CP series CP1L CPU Unit
CP1L-EM□□D□-D/CP1L-EL□□D□-D
CP1L-M□□DR-A/CP1L-L□□DR-A

High Performing Programmable Controller with Embedded Ethernet

- "CP1L-EM" and "CP1L-EL" has a standard-feature Ethernet port.
- "CP1L-M" and "CP1L-L" has a standard-feature peripheral USB port.
- Function blocks (FB) allow you to build up modular structure and programming of ladder diagrams.

CP1L-EL CPU Units
with 20 Points

CP1L-EM CPU Units
with 40 Points

CP1L-L CPU Units
with 10 Points

CP1L-M CPU Units
with 60 Points

Features

- "CP1L-EM" and "CP1L-EL" have complete with a Ethernet port.
- Pulse output for two axes. Advanced power for high-precision positioning control.
- High-speed Counters. Single-phase for four axes.
- Six interrupt inputs are built in. Faster processing of instructions speeds up the entire system.
- Serial Communications. Two ports. Select Option Boards for either RS-232C or RS-485 communications.
- "CP1L-M" and "CP1L-L" have a peripheral USB port.
- The Structured Text (ST) Language. Makes math operations even easier.
- Can be used for the CP1W series Unit. The extendibility of it is preeminently good.
- LCD displays and settings. Enabled using Option Board.

Model Number Structure

■ **Model Number Legend(Not all models that can be represented with the model number legend can necessarily be produced.)**

CP1L-□□□D□-□
(1) (2) (3) (4) (5)

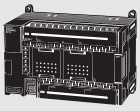
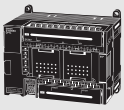
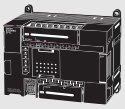
1. Expansion capability
   E : Ethernet port
   None : -
2. Program capacity
   M : 10K steps
   L : 5K steps
3. Number of Built-In number I/O points
   60 : 60 I/O points
   40 : 40 I/O points
   30 : 30 I/O points
   20 : 20 I/O points
   14 : 14 I/O points
   10 : 10 I/O points
4. Output classification
   R : Relay outputs
   T : Transistor Outputs (sinking)
   T1 : Transistor Outputs (sourcing)
5. Power supply
   A : AC
   D : DC

Ordering Information

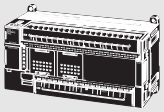
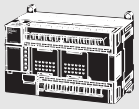
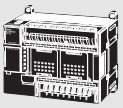
Applicable standards
Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

■ CPU Units

Built-in Ethernet port

CPU Unit	Specifications					Model
	CPU type	Power supply	Output method	Inputs	Outputs	
CP1L-EM CPU Units with 40 Points 	Memory capacity: 10K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	DC power supply	Relay output	24	16	CP1L-EM40DR-D
			Transistor output (sinking)			CP1L-EM40DT-D
			Transistor output (sourcing)			CP1L-EM40DT1-D
CP1L-EM CPU Units with 30 Points 	Memory capacity: 10K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	DC power supply	Relay output	18	12	CP1L-EM30DR-D
			Transistor output (sinking)			CP1L-EM30DT-D
			Transistor output (sourcing)			CP1L-EM30DT1-D
CP1L-EL CPU Units with 20 Points 	Memory capacity: 5K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	DC power supply	Relay output	12	8	CP1L-EL20DR-D
			Transistor output (sinking)			CP1L-EL20DT-D
			Transistor output (sourcing)			CP1L-EL20DT1-D

Built-in USB port

CPU Unit	Specifications					Model
	CPU type	Power supply	Output method	Inputs	Outputs	
CP1L-M CPU Units with 60 Points 	Memory capacity: 10K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	AC power supply	Relay output	36	24	CP1L-M60DR-A
			Transistor output (sinking)			CP1L-M60DT-A
		DC power supply	Relay output			CP1L-M60DR-D
			Transistor output (sinking)			CP1L-M60DT-D
			Transistor output (sourcing)			CP1L-M60DT1-D
CP1L-M CPU Units with 40 Points 	Memory capacity: 10K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	AC power supply	Relay output	24	16	CP1L-M40DR-A
			Transistor output (sinking)			CP1L-M40DT-A
		DC power supply	Relay output			CP1L-M40DR-D
			Transistor output (sinking)			CP1L-M40DT-D
			Transistor output (sourcing)			CP1L-M40DT1-D
CP1L-M CPU Units with 30 Points 	Memory capacity: 10K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	AC power supply	Relay output	18	12	CP1L-M30DR-A
			Transistor output (sinking)			CP1L-M30DT-A
		DC power supply	Relay output			CP1L-M30DR-D
			Transistor output (sinking)			CP1L-M30DT-D
			Transistor output (sourcing)			CP1L-M30DT1-D

