Specifications

■ General Specifications

Item		CPU Units with 30 I/O points	CPU Units with 40 I/O points	CPU Units with 60 I/O points
Supply voltage	AC power	100 to 240 VAC, 50/60 Hz		
	DC power	24 VDC		
Operating voltage range	AC power	85 to 264 VAC		
	DC power	20.4 to 26.4 VDC		
Power consumption	AC power	60 VA max.		
	DC power	20 W max.		
Inrush current	AC power	60 A max.		
	DC power	20 A max.		
External power supply (AC power supplies only)	Supply voltage	24 VDC		
	Output capacity	300 mA		
Insulation resistance		20 MΩ min. (at 500 VDC) between the external AC terminals and protective earth terminals		
Dielectric strength		2,300 VAC 50/60 Hz for 1 min between the external AC and protective earth terminals, leakage current: 10 mA max.		
Noise immunity		1,500 Vp-p, pulse width: 0.1 to 1 μs, rise time: 1 ns (via noise simulation)		
Vibration resistance		10 to 57 Hz, 0.075-mm 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 Storage: –20° to 75°C		
Humidity		10% to 90% (with no condensation)		
Atmosphere		Must be free from corrosive gas		
Terminal screw size		M3		
Power interrupt time		AC power supply: 10 ms min. DC power supply: 2 ms min.		
CPU Unit weight	AC power	700 g max.	800 g max.	1,000 g max.
	DC power	600 g max.	700 g max.	900 g max.
Expansion I/O Unit 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. Analog I/O Units: 200 g max. CompoBus/S I/O Link Units: 200 g max.		

Specifications

■ Characteristics

Item		Specification		
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		
I/O capacity	CPU Unit only	30 points	40 points	60 points
	With Expansion I/O Units	90 points max.	100 points max.	120 points max.
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 and IR 20000 to IR 22715 (Words IR 200 to IR 227)		
Special bits (SR area)		448 bits: SR 22800 to SR 25515 (Words IR 228 to IR 255)		
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.		
Basic interrupts	Interrupt processing	External interrupts: 4 (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)	Four inputs (Shared with external interrupt inputs (counter mode) and quick-response inputs.) Counter interrupts: 4 (Shared by the external interrupt inputs and quick-response inputs.)		
Pulse output		Two points with no acceleration/deceleration, 10 to 10 kHz each, and no direction control. One point with waveform acceleration/deceleration, 10 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 the pulse output 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		Four points (Min. input pulse width: 0.05 ms min.)		
Analog controls		2 controls, setting range: 0 to 200		

Specifications

Item	Specification
Input time constant	Can be set for all input points. (1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms; default setting: 10 ms)
Clock function	Shows the year, month, day of the week, day, hour, minute, and second. (Battery backup)
Communications functions	Built-in peripheral port: Supports host link, peripheral bus, no-protocol, or Programming Console connections. Built-in RS-232C port: Supports host link, no-protocol, 1:1 Slave Unit link, 1:1 Master Unit link, or 1:1 NT Link connections.
Functions provided by Expansion Units	Analog I/O Unit: Provides 2 analog inputs and 1 analog output. CompoBus/S I/O Link Unit: Provides 8 inputs and 8 outputs as a CompoBus/S Slave.
Memory protection	HR area, AR area, program contents, read/write DM area contents, and counter values maintained during power interruptions.
Memory backup	Flash memory: Program, read-only DM area, and PC Setup Battery backup: The read/write DM area, HR area, AR area, and counter values are backed up by a battery. (Battery life is approximately 5 years.)
Self-diagnostic functions	CPU Unit failure (watchdog timer), I/O bus error, and memory failure, battery error
Program checks	No END instruction and programming errors are checked at the start of operation.

■ I/O Specifications

1. CPU Unit Input Specifications

Item	Inputs	Specification
Input voltage	All	24 VDC $^{+10\%}/_{-15\%}$
Input impedance	IN00000 to IN00001	2.7 kΩ
	IN00002 to IN00006	3.9 kΩ
	IN00007 and up	4.7 kΩ
Input current	IN00000 to IN00001	8 mA typical
	IN00002 to IN00006	6 mA typical
	IN00007 and up	5 mA typical
ON voltage/current	IN00000 to IN00001	17 VDC min., 5 mA
	IN00002 and up	14.4 VDC min., 3 mA
OFF voltage/current	All	5.0 VDC max., 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	
	IN00002 to IN00006	
	IN00007 and up	

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

High-speed Counter Inputs

Inputs IN00000 through IN00002 can be used as high-speed counter inputs, as shown in the following table. The maximum count frequency is 5 kHz in differential phase mode and 20 kHz in the other modes.
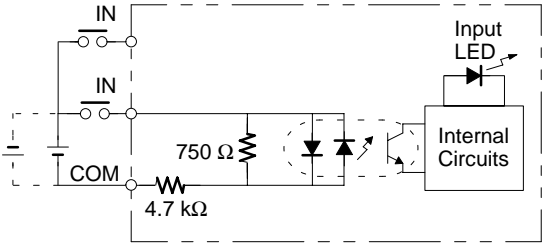
Input	Function			
	Differential phase mode	Pulse + direction input mode	Up/down input mode	Increment mode
IN00000	A-phase pulse input	Pulse input	Increment pulse input	Increment pulse input
IN00001	B-phase pulse input	Direction input	Decrement pulse input	Normal input
IN00002	Z-phase pulse input/Hardware reset input (IN00002 can be used as a normal input when it is not used as a high-speed counter input.)			

Specifications

Interrupt Inputs

Inputs IN00003 through IN00006 can be used as interrupt inputs (interrupt input mode or counter mode) and quick-response inputs. The minimum pulse width for these inputs is 0.05 ms.
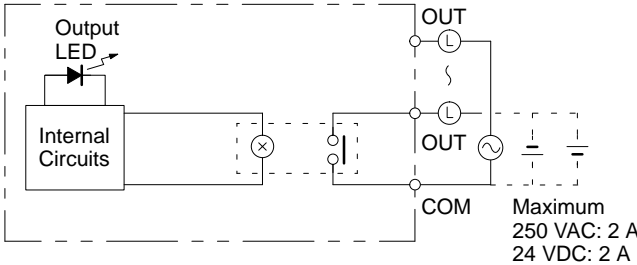
2. Expansion I/O Unit Input Specifications

Item	Specification
Input voltage	24 VDC $^{+10\%}/_{-15\%}$
Input impedance	4.7 kΩ
Input current	5 mA typical
ON voltage	14.4 VDC min.
OFF voltage	5.0 VDC max.
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 PC Setup.

