2-m (6.56 ft) length	**C200H-CN222**
	4 m (13.12 ft) length	**C200H-CN422**
Connecting Cable for C200H-PRO27-E allows direct connection to the CPM2C CPU Unit's Communications port.	2 m (6.56 ft) length)	**CS1W-CN224**
	6 m (19.69 ft) length	**CS1W-CN624**
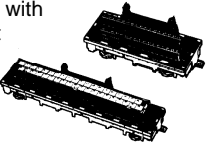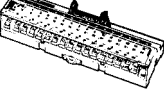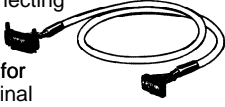
■ SUPPORT SOFTWARE

Product	Functions	Part number
CX-Programmer Jr.	Windows-based programming software; reduced instruction set and networking commands. OS: Windows 95/98/NT	**WS02-CXPC1-EJR-V2.0**
CX-Programmer	Full programming software package programs micro, small and larger controllers.	**WS02-CXPC1-EV2.0**
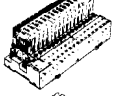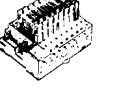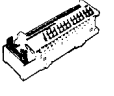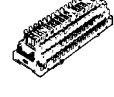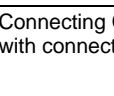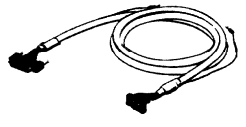
■ PERIPHERAL PORT COMMUNICATION ADAPTERS AND CONNECTING CABLES

CPM2C port	Name	Appearance	Comments	Cable length	**Part number**
Communication	RS-232C Adapter		DIN mount adapter converts the CPU's communications port to one communications port and one RS-232C DB9-pin serial port.	3.3 m (10.8 ft)	**CPM2C-CIF01**
			Converts the CPM2C CPU Unit's communication port to an RS-232C port; for DB9-pin serial port. Can be used for program downloads.	2 m (6.56 ft)	**CS1W-CN226**
				6 m (19.7 ft)	**CS1W-CN626**
RS-232C	RS-232C Cable		Program download cable from computer to Omron DB9-pin serial port.	2 m (6.56 ft)	**C200HS-CN220-EU**
			Communications cable to other Omron devices with DB9-pin serial port.	3 m (9.8 ft)	**C200H-CN320-EU**
				5 m (16.4 ft)	**C200H-CN520-EU**
Communication	RS-422/ RS-485 Adapter		DIN mount adapter converts the CPU's communications port to one RS-232C DB9-pin port and one RS-422/RS-485 port.	3.3 m (10.8 ft)	**CPM2C-CIF11**

■ SCREW TERMINALS AND CONNECTING CABLES

Product	Description	No. of inputs/outputs	**Part number**
Screw terminals with MIL style socket	Flat cable connector with M3 slotted screw terminal block	20	**XW2B-20G4**
	Flat cable connector with M3.5 screw terminal block	20	**XW2B-20G5**
Input screw terminal with common for power supply and LED indicators	Flat cable connector with M3.5 screw terminal block	16 inputs NPN input (+ common)	**XW2C-20G5-IN16**
Dedicated connecting cable with one connector for controller, one for the screw terminal	0.5 m (1.64 ft) cable length		**XW2Z-050A**
	1 m (3.28 ft) cable length		**XW2Z-100A**
	1.5 m (4.92 ft) cable length		**XW2Z-150A**
	2 m (6.56 ft) cable length		**XW2Z-200A**
	3 m (9.84 ft) cable length		**XW2Z-300A**
	5 m (16.40 ft) cable length		**XW2Z-500A**

■ RELAY I/O BLOCKS AND CONNECTING CABLES

Product	Mounted relay	I/O points	Processing	Rated voltage	Part number
Relay I/O Blocks	G7T (G3TA SSRs can be used; order separately)	16 inputs	NPN (– common)	24 VDC	G7TC-ID16 DC24V
				100/120 VAC	G7TC-IA16 AC110/120V
				200/240 VAC	G7TC-IA16 AC220/240V
		16 outputs	NPN (+ common, sinking output)	24 VDC	G7TC-OC16 DC24V
			PNP (– common, sourcing output)	24 VDC	G7TC-OC16-1 DC24V
		8 outputs	NPN (+ common, sinking output)	24 VDC	G7TC-OC08 DC24V
			PNP (– common, sourcing output)	24 VDC	G7TC-OC08-1 DC24V
	G6D	16 outputs	NPN (+ common, sinking output)	24 VDC	G70D-SOC16 DC24
			PNP (– common, sourcing output)	24 VDC	G70D-SOC16-1 DC24
	G3DZ (Power MOS FET Relay)		NPN (+ common, sinking output)	24 VDC	G70D-FOM16
			PNP (– common, sourcing output)	24 VDC	G70D-FOM16-1 DC24
	G6D		NPN (+ common, sinking output)	24 VDC	G70D-VSOC16
	G3DZ (Power MOS FET Relay)		NPN (+ common, sinking output)	24 VDC	G70D-VFOM16
	(Sold separately) G2R G3R G3RN H3RN		NPN (+ common, sinking output)	24 VDC	G70A-ZOC16-3 DC24V
			PNP (– common, sourcing output)		G70A-ZOC16-4 DC24V
		16 inputs	NPN/PNP (to the relay)	240 VAC/110 VDC	G70A-ZIM16-5 DC24V
Connecting Cable with connector (1:1)		1 m (3.28 ft) cable length			G79-100C
		1.5 m (4.92 ft) cable length			G79-150C
		2 m (6.56 ft) cable length			G79-200C
		3 m (9.84 ft) cable length			G79-300C
		5 m (16.40 ft) cable length			G79-500C

■ PROGRAM TRANSFER EQUIPMENT

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

■ MAINTENANCE ACCESSORIES

Product	Description	Part number
Battery	Backs up memory in the CPM2C CPU Unit. (One battery is already installed in the unit.)	CPM2C-BAT01

■ MANUALS

Product	Description	Part number
Operation manual	CPM2C operation manual	W356
Programming manual	CPM1/CPM1A/CPM2A/CPM2C programming manual	W353

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Specifications ─────────────────────

■ GENERAL SPECIFICATIONS FOR CPU AND EXPANSION UNITS

Item	CPU Units with 10/20 I/O points		CPU Units with 32 I/O points transistor outputs	Expansion I/O Units and Expansion Units
	Relay outputs	Transistor outputs		
Supply voltage	24 VDC			
Operating voltage range	20.4 to 26.4 VDC			
Power consumption (See Note)	CPM2C-10C☐DR-☐: 4 W CPM2C-10C☐DT☐C-D: 3 W CPM2C-10C☐DT☐M-D: 3 W CPM2C-20C☐DR-☐: 4 W CPM2C-20C☐DT☐C-D: 3 W CPM2C-20C☐DT☐M-D: 3 W CPM2C-32CDT☐C-D: 3 W CPM2C-32CDT☐M-D: 3 W Note: The above values for CPU Unit power consumption include the power consumption for Programming Consoles and Communications Adapter Units (CIF☐☐).			CPM2C-10EDR: 1 W CPM2C-20EDR: 2 W CPM2C-8ER: 2 W CPM2C-24EDTC: 1 W CPM2C-24EDT1C 1 W CPM2C-32EDTC: 1 W CPM2C-32EDT1C 1 W CPM2C-8EDC: 1 W CPM2C-16EDC: 1 W CPM2C-8ETC: 1 W CPM2C-8ET1C: 1 W CPM2C-16ETC: 1 W CPM2C-16ET1C: 1 W CPM2C-24EDTM: 1 W CPM2C-24EDT1M: 1 W CPM2C-32EDTM: 1 W CPM2C-32EDT1M: 1 W CPM2C-8EDM: 1 W CPM2C-16EDM: 1 W CPM2C-8ETM: 1 W CPM2C-8ET1M: 1 W CPM2C-16ETM: 1 W CPM2C-16ET1M: 1 W CPM2C-MAD11: 3.5 W CPM2C-TS001: 1.5 W CPM2C-TS101: 1.5 W CPM2C-SRT21: 1 W CPM2C-CIF21: 1 W
Inrush current	25 A max.			
Insulation resistance	20 MΩ min. (at 500 VDC) between insulated circuits			
Dielectric strength	2,300 VAC for 1 min (between insulated circuits)			
Noise immunity	Conforms to IEC61000-4-4; 2 kV (power lines)			
Vibration resistance	10 to 57 Hz, 0.075-mm double amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes each (Time coefficient; 8 minutes × coefficient factor 10 = total time 80 minutes)			
Shock resistance	147 m/s^2 three times each in X, Y, and Z directions			
Ambient temperature	Operating: 0° to 55°C (32° to 131°F) Storage: –20° to 75°C (–4° to 167°F) except for the battery			
Humidity	10% to 90% (with no condensation)			
Atmosphere	Must be free from corrosive gas			
Power interrupt time	2 ms min.			
Weight	10 I/O: 200 g max. 20 I/O: 250 g max.	200 g max.	200 g max.	8 and 16 inputs: 150 g 8 and 16 transistor outputs 150 g 8 relay outputs 200 g 10 I/O (relay outputs) 200 g 24 I/O (transistor outputs) 200 g 32 I/O (transistor outputs) 200 g Peripheral/RS-232C Adapter 150 g RS-422/RS-232C Adapter 150 g AC power supply unit 250 g Analog I/O, Temperature units 200 g CompoBus/S unit 150 g

Note: When calculating the total power consumption, it is necessary to include the power consumption of Programming Consoles, RS-232C Adapters and other devices.

■ CPU CHARACTERISTICS

Item		10 I/O points (relay/transistor outputs)	20 I/O points (relay/transistor outputs)	32 I/O points (transistor outputs)
Control method		Stored program method		
I/O control method		Cyclic scan with direct output (Immediate refreshing can be performed with IORF(97).)		
Programming language		Ladder diagram		
Instruction length		1 step per instruction, 1 to 5 words per instruction		
Instructions		Basic instructions: 14 Special instructions: 105 instructions, 185 variations		
Execution time		Basic instructions: 0.64 µs (LD instruction) Special instructions: 7.8 µs (MOV instruction)		
Program capacity		4,096 words		
User data memory capacity		2,048 words		
I/O capacity	CPU Unit only	10 points	20 points	32 points
	With Expansion I/O Modules	170 points max.	180 points max.	192 points max.
Clock function		Shows the year, month, day of the week, day, hour, minute, and second. (Battery backup) CPU Units with "C1" in the model number have a built-in clock. The 32 I/O CPU does not have a clock function.		
Communications functions		A CPM2C-CN111, CS1W-CN114 or CS1W-CN118 connecting cable is required to connect to the CPM2C's communications port. The communications port can be used as both a peripheral and RS-232C port. Peripheral port: Supports Host Link, peripheral bus, no-protocol, or Programming Console connections. RS-232C port: Supports Host Link, no-protocol, 1:1 Slave Unit Link, 1:1 Master Unit Link, or 1:1 NT Link connections.		
Memory protection		HR area, AR area, program contents, read/write DM area contents, and counter values are maintained during power interruptions.		
Memory backup		Flash memory: Program, read-only DM area, and PC Setup Memory backup: The read/write DM area, HR area, AR area, and counter values are backed up. When a battery is installed, its lifetime is approximately 2 years at 25°C. When a battery is not installed, the internal capacitor will backup memory for 10 days at 25°C. (See Note)		
Self-diagnostic functions		CPU Unit failure (watchdog timer), I/O bus error, battery error, and memory failure		
Program checks		No END instruction, programming errors (checked when operation is started)		
Basic interrupts	Interrupt processing	2 interrupts	4 interrupts	4 interrupts
		Shared by the external interrupt inputs (counter mode) and the quick-response inputs.		
	Interval timer interrupts	1 (Scheduled Interrupt Mode or Single Interrupt Mode)		
High-speed counter	High-speed counter	One high-speed counter: 20 kHz single-phase or 5 kHz two-phase (linear count method) Counter interrupt: 1 (set value comparison or set-value range comparison)		
	Interrupt Inputs (Counter mode)	2 inputs	4 inputs	4 inputs
		Shared by the external interrupt inputs and the quick-response inputs. Count-up interrupts: Shared by the external interrupt inputs and the quick-response inputs.		
Pulse output		Two points with no acceleration/deceleration, 10 Hz to 10 kHz each, and no direction control. One point with trapezoid acceleration/deceleration, 10 Hz to 10 kHz, and direction control. Two points with variable duty-ratio outputs (using PWM(—)). (Pulse outputs can be used with transistor outputs only, they cannot be used with relay outputs.)		
Synchronized pulse control		One point: A pulse output can be created by combining the high-speed counter with pulse outputs and multiplying the frequency of the input pulses from the high-speed counter by a fixed factor. (This output is possible with transistor outputs only, it cannot be used with relay outputs.)		
Quick-response inputs		2 inputs	4 inputs	4 inputs
		Shared by the external interrupt inputs and the interrupt inputs (counter mode). Min. input pulse width: 50 µs max.		
Input time constant (ON response time = OFF response time)		Can be set for all input points. (1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms)		

Note: A CPM2C-BAT01 Battery can be installed in CPU Units that are not equipped with a clock to backup the contents of the read/write DM area, HR area, AR area, and counter values. Memory can be backed up for up to 2 years.