CPU Unit	Specifications					Model
	CPU type	Power supply	Output method	Inputs	Outputs	
CP1L-L CPU Units with 20 Points 	Memory capacity: 5K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	AC power supply	Relay output	12	8	CP1L-L20DR-A
			Transistor output (sinking)			CP1L-L20DT-A
		DC power supply	Relay output			CP1L-L20DR-D
			Transistor output (sinking)			CP1L-L20DT-D
			Transistor output (sourcing)			CP1L-L20DT1-D
CP1L-L CPU Units with 14 Points 	Memory capacity: 5K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	AC power supply	Relay output	8	6	CP1L-L14DR-A
			Transistor output (sinking)			CP1L-L14DT-A
		DC power supply	Relay output			CP1L-L14DR-D
			Transistor output (sinking)			CP1L-L14DT-D
			Transistor output (sourcing)			CP1L-L14DT1-D
CP1L-L CPU Units with 10 Point 	Memory capacity: 5K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	AC power supply	Relay output	6	4	CP1L-L10DR-A
			Transistor output (sinking)			CP1L-L10DT-A
		DC power supply	Relay output			CP1L-L10DR-D
			Transistor output (sinking)			CP1L-L10DT-D
			Transistor output (sourcing)			CP1L-L10DT1-D

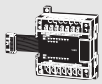
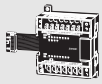
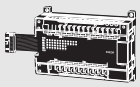
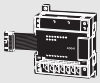
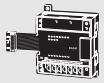
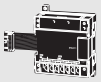
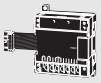
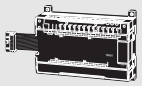
Note: 1. Refer to "Models and Software Versions" about supported software.
2. Refer to "Option Unit Specifications" about supported Option Units.

■ Options for CPU Units

Name	Specifications	Model
RS-232C Option Board 	Can be mounted in either CPU Unit Option Board slot 1 or 2. *1	CP1W-CIF01
RS-422A/485 Option Board 		CP1W-CIF11
RS-422A/485 (Isolated-type) Option Board 		CP1W-CIF12-V1
Ethernet Option Board 	Can be mounted in either CPU Unit Option Board slot 1 or 2. *1 *2 *4	CP1W-CIF41
Analog Input Option Board 	Can be mounted in either CPU Unit Option Board slot 1 or 2. *3 2 analog inputs. 0-10V(Resolution:1/4000), 0-20mA (Resolution:1/2000).	CP1W-ADB21
Analog Output Option Board 	Can be mounted in either CPU Unit Option Board slot 1 or 2. *3 2 analog outputs. 0-10V (Resolution:1/4000).	CP1W-DAB21V
Analog I/O Option Board 	Can be mounted in either CPU Unit Option Board slot 1 or 2. *3 2 analog inputs. 0-10V(Resolution:1/4000), 0-20mA(Resolution:1/2000). 2 analog outputs. 0-10V (Resolution:1/4000).	CP1W-MAB221
LCD Option Board 	Can be mounted only in the CPU Unit Option Board slot 1. *1	CP1W-DAM01
Memory Cassette 	Can be used for backing up programs or auto-booting.	CP1W-ME05M

***1.** Cannot be used for the CP1L-L10.
***2.** When using CP1W-CIF41 Ver.1.0, one Ethernet port can be added.
***3.** CP1L-EM / EL only.
***4.** Cannot be used for the CP1L-EM / EL.