■ CPU Unit and Expansion I/O Unit Output Specifications

1. 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 = 4) Mechanical: 20,000,000 operations
ON delay	15 ms max.
OFF delay	15 ms max.
Circuit configuration	

2. Transistor Output (Sinking)

Item	Specification				
	30CDT-D	**40CDT-D**	**60CDT-D**	**8ET**	**20EDT**
Max. switching capacity	OUT01000, 01001: 4.5 to 30 VDC, 0.2 A/output OUT01002 and up: 4.5 to 30 VDC, 0.3 A/output				24 VDC$^{+10\%}/_{-5\%}$, 0.3 A/output
	0.8 A/common 2.4 A/Unit	0.8 A/common 3.2 A/Unit	0.8 A/common 4.8 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 1.8 A/Unit
Leakage current	0.1 mA max.				
Residual voltage	1.5 V max.				
ON delay	OUT01000 and OUT01001: 20 µs max. OUT01002 and up: 0.1 ms max.				0.1 ms max.
OFF delay	OUT01000 and OUT01001: 40 µs max. (4.5 to 26.5 V, 10 to 100 mA) 0.1 ms max. (4.5 to 30 V, 10 to 300 mA) OUT01002 and up: 1 ms max. (4.5 to 30 V, 10 to 300 mA)				1 ms max. (24VDC$^{+10\%}/_{-5\%}$, 5 to 300 mA)
Fuse (see note)	1 fuse/output				1 fuse/common
Circuit configuration					

Note: Cannot be replaced by the user.

3. Transistor Output (Sourcing)

Item	Specification				
	30CDT1-D	**40CDT1-D**	**60CDT1-D**	**8ET**	**20DET**
Max. switching capacity	OUT01000, 01001: 4.5 to 30 VDC, 0.2 A/output OUT01002 and up: 4.5 to 30 VDC, 0.3 A/output				24 VDC$^{+10\%}/_{-5\%}$, 0.3 A/output
	0.8 A/common 2.4 A/Unit	0.8 A/common 3.2 A/Unit	0.8 A/common 4.8 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 1.8 A/Unit
Leakage current	0.1 mA max.				
Residual voltage	1.5 V max.				
ON delay	OUT01000 and OUT01001: 20 µs max. OUT01002 and up: 0.1 ms max.				0.1 ms max.
OFF delay	OUT01000 and OUT01001: 40 µs max. (4.5 to 26.5 V, 10 to 100 mA) 0.1 ms max. (4.5 to 30 V, 10 to 300 mA) OUT01002 and up: 1 ms max. (4.5 to 30 V, 10 to 300 mA)				1 ms max. (24VDC$^{+10\%}/_{-5\%}$, 5 to 300 mA)
Fuse (see note)	1 fuse/output				1 fuse/common
Circuit configuration					

**Note:** Cannot be replaced by the user.

Specifications

■ Analog I/O Unit

Up to 3 Expansion Units (including CPM1A-MAD01 Analog I/O Units) can be connected to a CPM2A CPU Unit.

Item		Voltage I/O	Current I/O
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.

■ CompoBus/S I/O Link Unit

The CPM2A PC can function as a Slave to a CompoBus/S Master Unit (or SRM1 CompoBus/S Master Control Unit) when a CPM1A-SRT21 CompoBus/S I/O Link Unit is connected. The CompoBus/S I/O Link Unit establishes an I/O link of 8 inputs and 8 outputs between the Master Unit and the CPM2A. Up to 3 Expansion Units can be connected to a CPM2A CPU Unit, but only one of those Units can be a CompoBus/S I/O Link Unit.
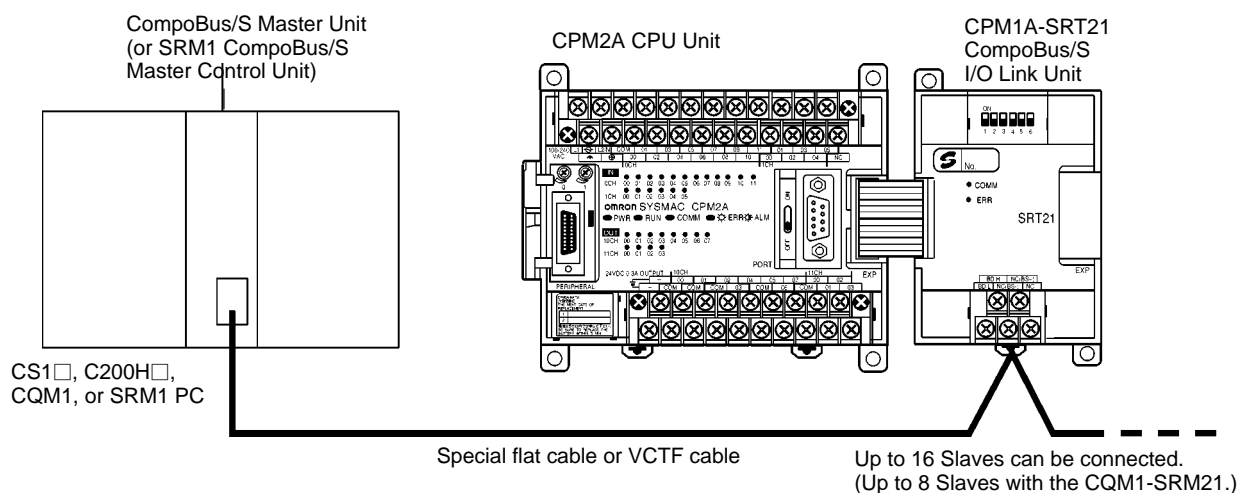
Specifications

Specifications

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

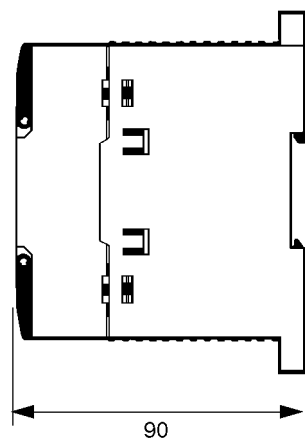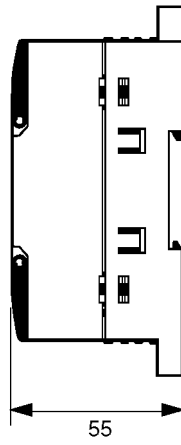**Note:** See the *CompoBus/S Catalog (Q103)* for more details on CompoBus/S communications.