■ I/O ALLOCATION

Input bits	IR 00000 to IR 00915 (Words not used for input bits can be used for work bits.)
Output bits	IR 01000 to IR 01915 (Words not used for output bits can be used for work bits.)
Work bits	928 bits: IR 02000 to IR 04915 (Words IR 020 to IR 049) and IR 20000 to IR 22715 (Words IR 200 to IR 227)
Special bits (SR area)	448 bits: SR 22800 to SR 25515
Temporary bits (TR area)	8 bits (TR0 to TR7)
Holding bits (HR area)	320 bits: HR 0000 to HR 1915 (Words HR 00 to HR 19)
Auxiliary bits (AR area)	384 bits: AR 0000 to AR 2315 (Words AR 00 to AR 23)
Link bits (LR area)	256 bits: LR 0000 to LR 1515 (Words LR 00 to LR 15)
Timers/Counters	256 timers/counters (TIM/CNT 000 to TIM/CNT 255) 1-ms timers: TMHH(—) 10-ms timers: TIMH(15) 100-ms timers: TIM 1-s/10-s timers: TIML(—) Decrementing counters: CNT Reversible counters: CNTR(12)
Data memory	Read/Write: 2,048 words (DM 0000 to DM 2047)* Read-only: 456 words (DM 6144 to DM 6599) PC Setup: 56 words (DM 6600 to DM 6655) *The Error Log is contained in DM 2000 to DM 2021.

■ I/O SPECIFICATIONS

CPU Unit Input Specifications

Item	Inputs	Specification		
		10 I/O CPU	20 I/O CPU	32 I/O CPU
Input voltage	All	24 VDC $^{+10\%}/_{-15\%}$		
Input impedance	IN00000 to IN00001	2.7 kΩ		
	IN00002 to IN00004	3.9 kΩ	—	—
	IN00002 to IN00006	—	3.9 kΩ	3.9 kΩ
	IN00005	4.7 kΩ	—	—
	IN00007 and up	—	4.7 kΩ	4.7 kΩ
Input current	IN00000 to IN00001	8 mA typical		
	IN00002 to IN00004	6 mA typical	—	—
	IN00002 to IN00006	—	6 mA typical	6 mA typical
	IN00005 and up	5 mA typical	—	—
	IN00007 and up	—	5 mA typical	—
	IN00007	—	—	5 mA typical
	IN00100 to IN00107	—	—	5 mA typical
ON voltage/current	IN00000 to IN00001	17 VDC min., 5.0 mA		
	IN00002 and up	14.4 VDC min., 3.5 mA		
OFF voltage/current	All	5.0 VDC max., 1.1 mA		
ON delay	All	1 to 80 ms max. Default: 10 ms (See Note)		
OFF delay	All	1 to 80 ms max. Default: 10 ms (See Note)		
Circuit configuration	IN00000 to IN00001			
	CPU Units with 10 I/O poitns: IN00002 to IN00004 CPU Units with 20 or 32 I/O points: IN00002 to IN00006			
	CPU Units with 10 I/O points: IN00005 CPU Units with 20 I/O points: IN00007 to IN00011 CPU Units with 32 I/O points: IN00007 and IN00100 to IN00107			

Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PLC Setup.

High-speed Counter Inputs

The following CPU Unit input bits can be used as high-speed counter inputs. The maximum count frequency is 5 kHz in differential phase mode and 20 kHz in the other modes.

Input	Function			
	Differential phase mode	Pulse plus direction input mode	Up/down input mode	Increment mode
IN00000	A-phase pulse input	Pulse input	Increment pulse input	Increment pulse input
IN00001	B-phase pulse input	Direction input	Decrement pulse input	Normal input
IN00002	Z-phase pulse input or hardware reset input (IN00002 can be used as a normal input when it is not used as a high-speed counter input.)			

Note: The minimum pulse widths for inputs IN00000 (A-phase input) and IN00001 (B-phase input) are as follows:

Pulse plus direction input mode, Up/down input mode, Increment mode
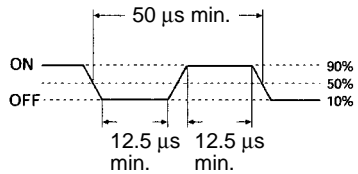
Differential phase mode

T_1 T_2 T_3 T_4 : 12.5 μs min.
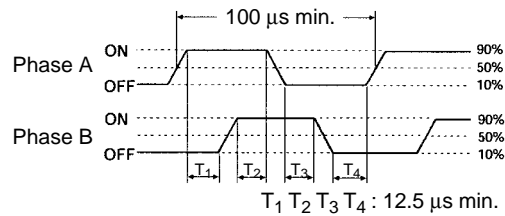
The minimum pulse width for input IN00002 (Z-phase input) is as follows:
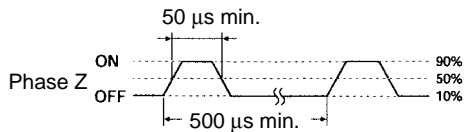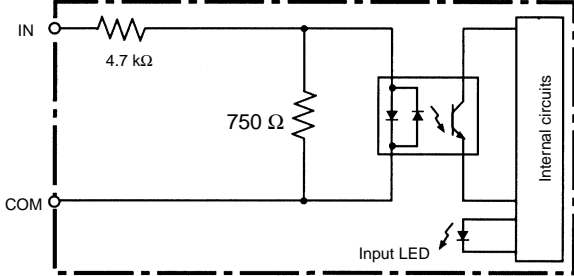
Interrupt Inputs

CPM2C PLCs have inputs that can be used as interrupt inputs (interrupt input mode or counter mode) and quick-response inputs. The minimum pulse width for these inputs is 50 μs.
In CPU Units with 10 I/O points, inputs IN00003 and IN00004 can be used as interrupt inputs. In CPU Units with 20 I/O points, inputs IN00003 through IN00006 can be used as interrupt inputs.
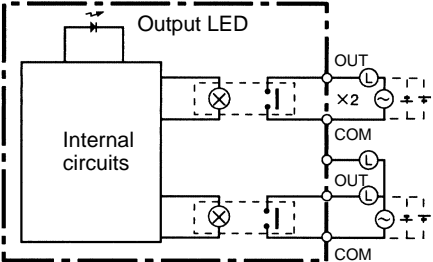
■ EXPANSION I/O MODULE INPUT SPECIFICATIONS

Item	Specification
Input voltage	24 VDC $^{+10\%}/_{-15\%}$
Input impedance	4.7 kΩ
Input current	5 mA typical
ON voltage	14.4 VDC min., 3.5 mA
OFF voltage	5.0 VDC max., 1.1 mA
ON delay	1 to 80 ms max. Default: 10 ms (See note.)
OFF delay	1 to 80 ms max. Default: 10 ms (See note.)
Circuit configuration	

Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PLC Setup.
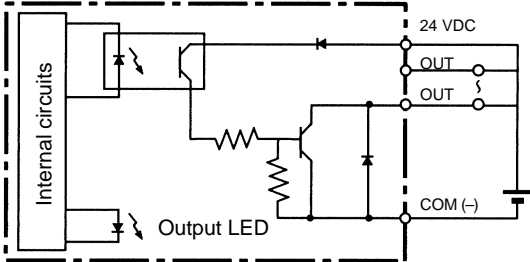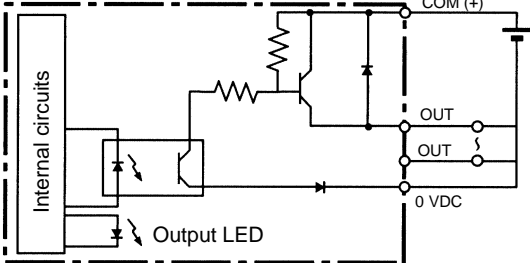
■ CPM2C OUTPUT SPECIFICATIONS (CPU UNITS AND EXPANSION I/O MODULES)

Relay Output

Item	Specification
Max. switching capacity	2 A, 250 VAC (cosϕ = 1) 2 A, 24 VDC (4 A/common)
Min. switching capacity	10 mA, 5 VDC
Service life of relay	Electrical: 150,000 operations (30-VDC resistive load) 100,000 operations (240-VAC inductive load, cosϕ = 0.4) Mechanical: 20,000,000 operations
ON delay	15 ms max.
OFF delay	15 ms max.
Circuit configuration	

■ TRANSISTOR OUTPUTS (NPN OR PNP)

For CPU Units and Expansion I/O Modules

Item	Specification
Max. switching capacity	CPU Units with 10 or 20 I/O points: OUT01000 to OUT01007: 40 mA/4.5 VDC to 300 mA/20.4 VDC, 300 mA (20.4 VDC to 26.4 VDC) CPU Units with 32 I/O points: OUT01000 to OUT01007: 40 mA/4.5 VDC to 300 mA/20.4 VDC, 300 mA (20.4 VDC to 26.4 VDC) OUT01100 to OUT01107: 40 mA/4.5 VDC to 100 mA/20.4 VDC, 100 mA (20.4 VDC to 26.4 VDC) Expansion I/O Modules: OUT01☐00 to OUT01☐07: 40 mA/4.5 VDC to 300 mA/20.4 VDC, 300 mA (20.4 VDC to 26.4 VDC) OUT01☐08 to OUT01☐15: 40 mA/4.5 VDC to 100 mA/20.4 VDC, 100 mA (20.4 VDC to 26.4 VDC) Note: When using OUT01000 or OUT01001 as a pulse output, connect a dummy resistor as required to bring the load current bewteen 10 and 150 mA. If the load current is below 10 mA, the ON/OFF response time will be longer and high-speed pulses will not be output. The transistor will heat if used at 150 mA or higher, possibly damaging elements.
Min. switching capacity	0.5 mA
Max. inrush current	0.9 A for 10 ms (charging and discharging waveform)
Leakage current	0.1 mA max.
Residual voltage	0.8 V max.
ON delay	OUT01000 and OUT01001: 20 μs max. OUT01002 and up: 0.1 ms max.
OFF delay	OUT01000 and OUT01001: 40 μs max. for 10 to 300 mA 0.1 ms max. for 0.5 to 10 mA OUT01002 and up: 1 ms max.
Fuse	1 fuse for each 2 outputs (The fuse cannot be replaced by the user.)
Circuit configuration	**NPN Outputs** **PNP Outputs**

■ AC POWER SUPPLY UNIT

The slim, compact CPM2C-PA201 AC Power Supply Unit is the same shape as the CPM2C's CPU Unit. It connects with a connecting cable (23 cm) provided. It can also be used for CPM1A and CPM2A CPU Units and as display power supply (wired by the user).
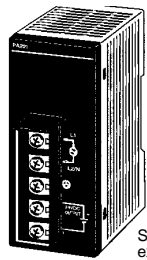
Service power supply for external devices such as sensors (24 V).