■ Expansion Units

Product name	Inputs	Outputs	Output type		Model
Input Unit	8	--	24 VDC Input		**CP1W-8ED**
Output Units 	--	8	Relay		**CP1W-8ER**
			Transistor (sinking)		**CP1W-8ET**
			Transistor (sourcing)		**CP1W-8ET1**
	--	16	Relay		**CP1W-16ER**
			Transistor (sinking)		**CP1W-16ET**
			Transistor (sourcing)		**CP1W-16ET1**
	--	32	Relay		**CP1W-32ER**
			Transistor (sinking)		**CP1W-32ET**
			Transistor (sourcing)		**CP1W-32ET1**
I/O Units 	12	8	Relay		**CP1W-20EDR1**
			Transistor (sinking)		**CP1W-20EDT**
			Transistor (sourcing)		**CP1W-20EDT1**
	24	16	Relay		**CP1W-40EDR**
			Transistor (sinking)		**CP1W-40EDT**
			Transistor (sourcing)		**CP1W-40EDT1**
Analog Input Unit 	4CH	--	Input range: 0 to 5 V, 1 to 5 V, 0 to 10 V, ±10 V, 0 to 20 mA, or 4 to 20 mA.	Resolution: 1/6000	**CP1W-AD041**
				Resolution: 1/12000	**CP1W-AD042**
Analog Output Unit 	--	2CH	Output range: 1 to 5 V, 0 to 10 V, ±10 V, 0 to 20 mA, or 4 to 20 mA.	Resolution: 1/6000	**CP1W-DA021**
	--	4CH		Resolution: 1/6000	**CP1W-DA041**
				Resolution: 1/12000	**CP1W-DA042**
Analog I/O Unit 	4CH	4CH	Input range: 0 to 5 V, 1 to 5 V, 0 to 10 V, ±10 V, 0 to 20 mA, or 4 to 20 mA. Output range: 1 to 5 V, 0 to 10 V, ±10 V, 0 to 20 mA, or 4 to 20 mA.	Resolution: 1/12000	**CP1W-MAD44**
	4CH	2CH		Resolution: 1/12000	**CP1W-MAD42**
	2CH	1CH		Resolution: 1/6000	**CP1W-MAD11**
Temperature Sensor Unit	2CH	--	Sensor type: Thermocouple (J or K)		**CP1W-TS001**
	4CH	--	Sensor type: Thermocouple (J or K)		**CP1W-TS002**
	2CH	--	Sensor type: Platinum resistance thermometer (Pt100 or JPt100)		**CP1W-TS101**
	4CH	--	Sensor type: Platinum resistance thermometer (Pt100 or JPt100)		**CP1W-TS102**
	4CH	--	Sensor type: Thermocouple (J or K) 2 channels can be used as analog input. Input range: 1 to 5 V, 0 to 10 V, 4-20 mA	Resolution: 1/12000	**CP1W-TS003**
	12CH	--	Sensor type: Thermocouple (J or K)		**CP1W-TS004**
CompoBus/S I/O Link Unit 	8	8	CompoBus/S slave		**CP1W-SRT21**

Note: CP1L (L Type) CPU Units with 10 points do not support Expansion Units.

■ I/O Connecting Cable

Name	Specifications	Model
I/O Connecting Cable	80 cm (for CP1W Expansion Units)	**CP1W-CN811**

Note: An I/O Connecting Cable (approx. 6 cm) for horizontal connection is provided with CP1W Expansion Units.

■ Optional Products, Maintenance Products and DIN Track Accessories

Name	Specifications	Model
Battery Set	For CPU Units (Use batteries within two years of manufacture.)	**CJ1W-BAT01**
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	A stopper to secure the Units on the DIN Track.	**PFP-M**

■ Industrial Switching Hubs

Product name	Appearance	Specifications			Accesories	Current consumption (A)	Model
		Functions	No. of ports	Failure detection			
Industrial Switching Hubs		Quality of Service (QoS): EtherNet/IP™ control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3	No	• Power supply connector	0.22	**W4S1-03B**
			5	No		0.22	**W4S1-05B**
			5	Yes	• Power supply connector • Connector for informing error	0.22	**W4S1-05C**