Dimensions

CPM2A-30CD□-□ CPU Units

CPU Units with DC Power   CPU Units with AC Power

55   90
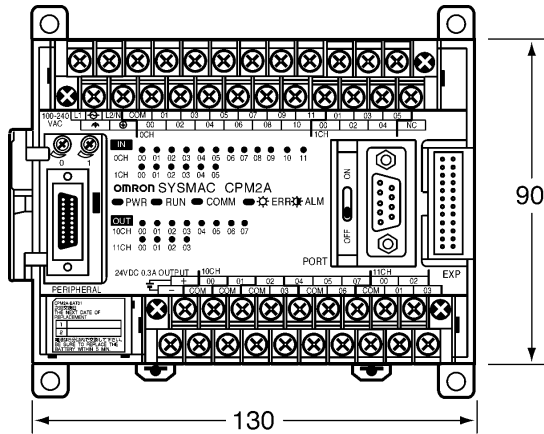
CPM2A-40CD□-□ CPU Units
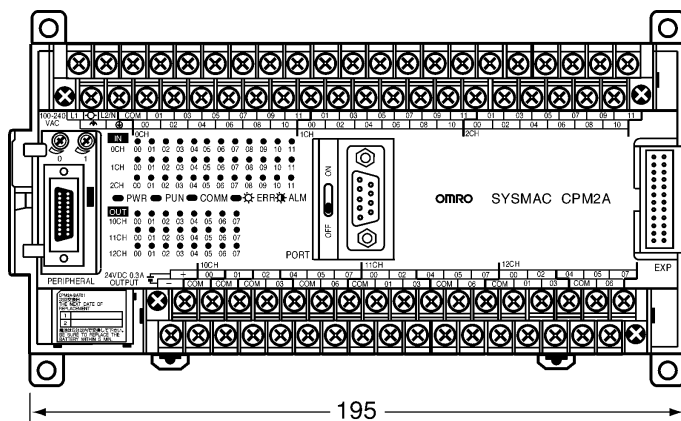

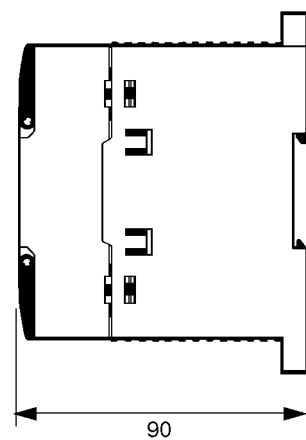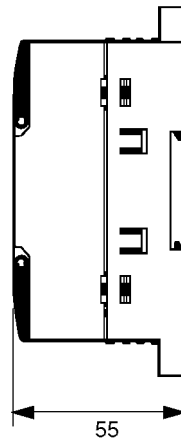CPU Units with DC Power   CPU Units with AC Power

55   90
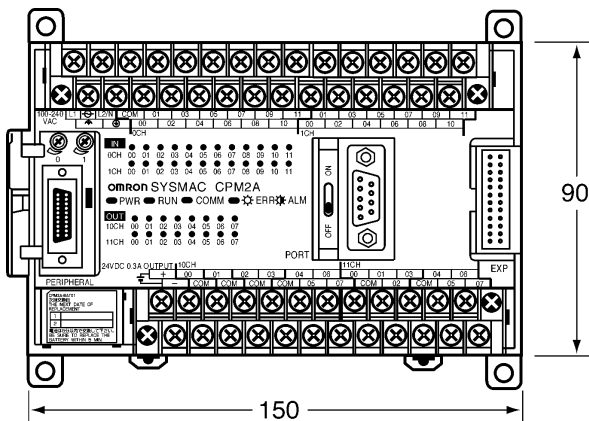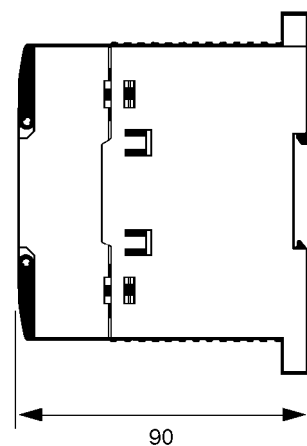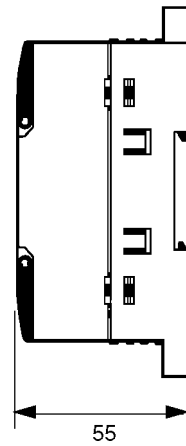
CPM2A-60CD□-□ CPU Units
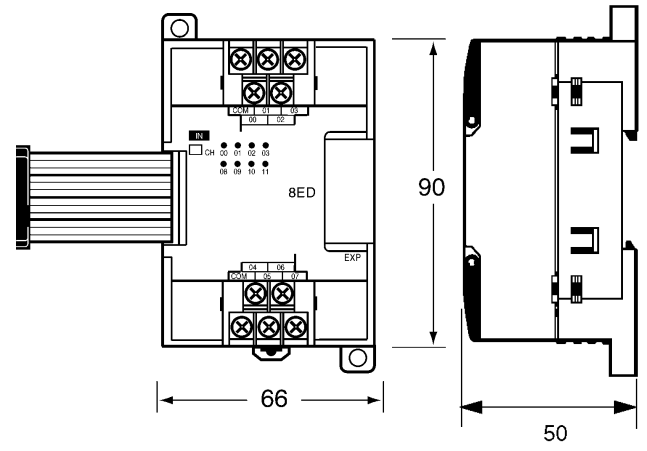
CPU Units with DC Power   CPU Units with AC Power

55   90

Note: All dimensions are in mm.
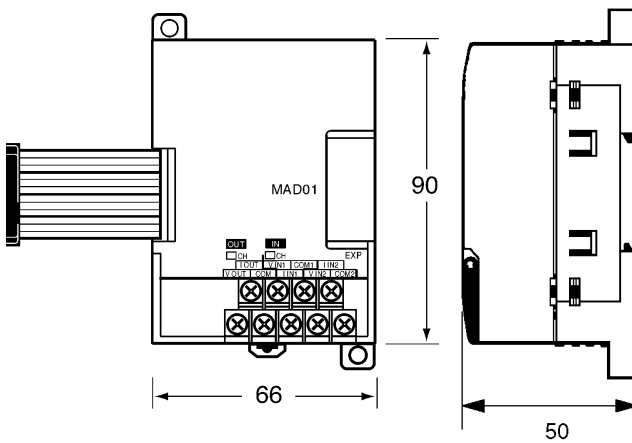
Dimensions