AC Power Supply Unit
PA201

Attached connecting cable

AC Power Supply Unit
PA201

CPM2C-PA201 AC Power Supply Unit Specifications

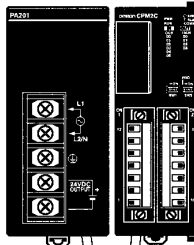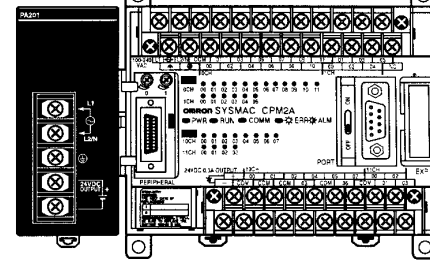| Item			Specification
Rated output			15 W
Output voltage			24 V
Output current			600 mA
Efficiency			75% min. (at rated output)
Input conditions	Rated voltage		100 to 240 VAC (85 to 264 VAC allowable voltage range)
	Frequency		47 to 63 Hz
	Current	100 V	0.4 A
		200 V	0.2 A
	Leakage current	100 V	0.5 mA max. (at rated output)
		200 V	1 mA max. (at rated output)
	Inrush current	100 V	15 A max. (at 25°C cold start)
		200 V	30 A max. (at 25°C cold start)
Output characteristics	Output voltage accuracy		5%/–10%, 10%/–15% (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 independent operation
Overvoltage protection			None
Ambient operating temperature			0° to 55°C (32° to 131°F)
Ambient storage temperature			–20° to 70°C (–4° to 158°F)
Ambient operating humidity			10% to 90% (no condensation)
Dielectric strength			2,000 V for 1 min between all inputs and GR Leakage current: 10 mA 3,000 V for 1 min between all inputs and all outputs Leakage current: 10 mA 1,000 V for 1 min between all outputs and GR Leakage 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, amplitude, 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.

■ DEDICATED I/O MODULES SPECIFICATIONS

Mixed Analog I/O Module CPM2C-MAD11 (2 input and 1 output channels)

For process input variables such as pressure, flow, and humidity, use a Mixed Analog I/O Module. The single analog output can provide a signal for recording devices, valve controllers or a transfer output of the analog signal. Up to 4 Mixed Analog I/O Modules can be used in a CPM2C system with other Expansion I/O Modules. A maximum of 5 Expansion I/O Modules, including Dedicated I/O Modules, can be used in a CPM2C system.

3. Expansion I/O connector (input)

2. Input type and range selector DIP switch

1. Analog I/O terminals
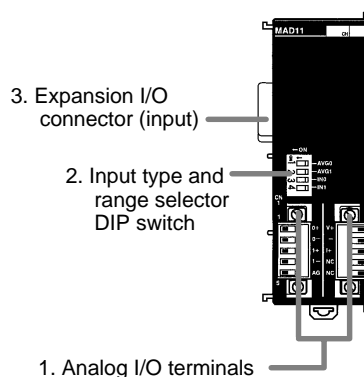
Item		Voltage I/O	Current I/O
Analog input section	Number of inputs	2 inputs (2 words allocated)	
	Input signal range	0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, or −10 to +10 VDC	0 to 20 mA or 4 to 20 mA
	Max. rated input	±15 V	±30 mA
	External input impedance	1 MΩ min.	250 Ω
	Resolution	1/6000 (full scale)	
	Overall accuracy	25°C	0.3% full scale	0.4% full scale
		0 to 55°C	0.6% full scale	0.8% full scale
	A/D conversion 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 section	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 scale 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 Input Modules CPM2C-TS001 and CPM2C-TS101 (2 input channels)

By connecting a Temperature Sensor Module to the CPM2C, inputs can be received from thermocouples or temperature resistance thermometers. Inputs are converted to binary data (4-digit hexadecimal) and stored in the IR area. A maximum of four Temperature Sensor Input Modules can be used in a CPM2C system.
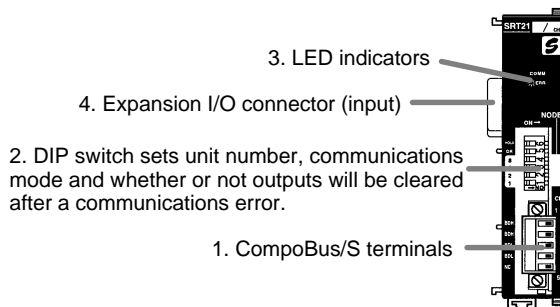
CPM2C-TS001

4. Expansion I/O connector (input)

Cold junction compensator

2. Temperature scale DIP switch

3. Temperature range rotary switch

1. Temperature input terminals

CPM2C-TS101

4. Expansion I/O connector (input)

2. Temperature scale DIP switch

3. Temperature range rotary switch

1. Temperature input terminals
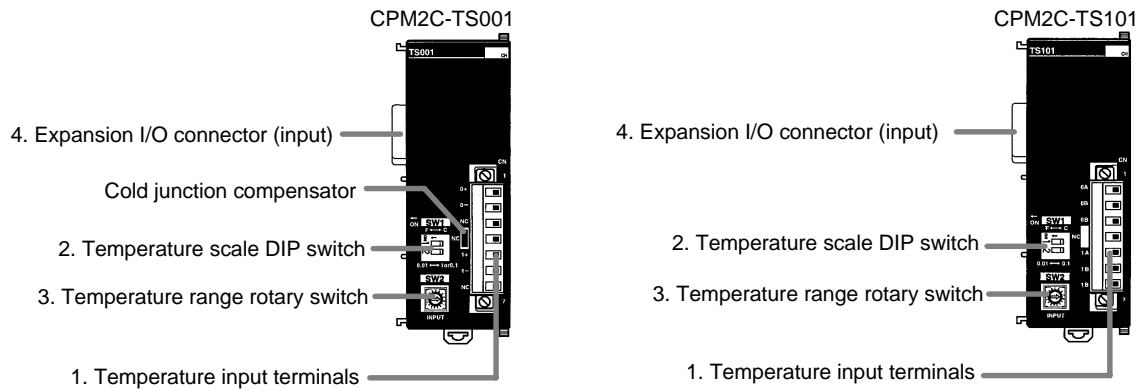
Item	CPM2C-TS001	CPM2C-TS101
Temperature sensors	Thermocouples Switchable between Types K and J, but same type must be used for all inputs.	Platinum resistance thermometer Switchable between Pt100 and JPt100, but same type must be used for all inputs.
Number of inputs	2	
Allocated input words	2	
Max. number of modules	4	4

Temperature ranges	Type K: −200° to 1300°C, 0.0° to 500.0°C
	            −300° to 2300°F, 0.0° to 900.0°F
	
	Type J: −100° to 850°C, 0.0° to 400.0°C
	            −100° to 1500°F, 0.0° to 750.0°F
		Both Pt100 and JPt100:
		−200.0° to 650.0°C
		−300.0° to 1200.0°F

Accuracy (See Note 2)	The larger of ±0.5% of converted value or ±2°C, ±1 digit max. (See Note 1)	The larger of ±0.5% of converted value or ±1°C, ±1 digit max.
Conversion time	250 ms for 2 input points	
Converted temperature data	16-bit binary data (4-digit hexadecimal)	
Isolation	Photocouplers between all temperature input signals	

Note: 1.   Accuracy for a K-type sensor at −100°C or less is ±4°C ±1 digit max.
           2.   The error deviation for temperatures in °F is double that for °C.

CompoBus/S I/O Link Module CPM2C-SRT21

The CPM2C controller can function as a Slave to a CompoBus/S Master Module (or SRM1 Controller) when a CPM2C-SRT21 CompoBus/S I/O Link Module is connected. The CompoBus/S I/O Link Module links 8 inputs and 8 outputs between the Master Module and the CPM2C. Up to 5 Expansion I/O Modules or Expansion Modules can be connected to a CPM2C CPU Unit.

3. LED indicators

4. Expansion I/O connector (input)

2. DIP switch sets unit number, communications mode and whether or not outputs will be cleared after a communications error.

1. CompoBus/S terminals

Number of I/O bits	8 input bits, 8 output bits
Max. number of connectable nodes	16
Number of words occupied in CPM2C 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.
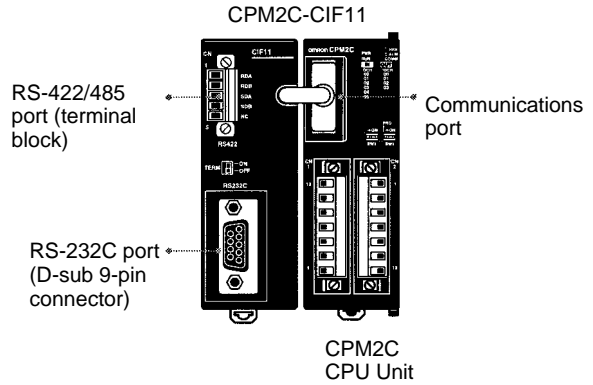
■ SERIAL COMMUNICATIONS MODULES

CPM2C-CIF01
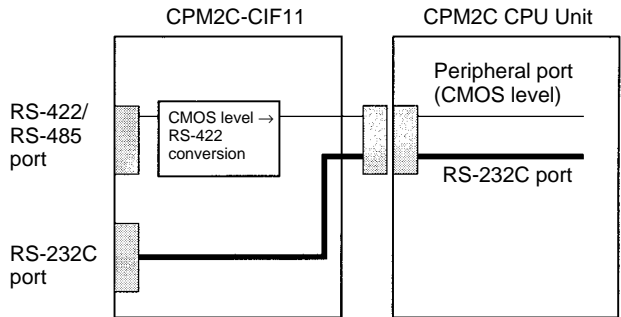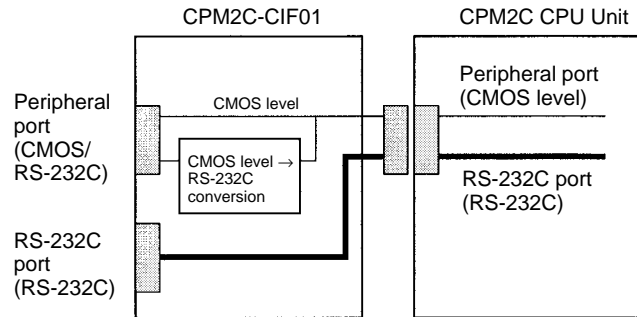**Peripheral and RS-232C Adapter Module**
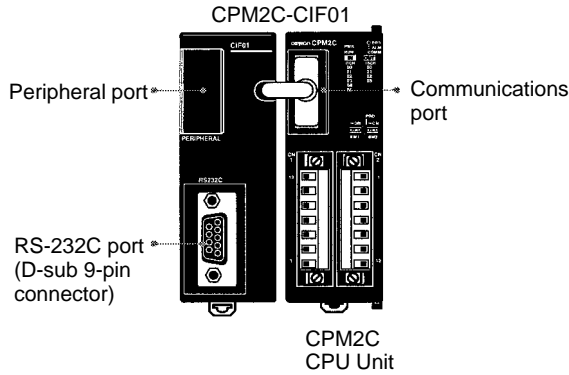
CPM2C-CIF11
RS-232 and RS-422/RS-485 Adapter Module

CPM2C-CIF01

Peripheral port

Communications port

RS-232C port
(D-sub 9-pin
connector)

CPM2C
CPU Unit

CPM2C-CIF11

RS-422/485
port (terminal
block)

Communications port

RS-232C port
(D-sub 9-pin
connector)

CPM2C
CPU Unit

Internal Configuration

CPM2C-CIF01 — CPM2C CPU Unit

Peripheral
port
(CMOS/
RS-232C)

CMOS level

CMOS level →
RS-232C
conversion

Peripheral port
(CMOS level)

RS-232C port
(RS-232C)

RS-232C
port
(RS-232C)

CPM2C-CIF11 — CPM2C CPU Unit

RS-422/
RS-485
port

CMOS level →
RS-422
conversion

Peripheral port
(CMOS level)

RS-232C port

RS-232C
port

Note: The signal levels for the peripheral port will change auto-
matically with the connecting cable used. For example, if
a connecting cable from a Programming Console is con-
nected, the signal level will switch to CMOS level,
whereas if the CS1W-CN□26 Connecting Cable for a
personal computer is connected, the signal level will
switch to RS-232C.

