

CP1L

# CPU Units and Expansion Units

When it comes to controllers for compact machines, Omron's new CP1L series offers the compactness of a micro-PLC with the capability of a modular PLC. But this new and exciting range is not only compact, it is scaleable, has a faster processing speed than other controllers and is in a class of its own when it comes to price/performance. Naturally, it is compatible with all other devices in the Omron PLC line up.

- 4 high-speed encoder inputs and 2 high-speed pulse outputs
- CPUs with AC or DC supply and 10, 14, 20, 30, 40 or 60 I/O built-in
- Instruction set compatible with CP1H-, CJ1-, and CS1 series PLC
- Optional RS232C and RS-422A/485 serial ports
- USB programming port
- Scaleable with a wide range of I/O units (maximum up to 180 I/O points)
- Motion functionality
- One and the same software as other Omron controllers



## CPU Unit Specification

### CPU Units

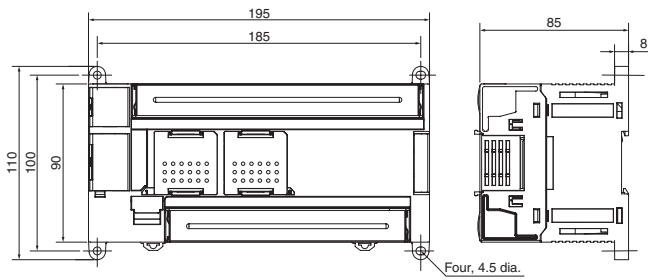
Type	CP1L-M60 (60 points)	CP1L-M40 (40 points)	CP1L-M30 (30 points)	CP1L-L20 (20 points)	CP1L-L14 (14 points)	CP1L-L10 (10 points)	
Item	Models	CP1L-M60□□-□	CP1L-M40□□-□	CP1L-M30□□-□	CP1L-L20□□-□	CP1L-L14□□-□	CP1L-L10□□-□
Control method	Stored program method						
I/O control method	Cyclic scan with immediate refreshing						
Program language	Ladder diagram						
Function blocks	Maximum number of function block definitions: 128 Maximum number of instances: 256 Languages usable in function block definitions: Ladder diagrams, structured text (ST) Function blocks cannot be used in CP1L-J CPU Unit.						
Instruction length	1 to 7 steps per instruction						
Instructions	Approx. 500 (function codes: 3 digits)						
Instruction execution time	Basic instructions: 0.61 μs min. Special instructions: 4.1 μs min.						
Common processing time	0.38 ms						
Program capacity	10K steps			5Ksteps (J models: 1K steps)			
Number of tasks	288 (32 cyclic tasks and 256 interrupt tasks)						
Scheduled interrupt tasks	1 (interrupt task No. 2, fixed)						
	Input interrupt tasks			4 (interrupt task No. 140 to 143, fixed)		2 (interrupt tasks No. 140 to 141, fixed)	
(Interrupt tasks can also be specified and executed for high-speed counter interrupts and executed.)							
Maximum subroutine number	256						
Maximum jump number	256						
I/O areas	Input bits	36: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11 and CIO 2.00 to CIO 2.11	24: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11	18: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.05	12: CIO 0.00 to CIO 0.11	8: CIO 0.00 to CIO 0.07	6: CIO 0.00 to CIO 0.05
	Output bits	24: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07 and CIO 102.00 to CIO 102.07	16: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07	12: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.03	8: CIO 100.00 to CIO 100.07	6: CIO 100.00 to CIO 100.05	4: CIO 100.00 to CIO 100.03
	1:1 Link Area	1,024 bits (64 words): CIO 3000.00 to CIO 3063.15 (CIO 3000 to CIO 3063)					-
Serial PLC Link Area	1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189)					-	
Work bits	8,192 bits (512 words): W000.00 to W511.15 (W0 to W511) CIO Area: 37,504 bits (2,344 words): CIO 3800.00 to CIO 6143.15 (CIO 3800 to CIO 6143)						
TR Area	16 bits: TR0 to TR15						
Holding Area	8,192 bits (512 words): H0.00 to H511.15 (H0 to H511)						
AR Area	Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447) Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959)						