General Specifications

Item \ Type	AC power supply models	DC power supply models
Model	CP1L-□□□-A	CP1L-□□□-D
Power supply	100 to 240 VAC 50/60 Hz	24 VDC
Operating voltage range	85 to 264 VAC	20.4 to 26.4 VDC
Power consumption	50 VA max. (CP1L-M60/-M40/-M30□□-A) 30 VA max. (CP1L-L20/-L14/-L10□□-A)	20 W max. (CP1L-EM40/-EM30/-M60/-M40/-M30□□-D) 13 W max. (CP1L-EL20/-L20/-L14/-L10□□-D)
Inrush current *	100 to 120 VAC inputs: 20 A max. (for cold start at room temperature) 8 ms max. 200 to 240 VAC inputs: 40 A max. (for cold start at room temperature), 8 ms max.	30 A max. (for cold start at room temperature) 20 ms max.
External power supply	300 mA at 24 VDC (CP1L-M60/-M40/-M30□□-A) 200 mA at 24 VDC (CP1L-L20/-L14/-L10□□-A)	None
Insulation resistance	20 MΩ min. (at 500 VDC) between the external AC terminals and GR terminals	No insulation between primary and secondary for DC power supply
Dielectric strength	2,300 VAC at 50/60 Hz for 1 min between the external AC and GR terminals, leakage current: 5 mA max.	No insulation between primary and secondary for DC power supply
Noise immunity	Conforms to IEC 61000-4-4. 2 kV (power supply line)	
Vibration resistance	CP1L-L/M: Conforms to JIS C60068-2-6. 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s² in X, Y, and Z directions for 80 minutes each. Sweep time: 8 minutes × 10 sweeps = total time of 80 minutes) CP1L-EL/EM: 5 to 8.4 Hz, 3.5 mm amplitude, 8.4 to 150 Hz, acceleration: 9.8 m/s² in X, Y, and Z directions for 100 minutes each (time coefficient of 10 minutes × coefficient factor of 10 = total time of 100 minutes)	
Shock resistance	Conforms to JIS C60068-2-27. 147 m/s² three times each in X, Y, and Z directions	
Ambient operating temperature	0 to 55°C	
Ambient humidity	10% to 90% (with no condensation)	
Ambient operating environment	No corrosive gas	
Ambient storage temperature	–20 to 75°C (Excluding battery.)	
Power holding time	10 ms min.	2 ms min.

***** The above values are for a cold start at room temperature for an AC power supply, and for a cold start for a DC power supply.

- A thermistor (with low-temperature current suppression characteristics) is used in the inrush current control circuitry for the AC power supply. The thermistor will not be sufficiently cooled if the ambient temperature is high or if a hot start is performed when the power supply has been OFF for only a short time. In those cases the inrush current values may be higher (as much as two times higher) than those shown above. Always allow for this when selecting fuses and breakers for external circuits.
- A capacitor charge-type delay circuit is used in the inrush current control circuitry for the DC power supply. The capacitor will not be charged if a hot start is performed when the power supply has been OFF for only a short time, so in those cases the inrush current values may be higher (as much as two times higher) than those shown above.

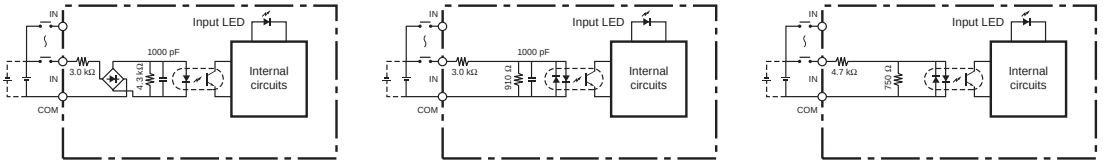
Item	Type / Models	CP1L-EM40 (40 points) CP1L-EM40D□-□	CP1L-EM30 (30 points) CP1L-EM30D□-□	CP1L-EL20 (20 points) CP1L-EL20D□-□
Pulse outputs (models with transistor outputs only)	Pulse outputs	Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)		
	PWM outputs	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: +1%/0% at 0.1 Hz to 10,000 Hz and +5%/0% at 10,000 Hz to 32,800 Hz)		
Analog input		2 input (Resolution: 1/1000, Input range: 0 to 10 V). Not isolated.		

● CP1L CPU Unit (M/L Type)