Note: A Programming Console cannot be connected to the
RS-422/485 port.

CPM2C-CIF01/CIF11 Specifications

Item		Specification	
		CPM2C-CIF01	CPM2C-CIF11
Upper port	Signal conversion	Outputs signals from the CPU Unit's CMOS inter-face without conversion, or converts CMOS level (CPU Unit side) to RS-232C (connected device side).	Converts CMOS level (CPU Unit side) to RS-422/RS-485 (connected device side). RS-422/RS-485 (externally connected device) insu-lated using DC/DC converter or photocoupler.
	Function	Host Link, peripheral bus, no-protocol, or Pro-gramming Console connections.	Host Link, peripheral bus, or no-protocol connec-tions.
Lower port	Signal conversion	Outputs signals from the CPU Unit's CMOS inter-face without conversion.	Outputs signals from the CPU Unit's CMOS inter-face without conversion.
	Function	Host Link, no-protocol, 1:1 Link, or 1:1 NT Link connections.	Host Link, no-protocol, 1:1 Link, or 1:1 NT Link con-nections.
Power supply		Power supplied from CPU Unit.	
Current consumption		0.3 A max. at 5 V	
Weight		150 g max.	

Note: Neither the CPM2C-CIF01 nor the CPM2C-CIF11 can be used with any PC other than the CPM2C. A CPM2C-CIF11 or another
CPM2C-CIF01 cannot be connected to the CPM2C if a CPM2C-CIF01 is already connected to it.

Dimensions

Unit: mm (inch)

■ CPU UNITS

**CPU Units with Relay Outputs
(CPM2C-10CDR-D, CPM2C-10C1DR-D
CPM2C-20CDR-D, CPM2C-20C1DR-D)**
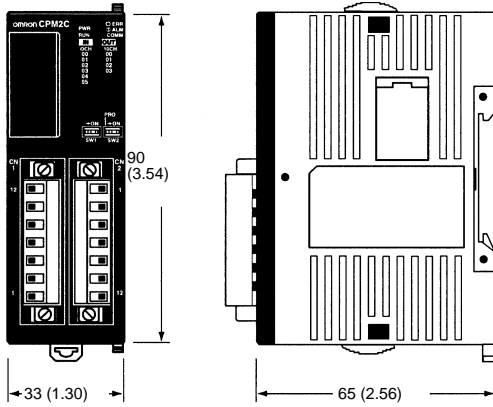
**CPU Units with Transistor Outputs
(CPM2C-10/20/32CDTC-D, CPM2C-10/20/32C1DTC-D,
CPM2C-10/20CDT1C-D, CPM2C-10/20C1DT1C-D)**
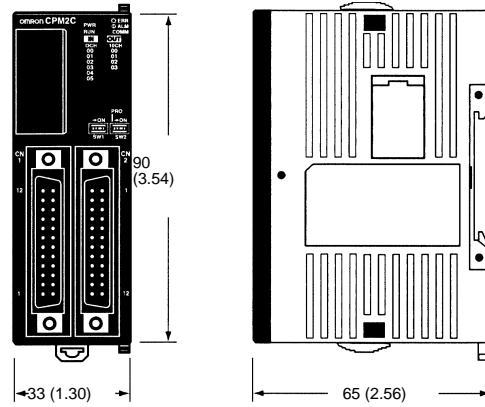
■ EXPANSION I/O MODULES

**Modules with Relay Outputs
(CPM2C-8ER, CPM2C-10EDR)**
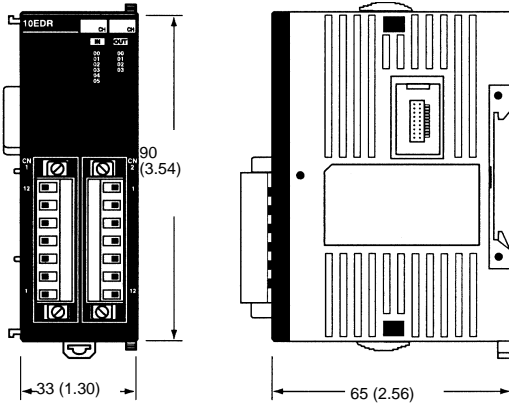
**Modules with Transistor Outputs
(CPM2C-24EDTC, CPM2C-24EDT1C)**
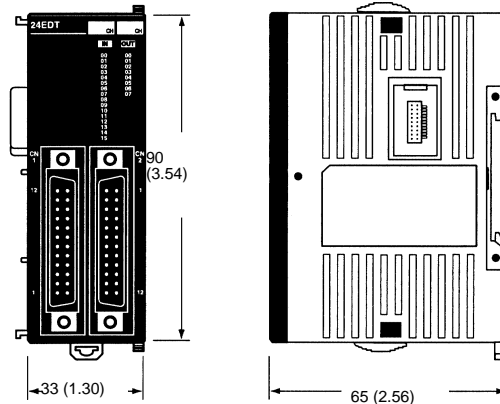
**Modules with Transistor Outputs Only and
Modules with Inputs Only
(CPM2C-8EDC, CPM2C-8ETC, CPM2C-8ET1C,
CPM2C-16EDC, CPM2C-16ETC, CPM2C-16ET1C)**
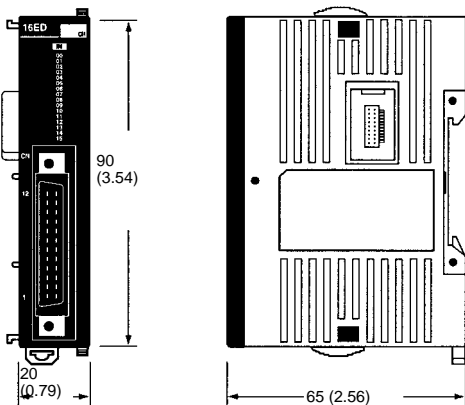
**Modules with 20 Relay I/O
(CPM2C-20EDR-D)**
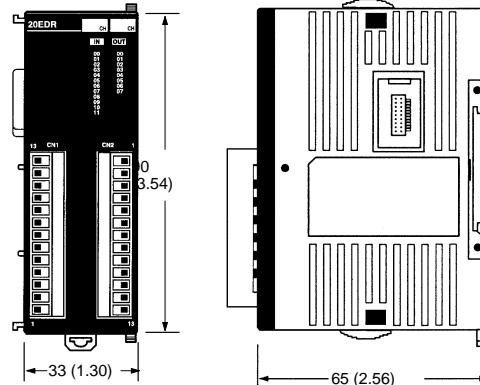
Unit: mm (inch)

**AC Power Supply Unit
(CPM2C-PA201)**
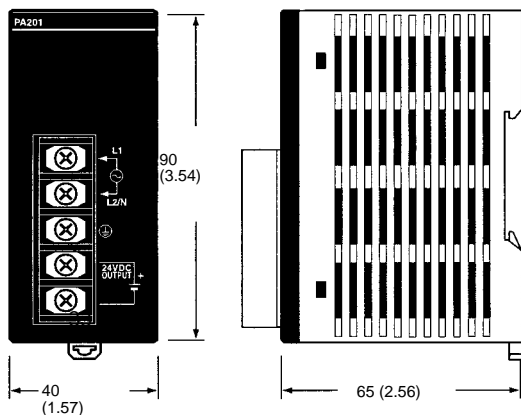
**Peripheral/RS-232C Adapter Module
(CPM2C-CIF01)**
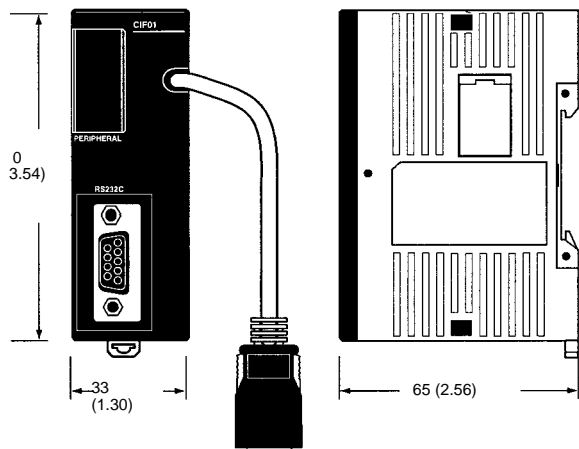
**RS-232C and RS-422/RS-485 Adapter Module
(CPM2C-CIF11)**
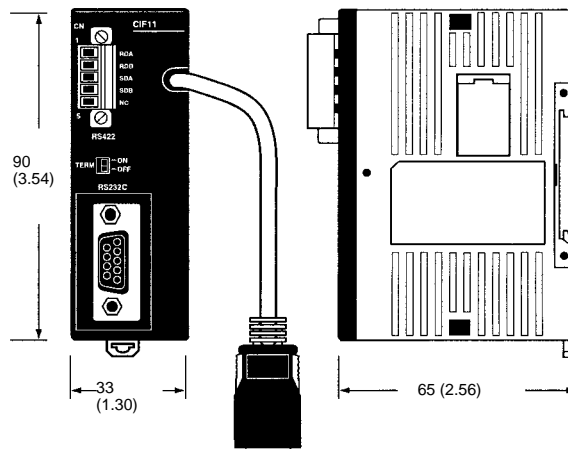
■ DEDICATED I/O MODULES

CPM2C-MAD11 Analog I/O Module
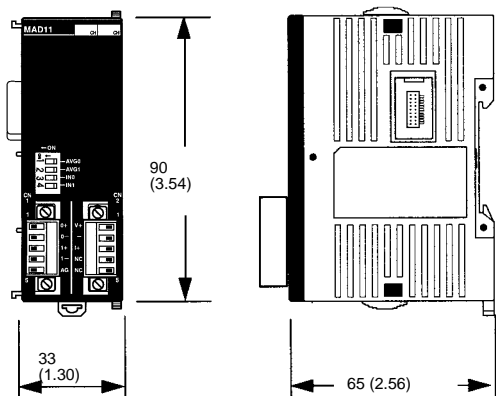
**CPM2C-TS001, CPM2C-TS101
Temperature Sensor Modules**

CPM2C-SRT21 CompoBus/S I/O Link Module

90 (3.54)

20 (0.79)

65 (2.56)
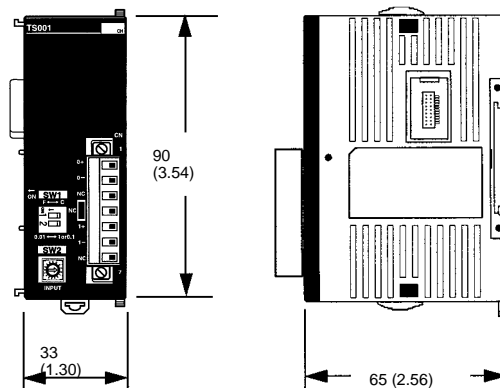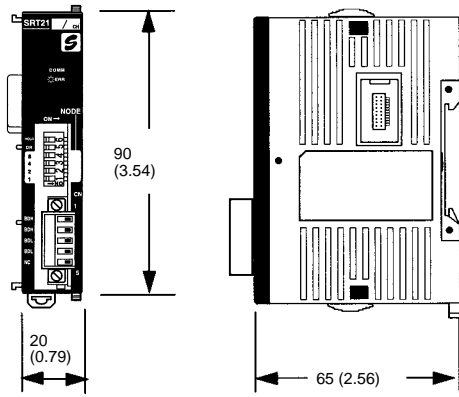
■ CPM2C MODULES WITH CONNECTORS ATTACHED

Modules with Relay Outputs
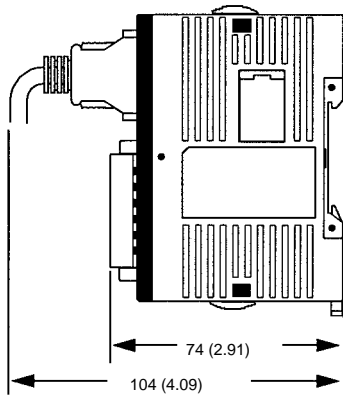
Modules with Transistor Outputs (Using pressure connectors)
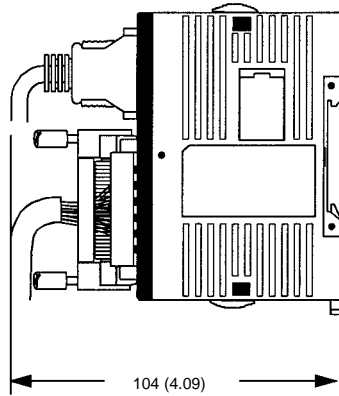
Modules with Transistor Outputs (Using soldered connectors)

74 (2.91)

104 (4.09)

104 (4.09)

111 (4.37)
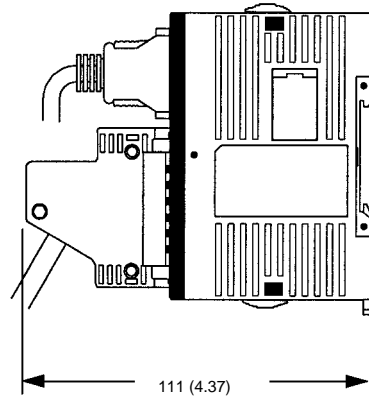
Functions

The CPM2C programmable controllers offer a variety of features in a compact Unit, including synchronized pulse control, interrupt inputs, pulse outputs, and a clock function. The CPM2C CPU Unit can handle a broad range of machine control applications and it is small enough to be incorporated as the control unit in almost any free-standing machine.