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<b>Item</b>	<b>Models</b>	CP1L-M60□□-□	CP1L-M40□□-□	CP1L-M30□□-□	CP1L-L20□□-□	CP1L-L14□□-□	CP1L-L10□□-□
<b>Timers</b>	4,096 bits: T0 to T4095						
<b>Counters</b>	4,096 bits: C0 to C4095						
<b>DM Area</b>	32 Kwords: D0 to D32767			10 Kwords: D0 to D9999, D32000 to D32767			
<b>Data Register Area</b>	16 registers (16 bits): DR0 to DR15						
<b>Index Register Area</b>	16 registers (32 bits): IR0 to IR15						
<b>Task Flag Area</b>	32 flags (32 bits): TK0000 to TK0031						
<b>Trace Memory</b>	4,000 words (500 samples for the trace data maximum of 31 bits and 6 words.)						
<b>Memory Cassette</b>	A special Memory Cassette (CP1W-ME05M) can be mounted. <b>Note:</b> Can be used for program backups and auto-booting.						
<b>Clock function</b>	Supported. Accuracy (monthly deviation): -4.5 min to -0.5 min (ambient temperature: 55°C), -2.0 min to +2.0 min (ambient temperature: 25°C), -2.5 min to +1.5 min (ambient temperature: 0°C)						
<b>Communications functions</b>	One built-in peripheral port (USB 1.1): For connecting Support Software only.						
	A maximum of two Serial Communications Option Boards can be mounted.			A maximum of one Serial Communications Option Board can be mounted.		-	
<b>Memory backup</b>	Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to flash memory as initial values. Battery backup: The Holding Area, DM Area, and counter values (flags, PV) are backed up by a battery.						
<b>Battery service life</b>	5 years at 25°C. (Use the replacement battery within two years of manufacture.)						
<b>Built-in input terminals</b>	60 terminals (36 inputs, 24 outputs)	40 (24 inputs, 16 outputs)	30 (18 inputs, 12 outputs)	20 (12 inputs, 8 outputs)	14 (8 inputs, 6 outputs)	10 (6 inputs, 4 outputs)	
<b>Number of connectable Expansion Units and Expansion I/O Units</b>	CP-series Expansion Unit and Expansion I/O Units: 3 max.			CP-series Expansion Units and Expansion I/O Units: 1 max.		-	
<b>Max. number of I/O points</b>	180 (60 built in + 40 per Expansion (I/O) Unit x 3 units)	160 (40 built in + 40 per Expansion (I/O) Unit x 3 units)	150 (30 built in + 40 per Expansion (I/O) Unit x 3 Units)	60 (20 built in + 40 per Expansion (I/O) Unit x 1 Unit)	54 (14 built in + 40 per Expansion (I/O) Unit x 1 Unit)	10	
<b>Interrupt inputs</b>	6 inputs (Response time: 0.3 ms)				4 inputs (Response time: 0.3 ms)	2 inputs (Response time: 0.3 ms)	
<b>Interrupt inputs counter mode</b>	6 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits Up or down counters				4 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits Up or down counters	2 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits Up or down counters	
<b>Quick-response inputs</b>	6 points (Min. input pulse width: 50 μs)				4 points (Min. input pulse width: 50 μs)	2 points (Min. input pulse width: 50 μs)	
<b>Scheduled interrupts</b>	1						
<b>High-speed counters</b>	4 counters, 2 axes (24-VDC input) 4 inputs: Differential phases (4x), 50 kHz or Single-phase (pulse plus direction, up/down, increment), 100 kHz Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison						
<b>Pulse outputs (models with transistor outputs only)</b>	<b>Pulse outputs</b>	Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)					
	<b>PWM outputs</b>	Duty ratio: 0.0% to 100.0% (specified in increments of 0.1% or 1%) 2 outputs, 0.1 to 6553.5 Hz or 1 to 32,800 Hz (Accuracy: ±5% at 1 kHz)					
<b>Analog control</b>	1 (Setting range: 0 to 255)						
<b>External analog input</b>	1 input (Resolution: 1/256, Input range: 0 to 10 V). Not isolated.						