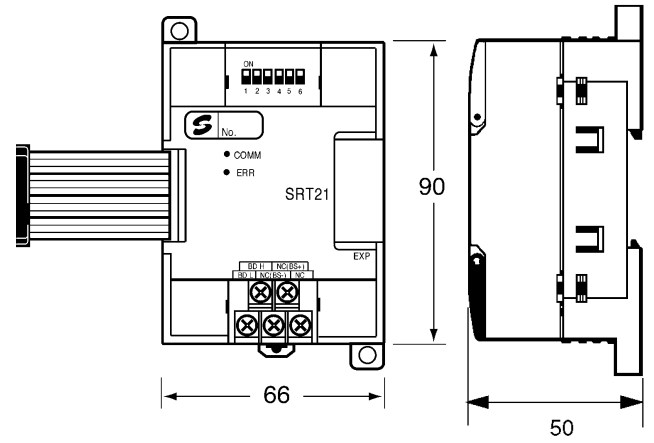## CPM1A-20ED☐ Expansion I/O Units
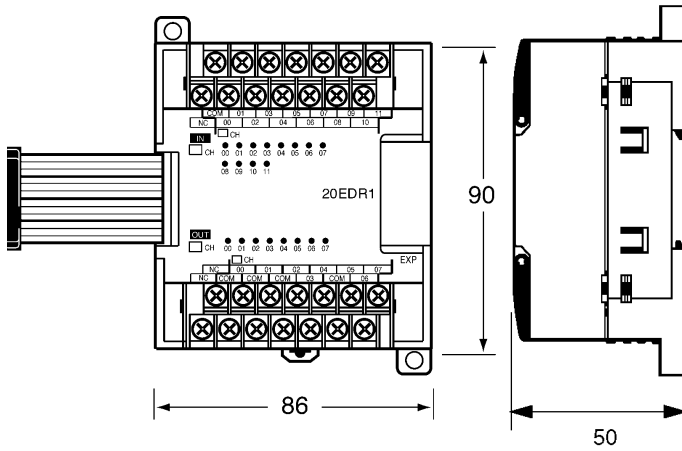
CPM1A-8☐☐☐ Expansion I/O Units

CPM1A-MAD01 Analog I/O Unit

CPM1A-SRT21 CompoBus/S I/O Link Unit

Note: All dimensions are in mm.
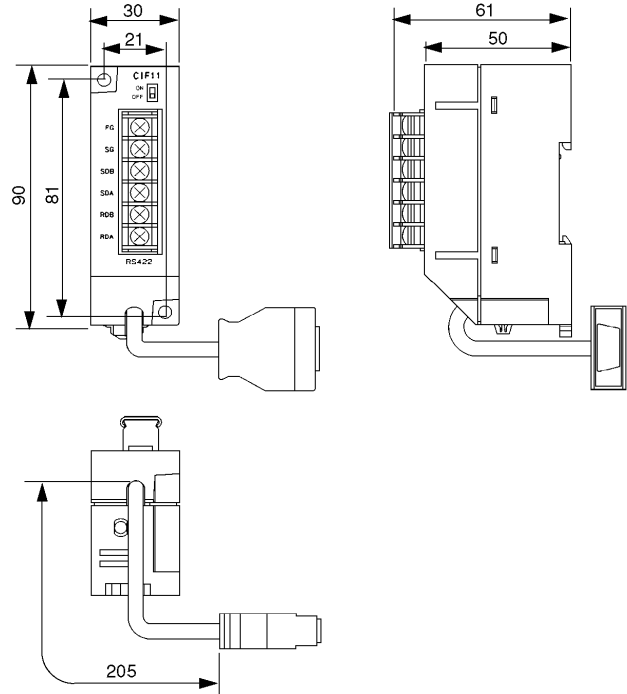
Dimensions
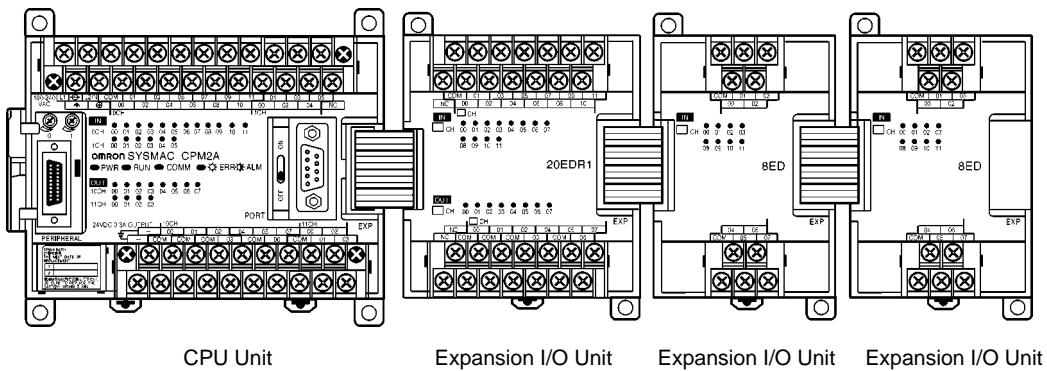
CPM1-CIF01 RS-232C Adapter
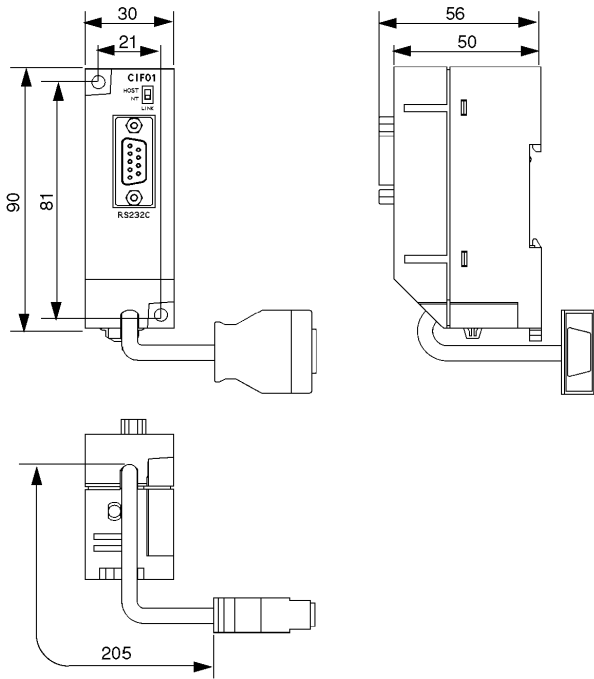
CPM1-CIF11 RS-422 Adapter

Note: All dimensions are in mm.

Example CPM2A System Configuration

Up to three Expansion Units* can be connected to a CPM2A CPU Unit.

| CPU Unit | Expansion I/O Unit | Expansion I/O Unit | Expansion I/O Unit |

Note: *Only one CompoBus/S I/O Link Unit can be connected to a CPU Unit.

Functions

■ Interrupts

The CPM2A provides the following kinds of interrupt processing.

Interrupt Inputs
Interrupt programs are executed when inputs to the CPU Unit's built-in input points (00003 to 00006) are turned from OFF to ON. Interrupt subroutine numbers 000 to 003 are allocated to input points 00003 to 00006.

Interval Timer Interrupts
Interval timer interrupt programs are executed with a precision of 0.1 ms. Interrupt subroutine numbers 000 to 049 are allocated by instructions.

Count-up Interrupts
Input signals to the CPU Unit's built-in input points (00003 to 00006) are counted at high speed (up to 2 KHz), and the normal program is stopped and an interrupt program is executed when the count reaches the SV. Interrupt subroutine numbers 000 to 003 are allocated to input points 00003 to 00006.