The full complement of communications functions lets you communicate with personal computers, other OMRON PLCs, and OMRON Programmable Terminals. These communications capabilities allow the user to design a low-cost, effective control system.

The communications port can be used simultaneously as two ports: Peripheral and RS-232C. The peripheral port supports Programming Devices, Host Link, and no-protocol communications. The RS-232C port supports Host Link, no-protocol (serial), 1:1 Link, and 1:1 NT Link communications.
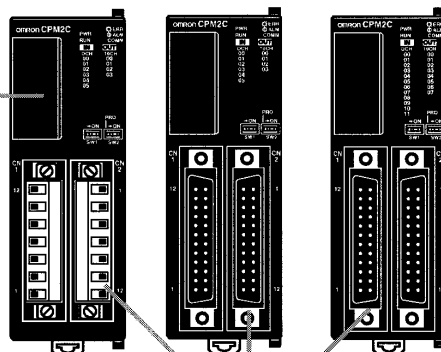
CPU Units with 10 or 20 I/O points (relay or transistor outputs) and 32 I/O points (transistor only are available. Expansion I/O Units can be connected to increase capacity to 192 I/O points.

19

■ TIME-PROPORTIONAL CONTROL

The CPM2C performs simple-to-program, time-proportional control using up to four Analog I/O modules (maximum 8 analog inputs and 4 analog outputs) and the PID and PWM expansion instructions. These instructions set the parameters for PID control and a pulse output with variable duty ratio. For increased reliability, an open-circuit detection function can be used with the 1 to 5 VDC and 4 to 20 mA analog input settings.

For temperature monitoring applications, CPM2C accepts up to 8 inputs (two per module) from Temperature Sensor Input modules. The PID instruction can manipulate the input from either thermocouple or platinum resistance thermometer sensors.

■ DISTRIBUTED I/O CONTROL

Omron's CompoBus/S I/O Link provides distributed CPU control based on a "PLC + compact PLC" configuration which provides improvements over distributed control based on "PLC + remote I/O" configurations. The distributed CPU control makes equipment module, so designs can be standardized, special needs can be addressed and modules can be replaced easily in the event of breakdown without affecting the main CPU.
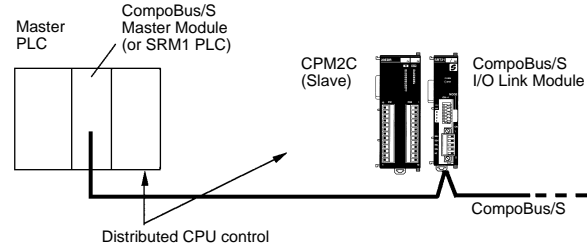
■ BUILT-IN MOTOR CONTROL CAPABILITY

Synchronized Pulse Control
(Transistor Output Models Only)

Synchronized pulse control provides an easy way to synchronize the operation of a peripheral piece of equipment with the main equipment. The output pulse frequency can be controlled as some multiple of the input pulse frequency, allowing the speed of a peripheral piece of equipment (such as a supply conveyor) to be synchronized with the speed of the main piece of equipment.
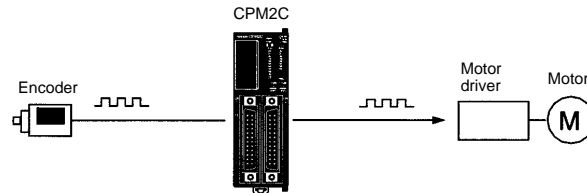
Pulses are output as a fixed multiple of the input frequency.

■ HIGH-SPEED COUNTERS AND INTERRUPTS

The CPM2C has up to four high-speed counter inputs. The one high-speed counter input has a response frequency of 20 kHz/5 kHz, and the four interrupt inputs (in counter mode) have a response frequency of 2 kHz.

Four Input Modes

The high-speed counter can be used in any one of the four input modes: differential phase mode (5 kHz), pulse plus direction input mode (20 kHz), up/down pulse mode (20 kHz), or increment mode (20 kHz). Interrupts can be triggered when the count matches a set value or falls within a specified range.

Interrupt Inputs

The interrupt inputs (counter mode) can be used for incrementing counters or decrementing counters (2 kHz) and trigger an interrupt (executing the interrupt program) when the count matches the target value. Use this for target-value comparison or range comparison control that is unaffected by the cycle time.

Easy Position Control with Pulse Outputs
(transistor output models only)

The CPM2C PLCs with transistor outputs have two outputs that can produce 10 Hz to 10 kHz pulses (single-phase outputs).

When used as single-phase pulse outputs, there can be two outputs with a frequency range of 10 Hz to 10 kHz with a fixed duty ratio or 0.1 to 999.9 Hz with a variable duty ratio (0 to 100% duty ratio).

When used as pulse plus direction or up/down pulse outputs, there can be just one output with a frequency range of 10 Hz to 10 kHz.
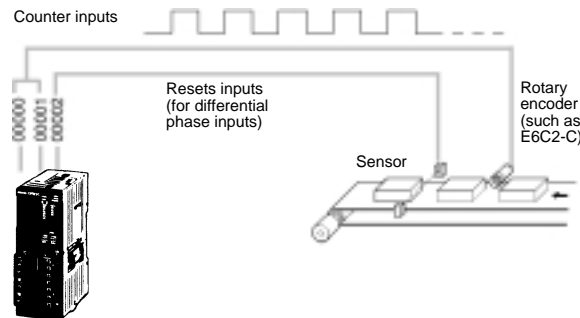
Input	Response frequency	Input mode (count value)	Control method
00000 00001 00002	5 kHz	Differential phase input mode (-8,388,608 to 8,388,607)	Target value comparison interrupts
	20 kHz	Pulse + direction input mode (-8,388,608 to 8,388,607) Up/down pulse input mode (-8,388,608 to 8,388,607) Increment mode (0 to 16,777,215)	Range comparison interrupts

■ PULSE OUTPUTS (TRANSISTOR OUTPUT MODELS ONLY)

The CPM2C has two pulse outputs. You can configure these outputs as two single-phase outputs without acceleration and deceleration, two variable duty-ratio pulse outputs, or pulse outputs with trapezoidal acceleration/deceleration (one pulse + direction output and one up/down pulse output). The pulse output's PV coordinate system can also be specified in the PLC Setup as either relative or absolute.
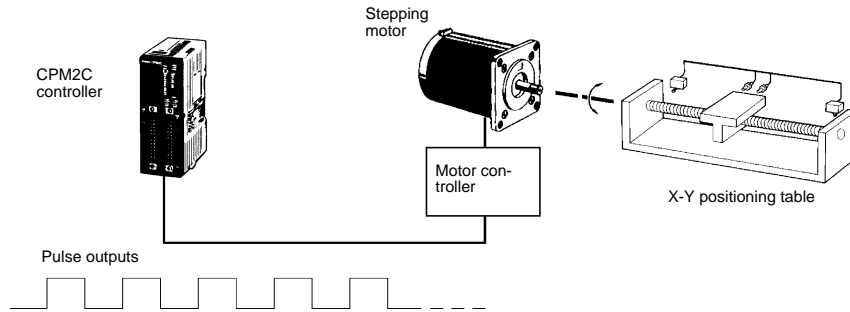
Item		Single-phase pulse output without acceleration/deceleration	Variable duty-ratio pulse output	Single-phase pulse output with trapezoidal acceleration/deceleration			
				Pulse + direction output		Up/down pulse output	
Controlling instruction(s)		PULS(65) and SPED(64)	PWM(—)	PULS(65) and ACC(—)			
Output number	01000	Pulse output 0 (See Note.)	Pulse output 0 (See Note.)	Pulse output 0	Pulse output	Pulse output 0	CW pulse output
	01001	Pulse output 1 (See Note.)	Pulse output 1 (See Note.)		Direction output		CCW pulse output
Output frequency range		10 Hz to 10 kHz	0.1 Hz to 999.9 Hz	10 Hz to 10 kHz		10 Hz to 10 kHz	
	Pitch	10 Hz	0.1 Hz	10 Hz		10 Hz	
Duty ratio		50%	0 to 100%	50%		50%	

Note: With single-phase pulse outputs, pulse outputs 0 and 1 can each be output independently.

Application Example: Adjusting Film/Paper Web Speed in Packaging and Printing
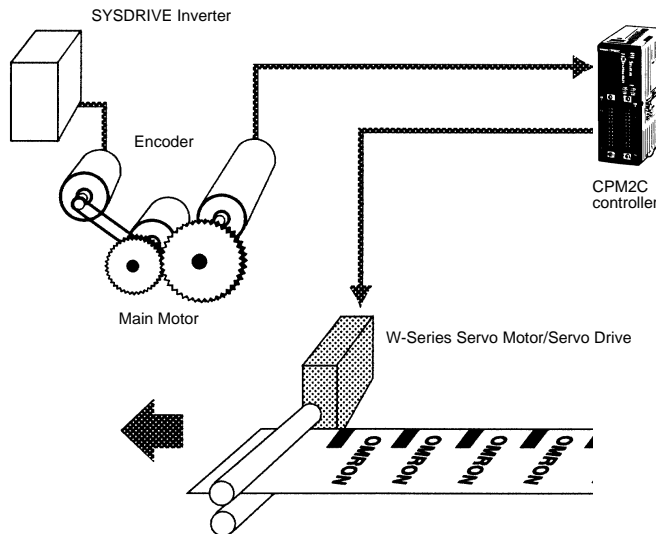
■ HIGH-SPEED INPUT CAPABILITIES FOR MACHINE CONTROL

High-speed Interrupt Input Function

The 20- and 32-point CPU Units have 4 inputs that can be used as interrupt inputs and the 10-point CPU Units have 2 inputs that can be used as interrupt inputs. These inputs are shared with quick-response inputs and interrupt inputs in counter mode and have a minimum input signal width of 50 μs and response time of 0.3 ms. When an interrupt input goes ON, the main program is stopped and the interrupt program is executed.

Quick-response Input Function

Regardless of the cycle time, the 20-point CPU Units have 4 inputs that can be used as quick-response inputs and the 10-point CPU Units have 2 inputs that can be used as quick-response inputs. These inputs are shared with interrupt inputs and interrupt inputs in counter mode; they can reliably read input signals with a signal width as short as 50 μs.