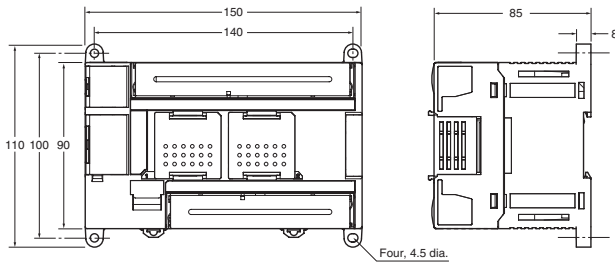
Dimensions

(Unit: mm)

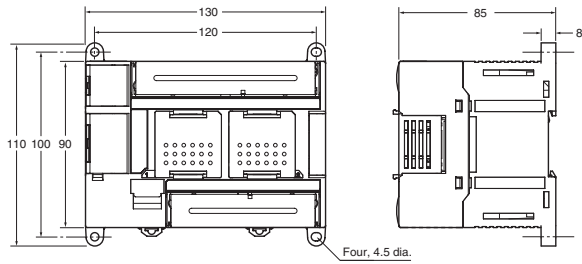
CP1L CPU Units with 60 I/O Points



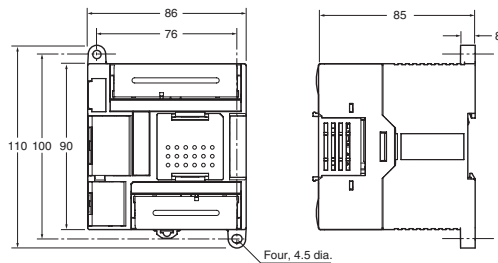
CP1L CPU Units with 40 I/O Points



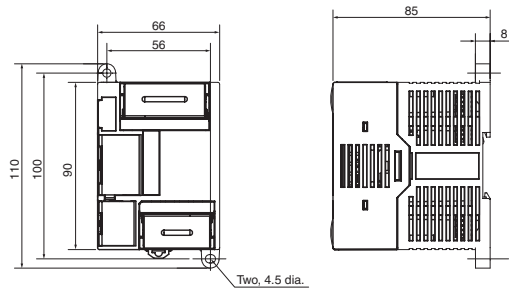
CP1L CPU Units with 30 I/O Points



CP1L CPU Units with 14 or 20 I/O Points

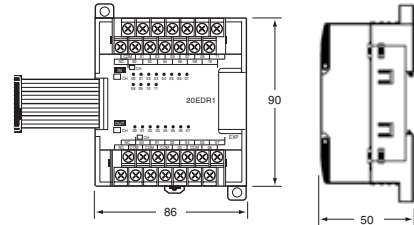


CP1L CPU Units with 10 I/O Points

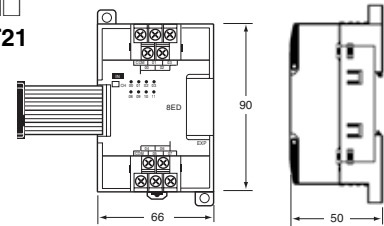


Expansion Units and Expansion I/O Units

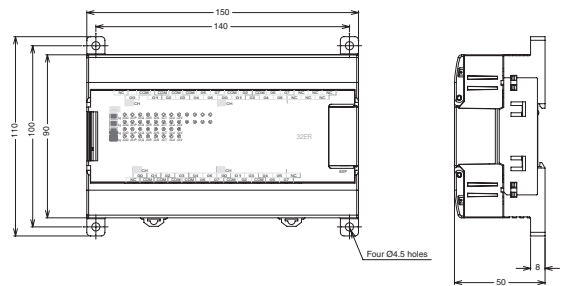
- CP1W-20ED□
- CP1W-16ER
- CP1W-AD041/CP1W-DA041
- CP1W-MAD11/CP1W-TS□□□