Count-check Interrupts Using the High-speed Counter
Pulse inputs to the CPU Unit's built-in input points (00003 to 00006) are counted at high speed (up to 20 KHz or 5 KHz), and an interrupt program is executed when the present value matches the target value or falls within a given range. Interrupt subroutine numbers 000 to 049 are allocated by instructions.

■ Interval Timer Interrupts

The CPM2A has one interval timer (precision: 0.1 ms) that can be set from 0.5 ms to 319,968 ms. There are two interrupt modes: the single-interrupt mode, in which a single interrupt is executed when the time is up, and the scheduled-interrupt mode, in which interrupts are executed at regular intervals.
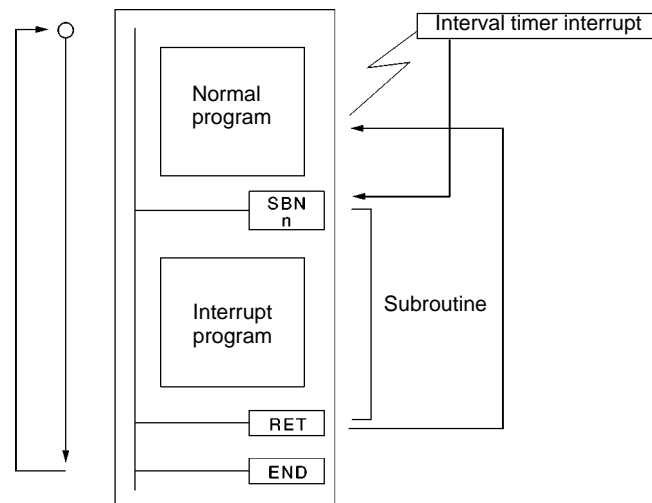
| Item	Single-interrupt mode	Scheduled-interrupt mode
Operation	Interrupt is executed once when time has elapsed.	Interrupts are executed at regular intervals.
Set time	0.5 to 316,968 ms (Unit: 0.1 ms)	
Interrupt response time	0.3 ms (from when time has elapsed until execution of interrupt program)	

Functions

■ High-speed Counters

The CPM2A CPU Unit has a built-in high-speed counter that can count input pulses at up to 20 KHz. When combined with the interrupt function, the high-speed counter can be used for target-value comparison or range comparison control that is unaffected by the cycle time.
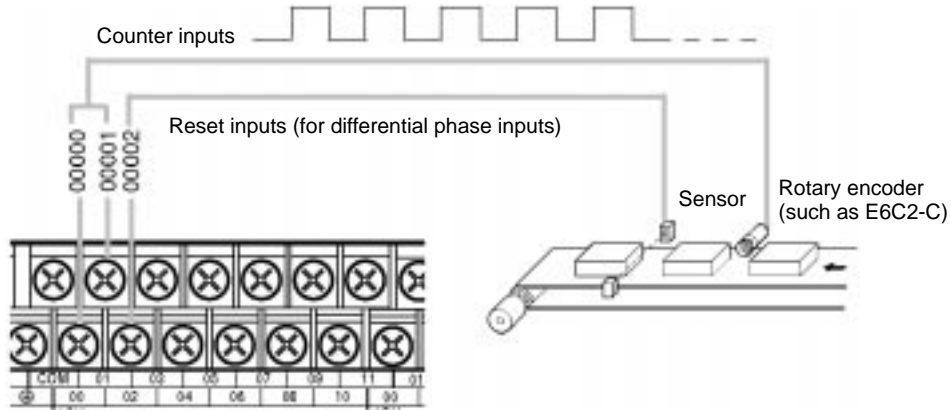
Input	Response frequency	Input mode (count value)	Counter PV Storage	Control method
00000 00001 00002	5 KHz	Differential phase input mode (-8,388,608 to 8,388,607)	SR 248 and SR 249	Target value comparison interrupts
	20 KHz	Pulse + direction input mode (-8,388,608 to 8,388,607)		
		Up/down pulse input mode (-8,388,608 to 8,388,607)		Range comparison interrupts
		Increment mode (0 to 16,777,215)		

■ Interrupt Inputs (Counter Mode)

The four built-in interrupt inputs in the CPM2A's CPU Unit can be used in counter mode to count inputs of up to 2 kHz. These inputs can be used as either incrementing counters or decrementing counters and can trigger an interrupt (i.e., executing an interrupt subroutine) when the count matches the set value.
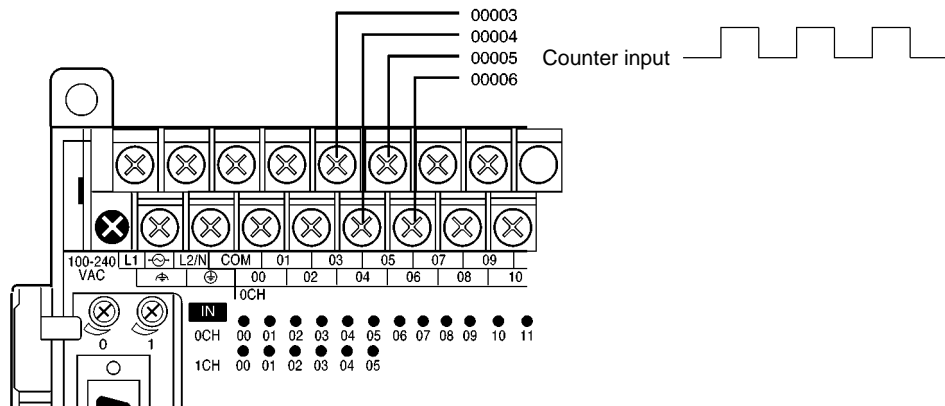
Input	Counter number	Set value location	Present value location	Response frequency	Input mode (count value)	Control method
00003	Counter 0	SR 240	SR 244	2 KHz	Incrementing counter (0000 to FFFF)	Count-up interrupts
00004	Counter 1	SR 241	SR 245		Decrementing counter (0000 to FFFF)	
00005	Counter 2	SR 242	SR 246			
00006	Counter 3	SR 243	SR 247			

■ Pulse Outputs

The CPM2A has two pulse outputs. The PC Setup can be set to use 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 PC Setup as either relative or absolute.
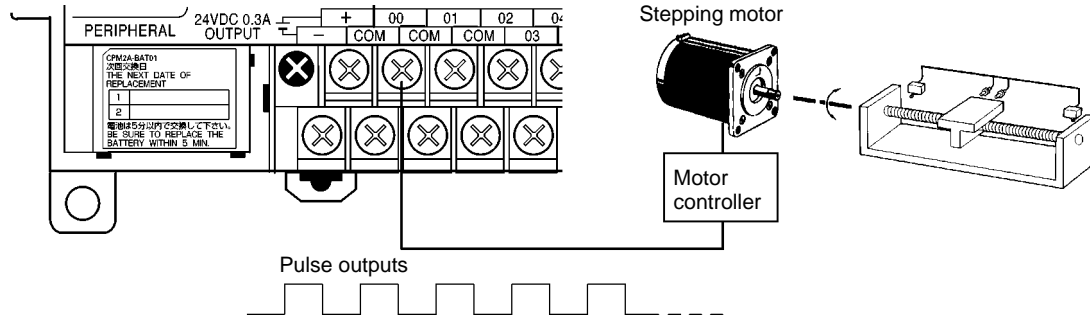
Item		Single-phase pulse output without accel/decel	Variable duty-ratio pulse output	Single-phase pulse output with trapezoidal acceleration/deceleration			
				Pulse + direction output		Up/down pulse output	
Controlling instruction(s)		PULS(65) and SPED(64)	PWM(—)	PULS(65) and ACC(—)			
Output number	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.