Stabilizing Input Filter Function

The input time constant for all inputs can be set to 1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms. The effects of chattering and external noise can be reduced by increasing the input time constant.

■ OTHER FUNCTIONS

Analog Settings

There are two controls on the CPU Unit that can be turned to change the analog settings (0 to 200 BCD) of timers and counters. These controls can be used to easily change or fine-tune machine settings such as a conveyor belt's pause time or feed rate.

Calendar/Clock

The CPU Units with a built-in clock (accuracy within 1 minute/month) can be read from the program to show the current year, month, day, day of the week, and time. The clock can be set from a programming device (such as a Programming Console) or the time can be adjusted by rounding up or down to the nearest minute.

Long-term Timer

The long-term timer provides an easy way to control equipment scheduling. Use two instructions to set this up. The long-term timer instruction (TIML) lets you set values up to 99,990 seconds (27 hours, 46 minutes, 30 seconds) and the Seconds-to-Hours conversion instruction (HMS) lets you schedule this with other clock functions.

■ CONFIGURATION USING I/O RELAY BLOCKS AND SCREW TERMINALS

Lightly shaded connections are Inputs; darkly shaded connections are outputs in the diagram below.

Note: The allowable current for the XW2Z-□□□A is 1 A. Do not allow the current on the common terminal to exceed 1 A.

Outputs | Inputs

Cables (See note.)
XW2Z-050A (0.5 m)
XW2Z-100A (1 m)
XW2Z-150A (1.5 m)
XW2Z-200A (2 m)
XW2Z-300A (3 m)
XW2Z-500A (5 m)

Screw Terminals
XW2B-20G4 (M3 screws)
XW2B-20G5 (M3.5 screws)

Cables (See note.)
XW2Z-050A (0.5 m)
XW2Z-100A (1 m)
XW2Z-150A (1.5 m)
XW2Z-200A (2 m)
XW2Z-300A (3 m)
XW2Z-500A (5 m)

Input Screw Terminal
XW2C-20G5-IN16 (M3.5 screws)

Cables
G79-100C (1 m)
G79-150C (1.5 m)
G79-200C (2 m)
G79-300C (3 m)
G79-500C (5 m)

Relay Input Blocks
G7TC-ID16, G7TC-IA16

Cables (See note.)
XW2Z-050A (0.5 m)
XW2Z-100A (1 m)
XW2Z-150A (1.5 m)
XW2Z-200A (2 m)
XW2Z-300A (3 m)
XW2Z-500A (5 m)

Screw Terminals
XW2B-20G4 (M3 screws)
XW2B-20G5 (M3.5 screws)

Cables
G79-100C (1 m)
G79-150C (1.5 m)
G79-200C (2 m)
G79-300C (3 m)
G79-500C (5 m)

Relay Output Terminals
G7TC-OC08

Relay Output Terminals
G70D-OC16,
G70D-OC16-1
G70D-SOC16,
G70D-SOC16-1
G70D-FOM16,
G70D-FOM16-1

Cables
G79-□□□C
G2R-1-S(N)

Relay Output Terminals
G70A-ZOC16-3
G70A-ZOC16-4

Communications ————————————

■ NT LINK FOR PROGRAMMABLE TERMINALS

The CPM2C can be connected directly to an OMRON NT-Series Programmable Terminal in NT Link mode (1:1) for high-speed transmission of data. No separate drivers are required. Use the communications port for the NT Link connection.

There are two ways to configure NT Link depending on the communications port's setting for single or dual transmission (host link style). For single transmission, use a C200H-CN□20-EU cable and a D-sub 9-pin adapter (either CPM2C-CN111 or CS1W-CN118) to connect at the communications port.
For dual transmission when the communications port may be used for two different purposes, connect the Programmable Terminal with a C200H-CN320-EU cable to the D-sub 9-pin connector on the CPM2C-CIF01 Communications Adapter. For RS-422 NT Link, configure a custom cable following the pinout shown in Programmable Terminal manual for the model selected, then connect it to the RS-422 terminals on the CPM2C-CIF11 Communications Adapter.

NT Link

Connecting Cable
C200H-CN320-EU (3 m)
C200H-CN520-EU (5 m)

RS-232C connection

Programmable
Terminal

RS-232C port
(D-sub 9-pin)

CPM2C-CN111 (0.15 m)

CS1W-CN118 (0.1 m)

Communications
port

CPM2C
CPU Unit

Host Link

CPM2C-CIF01

Communications port

Connecting Cable
C200H-CN320-EU (3 m)
C200H-CN520-EU (5 m)

RS-232C port
(D-sub 9-pin)

Connecting Cable
Refer to RS-422 connection based on the Program-
mable Terminal model.

RS-422/RS-485 ← Peripheral port

CPM2C-CIF11

Note: The Programmable Terminal cannot be connected using a pe-
ripheral port connection when communicating via an NT Link.

■ HOST LINK

1:1 Connection

Use one of the connecting cables shown in the following diagram to connect a personal computer with Support Software to the CPM2C's communications port for 1:1 Host Link communications or no-protocol (serial) communications.

A personal computer can be connected to the CPU Unit'scommunications port with an C200HS-CN220-EU cable and CS1W-CN118 adapter or CS1W-CN□26-EU for program downloads. The cable has D-sub 9-pin connector.
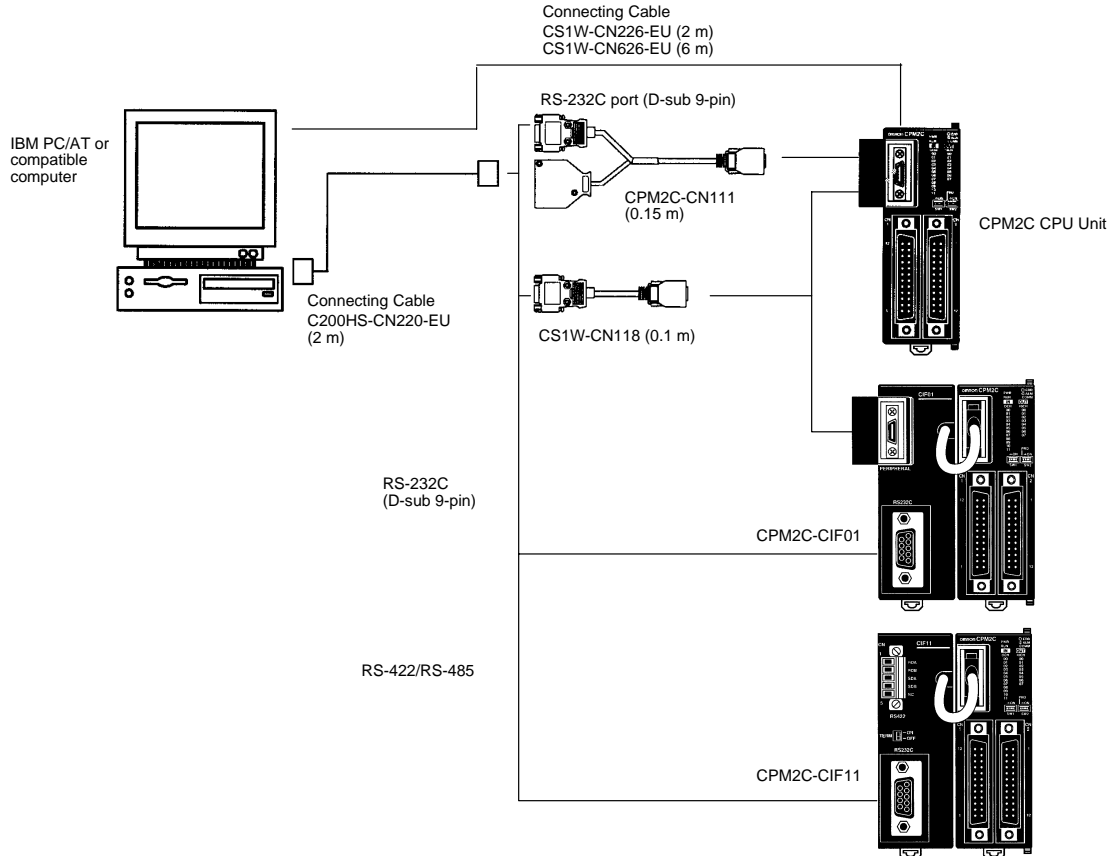
Note: Refer to *Section 4 Using Programming Devices* in the *CPM2C Operation Manual (W356)* for details on the Support Software that can be used with the CPM2C.

1:N Connection

Up to 32 Omron PLCs, including CPM2C PLCs, can be connected to a host computer. The total length of an RS-422/RS-485 system is 500 m max.

IBM PC/AT or compatible computer
with RS-422/RS-485

CPM2C
CPU Unit

CPM2C
CPU Unit

CPM2C
CPU Unit

When using the port as
an RS-422/RS-485 port

CPM2C-CIF11

CPM2C-CIF11

CPM2C-CIF11

Up to 32 programmable controllers
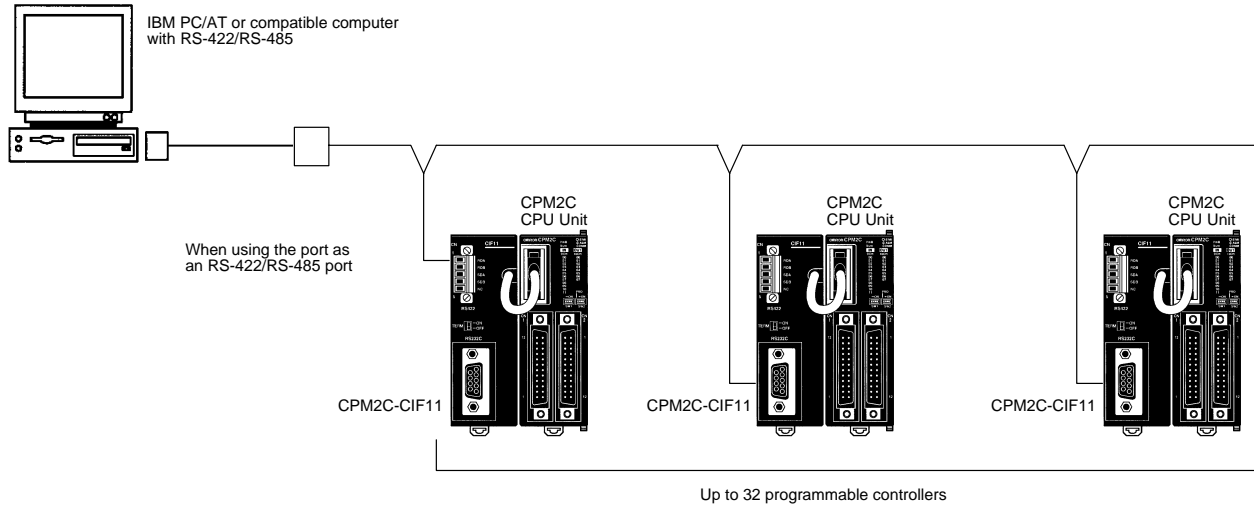
Note: Be sure that the power supply requirements of the CPU Unit, Expansion Modules, and Expansion I/O Modules do not exceed the available capacity.

■ NO-PROTOCOL COMMUNICATIONS

The transmit TXD(48) and receive RXD(47) instructions can be used in no-protocol mode to exchange data with standard serial devices. For example, data can be received from a bar code reader or transmitted to a serial printer. The serial devices can be connected to the communications port as a RS-232C port or peripheral port, as shown in the following diagrams. Some adapter cables may be required.