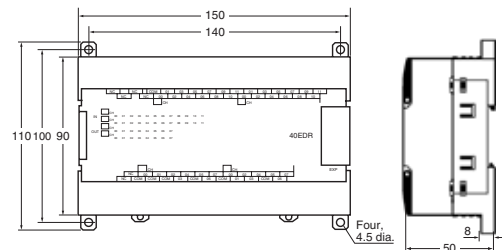
- CP1W-8E□□
- CP1W-SRT21



CP1W-32ER/32ET/32ET1



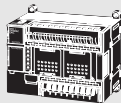





CP1W-40ED□



Ordering Information

CP1L CPU Units

CPU Unit	Specifications				Model	Standards
	Power supply	Output method	Inputs	Outputs		
<b>CP1L-M CPU Units with 60 Points</b> 	AC power supply	Relay output	36	24	CP1L-M60DR-A	UC1, N, L, CE
	DC power supply	Transistor output (sinking)			CP1L-M60DR-D	
		Transistor output (sourcing)			CP1L-M60-DT-D	
					CP1L-M60-DT1-D	
<b>CP1L-M CPU Units with 40 Points</b> 	AC power supply	Relay output	24	16	CP1L-M40DR-A	
	DC power supply	Transistor output (sinking)			CP1L-M40DR-D	
		Transistor output (sourcing)			CP1L-M40DT-D	
					CP1L-M40DT1-D	
<b>CP1L-M CPU Units with 30 Points</b> 	AC power supply	Relay output	18	12	CP1L-M30DR-A	
	DC power supply	Transistor output (sinking)			CP1L-M30DR-D	
		Transistor output (sourcing)			CP1L-M30DT-D	
					CP1L-M30DT1-D	
<b>CP1L-L CPU Units with 20 Points</b> 	AC power supply	Relay output	12	8	CP1L-L20DR-A	
	DC power supply	Transistor output (sinking)			CP1L-L20DR-D	
		Transistor output (sourcing)			CP1L-L20DT-D	
					CP1L-L20DT1-D	
<b>CP1L-L CPU Units with 14 Points</b> 	AC power supply	Relay output	8	6	CP1L-L14DR-A	
	DC power supply	Transistor output (sinking)			CP1L-L14DR-D	
		Transistor output (sourcing)			CP1L-L14DT-D	
					CP1L-L14DT1-D	
<b>CP1L-L CPU Units with 10 Points</b> 	AC power supply	Relay output	6	4	CP1L-L10DR-A	
	DC power supply	Transistor output (sinking)			CP1L-L10DR-D	
		Transistor output (sourcing)			CP1L-L10-DT-D	
					CP1L-L10-DT1-D	

Options for CPU Units

Name	Specifications	Model	Standards
RS-232C Option Board	For CPU Unit option port.	CP1W-CIF01	UC1, N, L, CE
RS-422A/485 Option Board	For CPU Unit option port.	CP1W-CIF11	
Memory Cassette	Can be used for backing up programs or auto-booting.	CP1W-ME05M	
LCD Option Board	Used to monitor and change user-specified messages, time or other data of the CPU Unit.	CP1W-DAM01	