Functions

■ Synchronized Pulse Control

The CPM2A's high-speed counter function can be combined with the pulse output function to generate an output pulse at a specified multiple of the input pulse frequency. (This function is supported only by the SSS.)
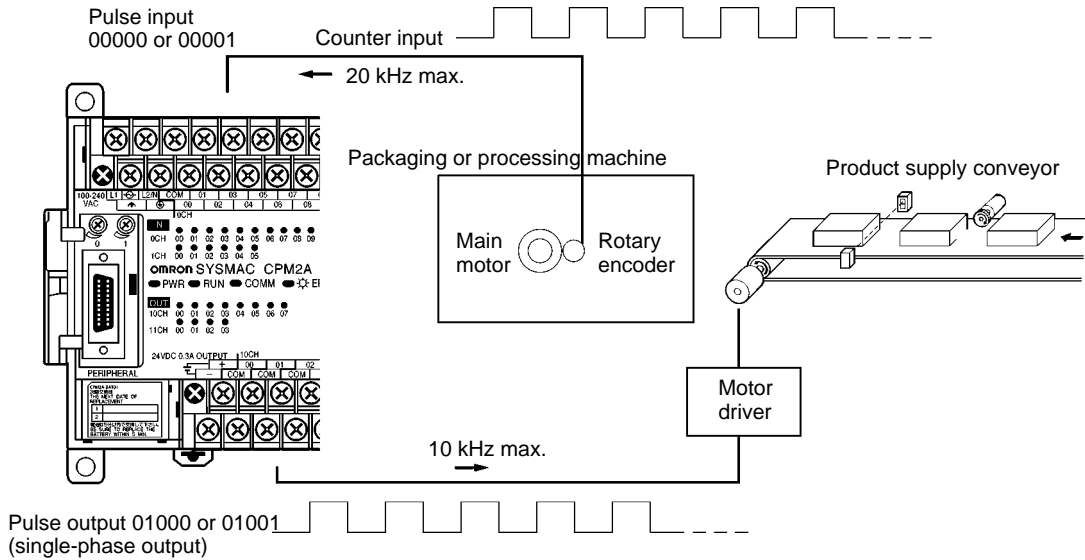
Item		Input mode			
		Phase differential input mode	**Pulse + direction input mode**	**Up/down pulse input mode**	**Increment mode**
Input number	00000	A-phase input	Count input	CW input	Count input
	00001	B-phase input	Direction input	CCW input	See note 1.
Input method		Phase differential quadruple input	Single-phase input	Single-phase input	Single-phase input
Input frequency range		10 Hz to 500 Hz (accuracy ±1 Hz) 20 Hz to 1 KHz (accuracy ±1 Hz) 300 Hz to 20 KHz (accuracy ±25 Hz) (See note 2.)			
Output frequency range		10 Hz to 10 KHz (accuracy 10 Hz)			
Frequency ratio (scaling factor)		1 % to 1,000% (Can be specified in units of 1%.)			
Synchronized control cycle		10 ms			

Note 1. Can be used as an ordinary input.

2. The accuracy is ±10 Hz when the input frequency is 10 KHz or less.

Functions

■ Quick-response Inputs

The CPM2A has four inputs that can be used for quick-response inputs (shared with interrupt inputs and 2-kHz high-speed counter inputs). Quick-response inputs are received into an internal buffer, so signals that change status within a scan can be received.
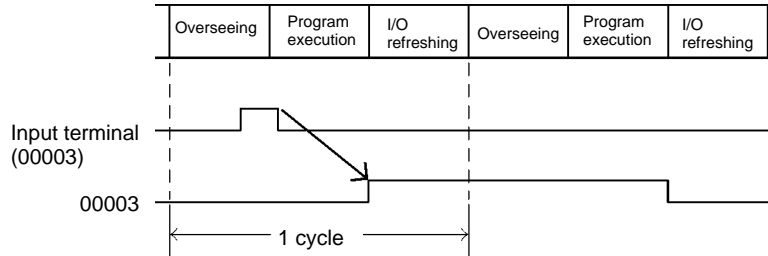
The minimum input signal width is 50 μs for inputs 00003 through 00006. Inputs 00003 through 00006 can be used as interrupt inputs, 2-KHz high-speed counter inputs, or quick-response inputs. If they are not used for any of these purposes, then they can be used as ordinary inputs.

■ Analog Controls

The CPM2A CPU Unit has two analog controls that can be used for a wide range of timer and counter analog settings. As these controls are turned, values from 0 to 200 (BCD) are stored in the SR Area.

Control	Storage area	Set value (BCD)
Analog control 0	SR 250	0000 to 0200
Analog control 1	SR 251	

■ Clock Function

The CPM2A has a built-in clock (accuracy: ±1 minute/month) that allows the date and time to be read from the ladder program. The time can be overwritten from a Programming Console or other Programming Device, but the CPM2A is also equipped with a 30-second Compensation Bit. The time will be rounded off to the nearest minute when this bit is turned ON, so the time can be set very accurately by turning ON this bit when the "time tone" is heard on the radio.
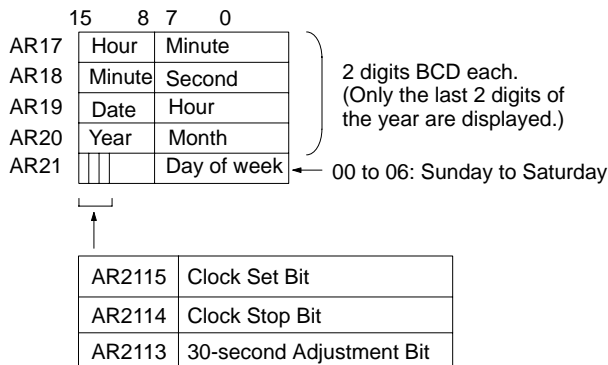
■ Additional Timer Functions

VERY HIGH-SPEED TIMER (Units: 1 ms)	Starts a very high-speed decrementing ON-delay timer with the specified timer number. The set value can be 0 to 9,999 ms. (Set in 1-ms units.)
LONG TIMER (Units: 1 s or 10 s)	Starts a long-term decrementing ON-delay timer with the specified timer number. The set value can be 0 to 9,999 s (when set in 1-s units) or 0 to 99,990 s (when set in 10-s units).