RS-232C port
• Bar code reader
• Serial printer
• Modem
• Other serial devices

CPM2C CPU Unit
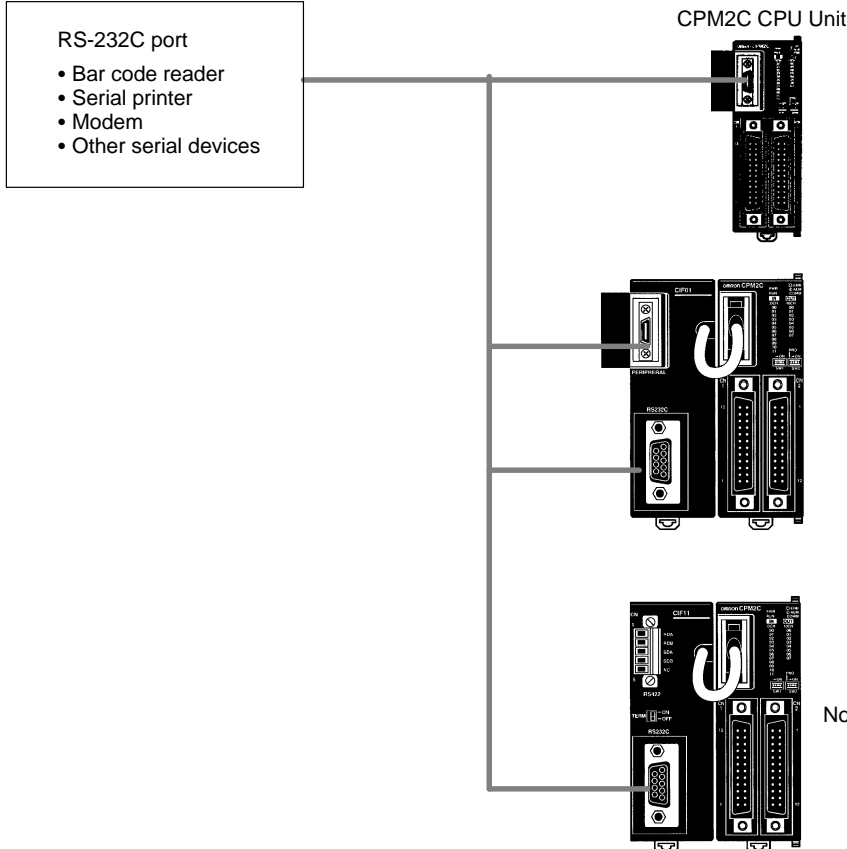
Note: See *One-to-one Computer Connections* in *Operation Manual (W356)* for details on the system configurations that can be assembled for serial communications.

■ 1:1 LINK CONNECTIONS FOR DATA EXCHANGE

A CPM2C can be linked to another CPM2C, a CQM1, CPM1, CPM1A, CPM2A, SRM1(-V2), C200HS, or C200HX/HE/HG controller. The CPM2C must be connected using the communications port as an RS-232C port (not as a peripheral port).
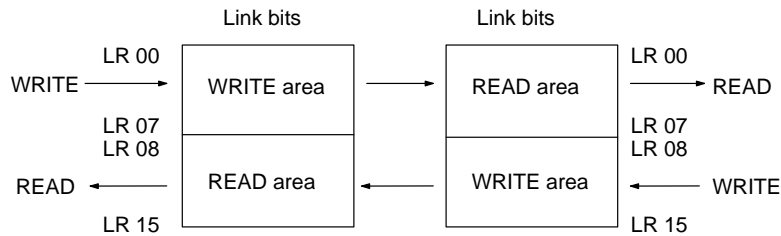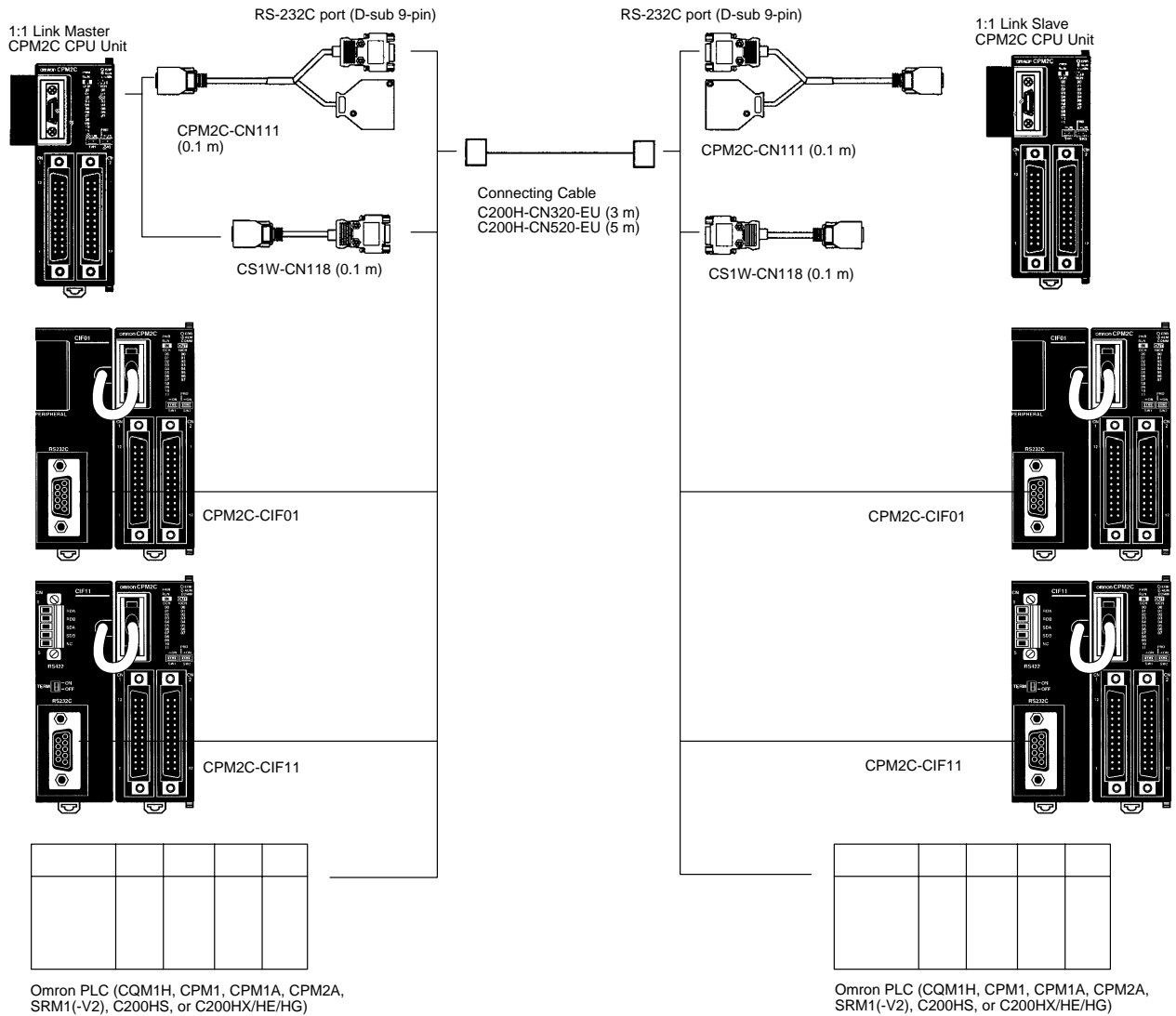
Note: Even though the peripheral port on the CPM2C-CIF01 can output RS-232C, this port cannot be used for one-to-one link communications.

■ COMPOBUS/S I/O LINK CONNECTIONS

A CompoBus/S I/O Link can be used to create an I/O link (remote I/O) of 8 input points and 8 output points with a CompoBus/S Master Module or SRM1 controller. The connection is made through a CompoBus/S I/O Link Module.

From the standpoint of the CPM2C CPU Unit, the area allocated to the CompoBus/S I/O Link Module can be treated just like the area allocated to an Expansion I/O Module. The difference is that the bits are not actual I/O points, but I/O bits in the Master Module.
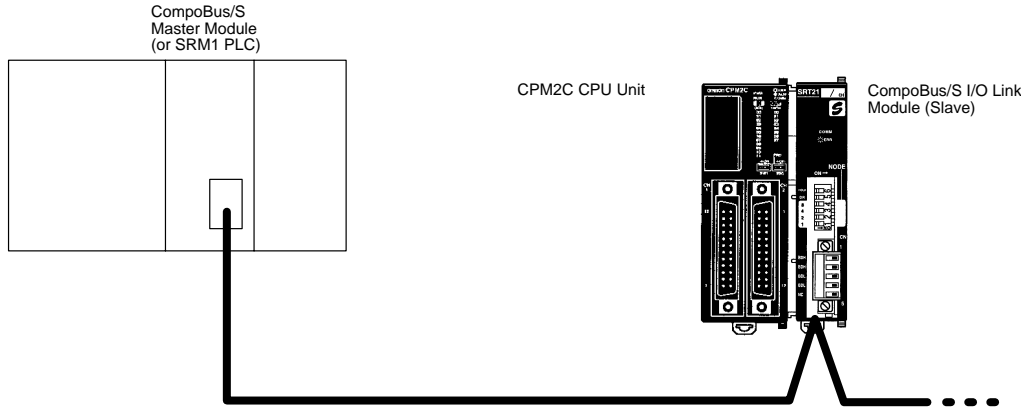
Cables

Use SCA1-4F10 flat cable or twisted pair cable to connect the nodes in the CompoBus/S I/O Link. (The flat cables and twisted pair cables cannot be combined in the same system.)

Description	Model	Specifications
Flat cable	SCA1-4F10	4-core flat cable, 0.75 mm^2; 100 m length
Twisted pair cable	Belden #9409 cable	2-core x 0.75 mm^2; available commercially

■ 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.
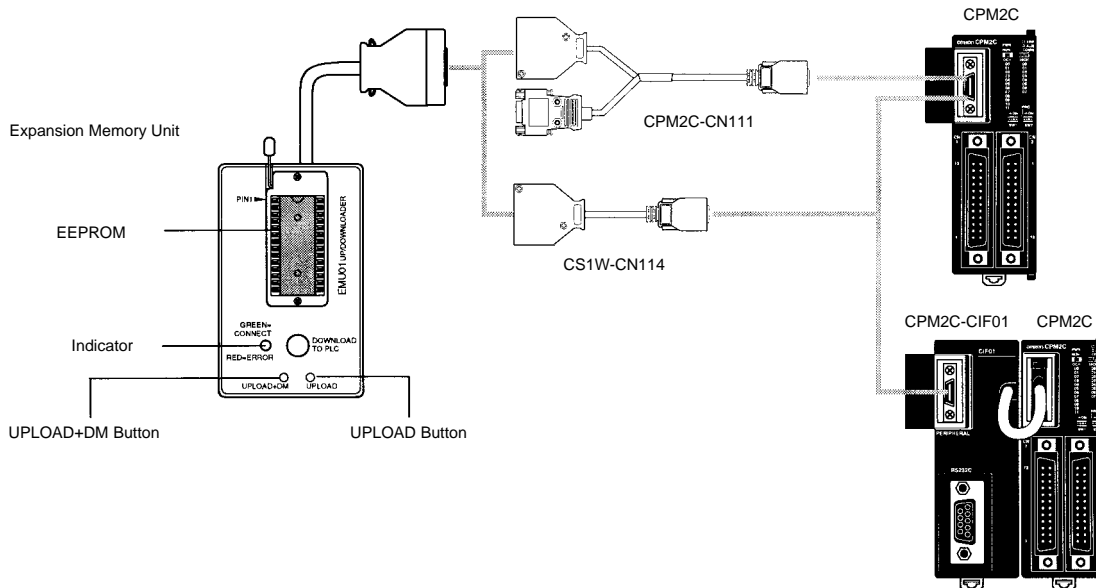
Instruction Set

■ SEQUENCE INSTRUCTIONS

Sequence Input Instructions

Instruction	Mnemonic	Code
LOAD	LD	○
LOAD NOT	LD NOT	○
AND	AND	○
AND NOT	AND NOT	○
OR	OR	○
OR NOT	OR NOT	○
AND LOAD	AND LD	○
OR LOAD	OR LD	○

Sequence Output Instructions

Instruction	Mnemonic	Code
OUTPUT	OUT	○
OUT NOT	OUT NOT	○
SET	SET	○
RESET	RSET	○
KEEP	KEEP	11
DIFFERENTIATE UP	DIFU	13
DIFFERENTIATE DOWN	DIFD	14