Programming Devices

Name	Specifications	Model	Standards	
<b>CX-One FA Integrated Tool Package Ver. 2.0</b>	CX-One is a package that integrates the Support Software for OMRON PLCs and components. CX-One runs on the following OS. OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP *CX-Thermo runs only on Windows 2000 (Service Pack 3 or higher) or XP.  CX-One Ver. 2.0 includes CX-Programmer Ver. 7.□. For details, refer to the CX-One catalog (Cat. No. R134).  *The software is provided on CDs for the CXONE-AL□□C-□EV2 and on DVD for the CXONE-AL□□D-□EV2. *Site licenses are available for users who must run the CX-One on many computers. Ask your OMRON representative for details.	1 license	CXONE-AL01C-EV2 CXONE-AL01D-EV2	---
		3 licenses	CXONE-AL03C-EV2 CXONE-AL03D-EV2	
		10 licenses	CXONE-AL10C-EV2 CXONE-AL10D-EV2	
		50 licenses	CXONE-AL50C-EV2 CXONE-AL50D-EV2	
<b>USB Programming cable</b>	A-type male to B-type male (Length: 1.8 m)	CP1W-CN221	---	

Name	Specifications	Model	Standards
Programming Device Connecting Cable for CP1W-CIF01 RS-232C Option Board	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	For anti-static connectors XW2Z-200S-CV	---
	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-CV	
	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-V	
	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-V	
USB-Serial Conversion Cable (See note)	USB-RS-232C Conversion Cable (Length: 0.5 m) and PC driver (on a CD-ROM disc) are included. Complies with USB Specification 1.1 On personal computer side: USB (A plug connector, male) On PLC side: RS-232C (D-sub 9-pin, male) Driver: Supported by Windows 98, Me, 2000, and XP	CS1W-CIF31	

- Note:** 1. Cannot be used with a peripheral USB port.  
2. CP1L PLCs are supported by CX-Programmer version 7.1 or higher.

**Expansion Units**

Name	Output method	Inputs	Outputs	Model	Standards
Expansion I/O Units	Relay	24	16	CP1W-40EDR	N, L, CE
	Transistor (sinking)			CP1W-40EDT	
	Transistor output (sourcing)			CP1W-40EDT1	
	Relay	---	32	CP1W-32ER	U, C, L, CE
	Transistor (sinking)			CP1W-32ET	
	Transistor output (sourcing)			CP1W-32ET1	
	Relay	12	8	CP1W-20EDR1	U, C, N, L, CE
	Transistor (sinking)			CP1W-20EDT	
	Transistor output (sourcing)			CP1W-20EDT1	
	Relay	---	16	CP1W-16ER	CE
	---			8	
	Relay	---	8	CP1W-8ER	
Transistor (sinking)	---	8	CP1W-8ET		
Transistor output (sourcing)	---	8	CP1W-8ET1		
Analog Input Unit	Analog (resolution: 1/6000)	4	---	CP1W-AD041	UC1, CE
Analog Output Unit	Analog (resolution: 1/6000)	---	4	CP1W-DA041	UC1, CE
Analog I/O Unit	Analog (resolution: 1/6000)	2	1	CP1W-MAD11	U, C, N, CE
CompoBus/S I/O Link Unit	---	8 (I/O link input bits)	8 (I/O link input bits)	CP1W-SRT21	U, C, N, L, CE
Temperature Sensor Unit	2 thermocouple inputs			CP1W-TS001	U, C, N, L, CE
	4 thermocouple inputs			CP1W-TS002	
	2 platinum resistance thermometer inputs			CP1W-TS101	
	4 platinum resistance thermometer inputs			CP1W-TS102	

**Optional Products, Maintenance Products and DIN Track Accessories**

Name	Specifications	Model	Standards
Battery Set	For CP1L CPU Units (Use batteries within two years of manufacture.)	CJ1W-BAT01	CE
DIN Track	Length: 0.5 m; Height: 7.3 mm	PFP-50N	---
	Length: 1 m; Height: 7.3 mm	PFP-100N	
	Length: 1 m; Height: 16 mm	PFP-100N2	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.	PFP-M	

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