Note: This function is supported only by the SSS.

Functions

■ NT Link

The CPM2A can be connected to an OMRON PT (Programmable Terminal) in NT Link mode (1:1). A communications program is not required in the CPM2A. The RS-232C port can be used for the NT Link.

CPM2A CPU Unit

RS-232C cable

OMRON PT

RS-232C port
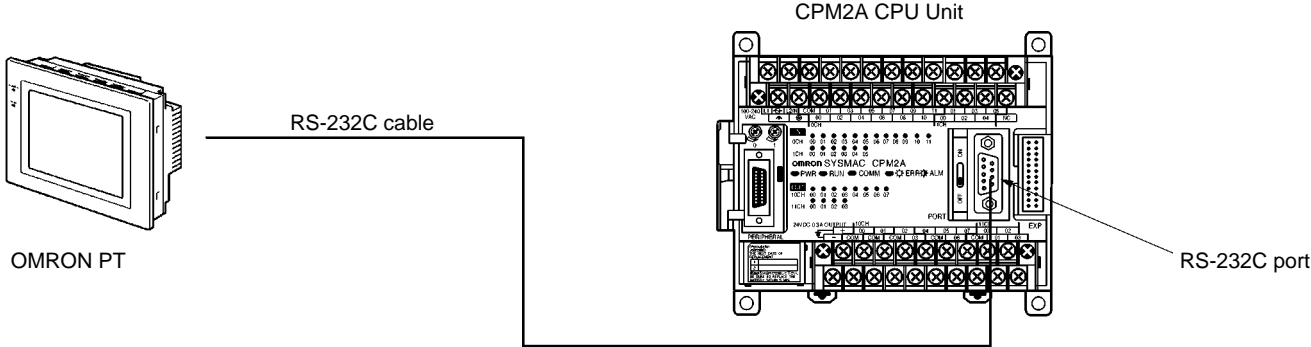
Instructions

The CPM2A supports 119 basic and special instructions.

■ Ladder Diagram Instructions

Name	Mnemonic	Variations
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	---

■ Bit Control Instructions

Name	Mnemonic	Variations
OUTPUT	OUT	---
OUTPUT NOT	OUT NOT	---
SET	SET	---
RESET	RSET	---
KEEP	KEEP(11)	---
DIFFERENTIATE UP	DIFU(13)	---
DIFFERENTIATE DOWN	DIFD(14)	---

■ Sequence Control Instructions

Name	Mnemonic	Variations
NO OPERATION	NOP(00)	---
END	END(01)	---
INTERLOCK	IL(02)	---
INTERLOCK CLEAR	ILC(03)	---
JUMP	JMP(04)	---
JUMP END	JME(05)	---

■ Timer and Counter Instructions

Name	Mnemonic	Variations
TIMER	TIM	---
COUNTER	CNT	---
REVERSIBLE COUNTER	CNTR(12)	---
HIGH-SPEED TIMER	TIMH(15)	---
ONE-MS TIMER	TMHH(—[1])[2, 3]	---
LONG TIMER	TIML(—[1])[2, 3]	---

■ Comparison Instructions

Name	Mnemonic	Variations
COMPARE	CMP(20)	---
TABLE COMPARE	TCMP(85)	@
DOUBLE COMPARE	CMPL(60)[1]	---
BLOCK COMPARE	BCMP(68)[1]	@
AREA RANGE COMPARE	ZCP(—[1])[2]	---
DOUBLE AREA RANGE COMPARE	ZCPL(—[1])[2]	---

■ Data Movement Instructions

Name	Mnemonic	Variations
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

Name	Mnemonic	Variations
SHIFT REGISTER	SFT(10)	---
WORD SHIFT	WSFT(16)	@
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)	@
ASYNCHRONOUS SHIFT REGISTER	ASFT(17)[1]	@

■ Increment/Decrement Instructions

Name	Mnemonic	Variations
INCREMENT	INC(38)	@
DECREMENT	DEC(39)	@

■ Calculation Instructions

Name	Mnemonic	Variations
BCD ADD	ADD(30)	@
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)	@

Note 1. Expansion instructions with default function codes.

2. Instructions not supported by the CPM1A.

3. Supported only by the SSS.

Instructions

■ Conversion Instructions

Name	Mnemonic	Variations
BCD-TO-BINARY	BIN(23)	@
BINARY-TO-BCD	BCD(24)	@
DOUBLE BCD-TO-DOUBLE BINARY	BINL(58)[2]	@
DOUBLE BINARY-TO-DOUBLE BCD	BCDL(59)[2]	@
DATA DECODER	MLPX(76)	@
DATA ENCODER	DMPX(77)	@
ASCII CONVERT	ASC(86)	@
ASCII-TO-HEXADECIMAL	HEX(—1)[2]	@
2'S COMPLEMENT	NEG(—1)[2]	@
HOURS-TO-SECONDS	SEC(—1)[2]	@
SECONDS-TO-HOURS	HMS(—1)[2]	@

■ Table Data Manipulation Instructions

Name	Mnemonic	Variations
FRAME CHECKSUM	FCS(—1)[2]	@
SUM	SUM(—1)[2]	@
DATA SEARCH	SRCH(—1)[2]	@
FIND MAXIMUM	MAX(—1)[2]	@
FIND MINIMUM	MIN(—1)[2]	@

■ Data Control Instructions

Name	Mnemonic	Variations
SCALING	SCL(66)[1, 2]	@
SCALING 2	SCL2(—1)[2]	@
SCALING 3	SCL3(—1)[2]	@
PID CONTROL	PID(—1)[2]	---
AVERAGE VALUE	AVG(—1)[2]	---

■ Logic Instructions

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

■ Special Calculation Instructions

Name	Mnemonic	Variations
BIT COUNTER	BCNT(67)[1]	@

■ Subroutine Instructions

Name	Mnemonic	Variations
SUBROUTINE CALL	SBS(91)	@
SUBROUTINE ENTRY	SBN(92)	---
SUBROUTINE RETURN	RET(93)	---
MACRO	MCRO(99)	@

■ Interrupt Control Instructions

Name	Mnemonic	Variations
INTERRUPT CONTROL	STIM(69)[1]	@
INTERVAL TIMER	INT(89)[1, 3]	@

■ Pulse Control Instructions

Name	Mnemonic	Variations
MODE CONTROL	INI(61)[1, 3]	@
HIGH-SPEED COUNTER PV READ	PRV(62)[1, 3]	@
REGISTER COMPARISON TABLE	CTBL(63)[1, 3]	@