Sequence Control Instructions

Instruction	Mnemonic	Code
NO OPERATION	NOP	00
END	END	01
INTERLOCK	IL	02
INTERLOCK CLEAR	ILC	03
JUMP	JMP	04
JUMP END	JME	05

■ TIMER/COUNTER INSTRUCTIONS

Instruction	Mnemonic	Code
TIMER	TIM	○
COUNTER	CNT	○
REVERSIBLE COUNTER	CNTR	12
HIGH-SPEED TIMER	TIMH	15

■ COMPARISON INSTRUCTIONS

Instruction	Mnemonic	Code
COMPARE	CMP	20
TABLE COMPARE	TCMP(@)	85
DOUBLE COMPARE	CMPL(@)†	60
BLOCK COMPARE	BCMP(@)†	68
AREA RANGE COMPARE	ZCP	—
DOUBLE AREA RANGE COMPARE	ZCPL	—

■ DATA MOVEMENT INSTRUCTIONS

Instruction	Mnemonic	Code
MOVE	MOV(@)	21
MOVE NOT	MVN(@)	22
BLOCK TRANSFER	XFER(@)	70
BLOCK SET	BSET(@)	71
DATA EXCHANGE	XCHG(@)	73
SINGLE WORD DISTRIBUTE	DIST(@)	80
DATA COLLECT	COLL(@)	81
MOVE BIT	MOVB(@)	82
MOVE DIGIT	MOVD(@)	83

■ SHIFT INSTRUCTIONS

Instruction	Mnemonic	Code
SHIFT REGISTER	SFT	○/10
WORD SHIFT	WSFT(@)	16
ASYNCHRONOUS SHIFT REGISTER	ASFT(@)†	17
ARITHMETIC SHIFT LEFT	ASL(@)	25
ARITHMETIC SHIFT RIGHT	ASR(@)	26
ROTATE LEFT	ROL(@)	27
ROTATE RIGHT	ROR(@)	28
ONE DIGIT SHIFT LEFT	SLD(@)	74
ONE DIGIT SHIFT RIGHT	SRD(@)	75
REVERSIBLE SHIFT REGISTER	SFTR(@)	84

■ INCREMENT/DECREMENT

Instruction	Mnemonic	Code
INCREMENT	INC(@)	38
DECREMENT	DEC(@)	39

■ CALCULATION INSTRUCTIONS

Instruction	Mnemonic	Code
BCD ADD	ADD(@)	3O
BCD SUBTRACT	SUB(@)	31
BCD MULTIPLY	MUL(@)	32
BCD DIVIDE	DIV(@)	33
BINARY ADD	ADB(@)	50
BINARY SUBTRACT	SBB(@)	51
BINARY MULTIPLY	MLB(@)	52
BINARY DIVIDE	DVB(@)	53
DOUBLE BCD ADD	ADDL(@)	54
DOUBLE BCD SUBTRACT	SUBL(@)	55
DOUBLE BCD MULTIPLY	MULL(@)	56
DOUBLE BCD DIVIDE	DIVL(@)	57
BIT COUNTER	BCNT(@)†	67

Note: ○: Instruction keys allocated to the Programming Console.
(@): Instruction can be differentiated using input rise time to execute the instruction in just one cycle.
—: Identifies an expansion instruction.
†: Identifies an expansion instruction assigned a default code.

■ DATA CONVERSION INSTRUCTIONS

Instruction	Mnemonic	Code
BCD TO BINARY	BIN(@)	23
BINARY TO BCD	BCD(@)	24
DOUBLE CBD-TO-DOUBLE BINARY	BINL(@)	58
DOUBLE BINARY-TO-DOUBLE BCD	BCDL(@)	59
4 TO 16 DECODER	MLPX(@)	76
16 TO 4 DECODER	DMPX(@)	77
ASCII CODE CONVERT	ASC(@)	86
ASCII-TO-HEXADECIMAL	HEX(@)	—
2'S COMPLEMENT	NEG(@)	—
HOURS-TO-SECONDS	SEC(@)	—
SECONDS-TO-HOURS	HMS(@)	—

■ TABLE DATA MANIPULATION INSTRUCTIONS

Instruction	Mnemonic	Code
FRAME CHECKSUM	FCS(@)	—
SUM	SUM(@)	—
DATA SEARCH	SRCH(@)	—
FIND MAXIMUM	MAX(@)	—
FIND MINIMUM	MIN(@)	—

■ DATA CONTROL INSTRUCTIONS

Instruction	Mnemonic	Code
SCALING	SCL(@)†	66
SIGNED BINARY TO BCD SCALING	SCL2(@)	—
BCD TO SIGNED BINARY SCALING	SCL3(@)	—
PID CONTROL	PID	—
AVERAGE VALUE	AVG	—

■ LOGIC INSTRUCTIONS

Instruction	Mnemonic	Code
COMPLEMENT	COM(@)	29
LOGICAL AND	ANDW(@)	34
LOGICAL OR	ORW(@)	35
EXCLUSIVE OR	XORW(@)	36
EXCLUSIVE NOR	XNRW(@)	37

■ SUBROUTINE INSTRUCTIONS

Instruction	Mnemonic	Code
SUBROUTINE ENTER	SBS(@)	91
SUBROUTINE ENTRY	SBN	92
SUBROUTINE RETURN	RET	93
MACRO	MCRO	99

■ INTERRUPT CONTROL INSTRUCTIONS

Instruction	Mnemonic	Code
INTERVAL TIMER	STIM(@)†	69
INTERRUPT CONTROL	INT[1]	89

■ PULSE CONTROL INSTRUCTIONS

High-speed Counter Control Instructions

Instruction	Mnemonic	Code
MODE CONTROL	INI(@)†	61
PV READ	PRV(@)†	62
COMPARE TABLE LOAD	CTBL(@)†	63

■ POSITION CONTROL INSTRUCTIONS

Pulse Output Control Instructions

Instruction	Mnemonic	Code
SPEED OUTPUT	SPED(@)†	64
SET PULSES	PULS(@)†	65
PULSE W/VARIABLE DUTY RATIO	PWM(@)	—
ACCELERATION CONTROL	ACC(@)	—
SYNCHRONIZED PULSE CONTROL	SYNC(@)	—

■ PERIPHERAL DEVICE CONTROL

I/O Unit Instructions

Instruction	Mnemonic	Code
7-SEGMENT DECODER	SDEC(@)	78
I/O REFRESH	IORF(@)	97

■ COMMUNICATIONS INSTRUCTIONS

Instruction	Mnemonic	Code
MESSAGE	MSG(@)	46
RECEIVE	RXD(@)†	47
TRANSMIT	TXD(@)†	48
CHANGE RS-232C SETUP	STUP(@)†	—

■ STEP INSTRUCTIONS

Instruction	Mnemonic	Code
STEP DEFINE	STEP	08
STEP START	SNXT	09

■ DAMAGE DIAGNOSIS INSTRUCTIONS

Instruction	Mnemonic	Code
FAILURE ALARM	FAL(@)	06
SEVERE FAILURE ALARM	FALS	07

■ CARRY FLAG INSTRUCTIONS

Instruction	Mnemonic	Code
SET CARRY	PST(@)	40
CLEAR CARRY	CLD(@)	41

Note: ○: Instruction keys allocated to the Programming Console.

(@): Instruction can be differentiated using input rise time to execute the instruction in just one cycle.

—: Identifies an expansion instruction.

†: Identifies an expansion instruction assigned a default code.

■ FUNCTION CODE SUMMARY

The following table lists the CPM2C instructions that have fixed function codes. Each instruction is listed by mnemonic and by instruction name. Use the numbers in the leftmost column as the left digit and the number in the column heading as the right digit of the function code.

The shaded areas are function codes to which expansion instructions are allocated by default or to which the user can allocate expansion instructions. The expansion instructions in the bottom table are available in addition to the ones listed with default function codes.

Left digit	Right digit									
	0	1	2	3	4	5	6	7	8	9
0	**NOP** No operation	**END** End	**IL** Interlock	**ILC** Interlock clear	**JMP** Jump	**JME** Jump end	**FAL(@)** Failure alarm and reset	**FALS** Severe failure alarm	**STEP** Step define	**SNXT** Step start
1	**SFT** Shift register	**KEEP** Keep	**CNTR** Reversible counter	**DIFU** Differenti-ate up	**DIFD** Differenti-ate down	**TIMH** High-speed timer	**WSFT(@)** Word shift	**ASFT(@)** Asynchro-nous shift register	---	---
2	**CMP** Compare	**MOV(@)** Move	**MVN(@)** Move not	**BIN(@)** BCD to binary	**BCD(@)** Binary to BCD	**ASL(@)** Shift left	**ASR(@)** Shift right	**ROL(@)** Rotate left	**ROR(@)** Rotate right	**COM(@)** Comple-ment
3	**ADD(@)** BCD add	**SUB(@)** BCD subtract	**MUL(@)** BCD multiply	**DIV(@)** BCD divide	**ANDW (@)** Logical AND	**ORW(@)** Logical OR	**XORW(@)** Exclusive OR	**XNRW (@)** Exclusive NOR	**INC(@)** Increment	**DEC(@)** Decre-ment
4	**STC(@)** Set carry	**CLC(@)** Clear carry	---	---	---	---	**MSG(@)** Message display	RXD**(@)** Receive	**TXD(@)** Transmit	---
5	**ADB(@)** Binary add	**SBB(@)** Binary subtract	**MLB(@)** Binary multiply	**DVB(@)** Binary divide	**ADDL(@)** Double BCD add	**SUBL(@)** Double BCD subtract	**MULL(@)** Double BCD multiply	**DIVL(@)** Double BCD divide	**BINL(@)** Double BCD-to-double binary	**BCDL(@)** Double binary-to-double BCD
6	**CMPL** Double compare	**INI(@)** Mode control	**PRV(@)** High-speed counter PV read	**CTBL(@)** Compari-son table load	**SPED(@)** Speed output	**PULS(@)** Set pulses	**SCL(@)** Scaling	**BCNT(@)** Bit counter	**BCMP(@)** Clock compare	**STIM(@)** Interval timer
7	**XFER(@)** Block transfer	**BSET(@)** Block set	---	**XCHG(@)** Data exchange	**SLD(@)** One digit shift left	**SRD(@)** One digit shift right	**MLPX(@)** 4-to-16 decoder	**DMPX(@)** 16-to-4 encoder	**SDEC(@)** 7-segment decoder	---
8	**DIST(@)** Single word distribute	**COLL(@)** Data collect	**MOVB(@)** Move bit	**MOVD(@)** Move digit	**SFTR(@)** Revers-ible shift register	**TCMP(@)** Table compare	**ASC(@)** ASCII convert	---	---	INT**(@)** Interrupt control
9	---	**SBS(@)** Subrou-tine entry	**SBN** Subroutine define	**RET** Subrou-tine return	---	---	---	**IORF(@)** I/O refresh	---	**MCRO(@)** Macro

Expansion Instructions Without Default Codes

Mnemonic	Name	Mnemonic	Name
ACC(@)	ACCELERATION CONTROL	SCL3(@)	BCD TO SIGNED BINARY SCALING
AVG	AVERAGE VALUE	SEC(@)	HOURS TO SECONDS
FCS(@)	FRAME CHECK SUM CALCULATE	SRCH(@)	DATA SEARCH
HEX(@)	ASCII-TO-HEXADECIMAL	STUP(@)	CHANGE RS-232C SETUP
HMS(@)	SECONDS TO HOURS	SUM(@)	SUM CALCULATE
MAX(@)	FIND MAXIMUM	SYNC	SYNCHRONIZED PULSE CONTROL
MIN(@)	FIND MINIMUM	TIML	LONG TIMER
NEG(@)	2'S COMPLEMENT	TMHH	VERY HIGH-SPEED TIMER
PID	PID CONTROL	ZCP	AREA RANGE COMPARE
PWM(@)	PULSE WITH VARIABLE DUTY RATIO	ZCPL	DOUBLE AREA RANGE COMPARE
SCL2(@)	SIGNED BINARY TO BCD SCALING		

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.