■ Pulse Output Control Instructions

Name	Mnemonic	Variations
SPEED OUTPUT	SPED(64)[1, 3]	@
SET PULSES	PULS(65)[1, 3]	@
PULSE W/ VARIABLE DUTY RATIO	PWM(—1)[2]	@
ACCELERATION CONTROL	ACC(—1)[2]	@
SYNCHRONIZED PULSE CONTROL	SYNC(—1)[2, 4]	@

■ I/O Unit Instructions

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

■ Communications Instructions

Name	Mnemonic	Variations
RECEIVE	RXD(47)[1, 2]	@
TRANSMIT	TXD(48)[1, 2]	@
CHANGE RS-232C SETUP	STUP(—1)[2]	@

■ Step Instructions

Name	Mnemonic	Variations
STEP DEFINE	STEP(08)	---
STEP START	SNXT(09)	---

■ User Error Instructions

Name	Mnemonic	Variations
FAILURE ALARM AND RESET	FAL(06)	@
SEVERE FAILURE ALARM	FALS(07)	---

■ Display Instructions

Name	Mnemonic	Variations
MESSAGE DISPLAY	MSG(46)	@

■ Carry Flag Instructions

Name	Mnemonic	Variations
SET CARRY	STC(40)	@
CLEAR CARRY	CLC(41)	@

Note 1. Expansion instructions with default function codes.

2. Instructions not supported by the CPM1A.

3. Instructions improved in the CPM2A.

4. Supported only by the SSS.

ORDERING GUIDE

EMC Directives
OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards (see the following note). Whether the products conform to the standards in the system used by the customer, however, must be confirmed by the customer.

EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

Applicable EMC Standards

EMS (Electromagnetic Susceptibility):
    EN61131-2
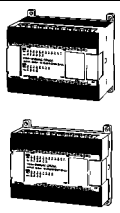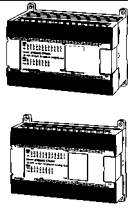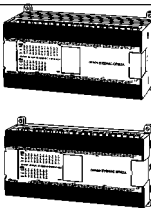EMI (Electromagnetic Interference):
    EN50081-2
    (Radiated emission: 10-m regulations)
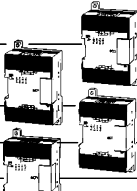
Low Voltage Directive
OMRON Power Supply Units and I/O Units have been determined safe when operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC according to the safety standards in EN61131-2.

Ordering Guide

■ CPU Units

CPU Unit		Power supply	Output type	Inputs	Outputs	Model	Approved standards
30 I/O points		AC	Relay	18	12	CPM2A-30CDR-A	U, C, CE
		DC	Relay			CPM2A-30CDR-D	U, C, CE
			Transistor (sinking)			CPM2A-30CDT-D	U, C, CE
			Transistor (sourcing)			CPM2A-30CDT1-D	U, C, CE
40 I/O points		AC	Relay	24	16	CPM2A-40CDR-A	U, C, CE
		DC	Relay			CPM2A-40CDR-D	U, C, CE
			Transistor (sinking)			CPM2A-40CDT-D	U, C, CE
			Transistor (sourcing)			CPM2A-40CDT1-D	U, C, CE
60 I/O points		AC	Relay	36	24	CPM2A-60CDR-A	U, C, CE
		DC	Relay			CPM2A-60CDR-D	U, C, CE
			Transistor (sinking)			CPM2A-60CDT-D	U, C, CE
			Transistor (sourcing)			CPM2A-60CDT1-D	U, C, CE

■ Expansion Units

Expansion Unit	Max. number of Units	Output type	Inputs	Outputs	Model	Approved standards
Expansion I/O Units	3 Units max. (See note.)	Relay	12	8	CPM1A-20EDR1	U, C, CE
		Transistor (sinking)			CPM1A-20EDT	U, C, CE
		Transistor (sourcing)			CPM1A-20EDT1	U, C, CE
		---	8	---	CPM1A-8ED	U, C, CE
		Relay	---	8	CPM1A-8ER	U, C, CE
		Transistor (sinking)	---	8	CPM1A-8ET	U, C, CE
		Transistor (sourcing)			CPM1A-8ET1	
Analog I/O Unit	3 Units max. (See note.)	Analog	2	1	CPM1A-MAD01	U, C, CE
CompoBus/S I/O Link Unit	3 Units max. (See note.)	---	I/O Link of 8 input bits and 8 output bits		CPM1A-SRT21	U, C, CE

Note: Only one Expansion Unit can be connected if an NT-AL001 Adapter is connected to the CPU Unit's RS-232C port.

Ordering Guide

■ Programming Consoles and Cables

Product		Model	Approved standards
Programming Console (2-m cable attached)		CQM1-PRO01-E	U, C, N, CE
Programming Console (Requires separate cable. See below.)		C200H-PRO27-E	U, C, CE
Connecting Cable for C200H-PRO27-E	2-m cable	C200H-CN222	---
	4-m cable	C200H-CN422	---

■ Support Software

Product	Functions	Model	Approved standards
SYSMAC Support Software	3.5", 2HD for IBM PC/AT compatible	C500-ZL3AT1-E	---
SYSMAC-CPT Support Software	For IBM PC/AT or compatible computer (3.5" disks (2HD) and CD ROM)	WS01-CPTB1-E	---

■ Personal Computer Connecting Cables

Connecting port (on the CPM2A)	Computer port	Length	Model	Approved standards
Peripheral port	For a D-sub 9-pin port	3.3 m	CQM1-CIF02	U, C, N, L, CE
	For a D-sub 25-pin port	3.3 m	CQM1-CIF01	U, C, L
	For a half-pitch 14-pin port	3.3 m + 0.15 m	CQM1-CIF01	U, C, N, L, CE
			XW2Z-S001	---
RS-232C port	For a D-sub 9-pin port	2 m	XW2Z-200S-V	---
		5 m	XW2Z-500S-V	---
	For a D-sub 25-pin port	2 m	XW2Z-200S	---
		5 m	XW2Z-500S	---
	For a half-pitch 14-pin port	2 m +0.15 m	XW2Z-200S	---
			XW2Z-S001	---
		5 m +0.15 m	XW2Z-500S	---
			XW2Z-S001	---

■ Adapters

Product	Function		Model	Approved standards
RS-232C Adapter	Peripheral port level conversion		CPM1-CIF01	U, C, N, L, CE
RS-422 Adapter			CPM1-CIF11	U, C, N, L, CE
Link Adapter	RS-232C to RS-422 conversion	For personal computer connection (Can also be connected to the CPM2A.)	B500-AL004	---
RS-422 Adapter		For CPM2A connection (Can also be connected to a personal computer, but requires an external 5-V power supply.)	NT-AL001	---

■ Battery

Product	Function	Model	Approved standards
Backup Battery	Backs up memory in the CPM2A CPU Unit.	CPM2A-BAT01	---