Item	Type / Models	CP1L-M60 (60 points) CP1L-M60□□-□	CP1L-M40 (40 points) CP1L-M40□□-□	CP1L-M30 (30 points) CP1L-M30□□-□	CP1L-L20 (20 points) CP1L-L20□□-□	CP1L-L14 (14 points) CP1L-L14□□-□	CP1L-L10 (10 points) 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)					
Instruction length		1 to 7 steps per instruction					
Instructions		Approx. 500 (function codes: 3 digits)					
Instruction execution time		Basic instructions: 0.55 μs min. Special instructions: 4.1 μs min.					
Common processing time		0.4 ms					
Program capacity		10K steps			5K steps		
Number of tasks		288 (32 cyclic tasks and 256 interrupt tasks)					
	Scheduled interrupt tasks	1 (interrupt task No. 2, fixed)					
	Input interrupt tasks	6 (interrupt task No. 140 to 145, fixed)				4 (interrupt task No. 140 to 143, fixed)	2 (interrupt task 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 Area	1,600 bits (100 words) CIO 0 to CIO 99					
	Built-in Input Area	36 bits: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11 and CIO 2.00 to CIO 2.11	24 bits: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11	18 bits: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.05	12 bits: CIO 0.00 to CIO 0.11	8 bits: CIO 0.00 to CIO 0.07	6 bits: CIO 0.00 to CIO 0.05
	Output Area	1,600 bits (100 words) CIO 100 to CIO 199					
	Built-in Output Area	24 bits: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07 and CIO 102.00 to CIO 102.07	16 bits: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07	12 bits: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 100.03	8 bits: CIO 100.00 to CIO 100.07	6 bits: CIO 100.00 to CIO 100.05	4 bits: CIO 100.00 to CIO 100.03
	1:1 Link Area	256 bits (16 words): CIO 3000.00 to CIO 3015.15 (CIO 3000 to CIO 3015)					
	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)					
Timers		4,096 timer numbers: T0 to T4095					
Counters		4,096 counter numbers: C0 to C4095					
DM Area		32 Kwords: D0 to D32767			10 Kwords: D0 to D9999, D32000 to D32767		
Data Register Area		16 registers (16 bits): DR0 to DR15					
Index Register Area		16 registers (32 bits): IR0 to IR15					
Task Flag Area		32 flags (32 bits): TK0000 to TK0031					
Trace Memory		4,000 words (500 samples for the trace data maximum of 31 bits and 6 words.)					
Memory Cassette		A special Memory Cassette (CP1W-ME05M) can be mounted. **Note:** Can be used for program backups and auto-booting.					
Clock function		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)					
Communications functions		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.		Not supported.
		A maximum of two Ethernet Option Board can be mounted. When using CP1W-CIF41 Ver.1.0, one Ethernet Option Board can be mounted.			A maximum of one Ethernet Option Board can be mounted.		Not supported.
Memory backup		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.					
Battery service life		Service life expectancy is 5 years at 25°C, less at higher temperatures. (From 0.75 to 5 years depending on model, power supply rate, and ambient temperature.)					

I/O Specifications for CPU Units

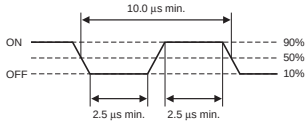
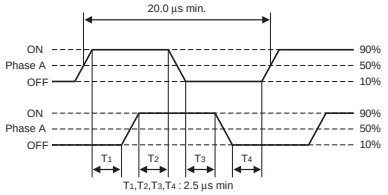
■ Input Specifications

ITEM	Specifications		
	High-speed counter inputs (phases A and B) *1	Interrupt inputs and quick-response inputs *1	Normal inputs
	CIO 0.00 to CIO 0.03	CIO 0.04 to CIO 0.09 *2	CIO 0.10 to CIO 0.11, CIO 1.00 to CIO 1.11, and CIO 2.00 to 2.11 *2
Input voltage	24 VDC +10%/–15%		
Applicable sensors	2-wire sensors or 3-wire sensors		
Input impedance	3.0 kΩ		4.7 kΩ
Input current	7.5 mA typical		5 mA typical
ON voltage	17.0 VDC min.		14.4 VDC min.
OFF voltage/current	1 mA max. at 5.0 VDC		
ON delay *3	2.5 μs max.	50 μs max.	1 ms max.
OFF delay *3	2.5 μs max.	50 μs max.	1 ms max.
Circuit configuration			

***1.** High-speed counter inputs, interrupt inputs, and quick-response inputs can also be used as normal inputs.
***2.** The bits that can be used depend on the model of CPU Unit.
***3.** The response time is the hardware delay value. The delay set in the PLC Setup (0 to 32 ms, default: 8 ms) must be added to this value.

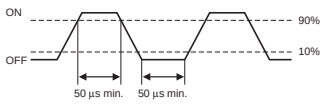
● High-speed Counter Function Input Specifications

Input bits: CIO 0.00 to CIO 0.03

Item	Specifications
ON/OFF delay	• Pulse plus direction input mode • Increment mode • Up/down input mode  • Differential phase input mode 

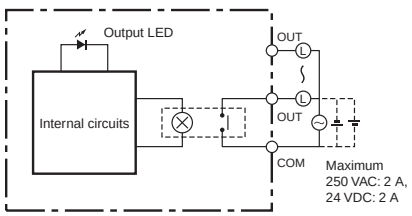
● Interrupt Input Counter Mode

Input bits: CIO 0.04 to CIO 0.09

Item	Specifications
ON/OFF delay	

■ Output Specifications

● CPU Units with Relay Outputs

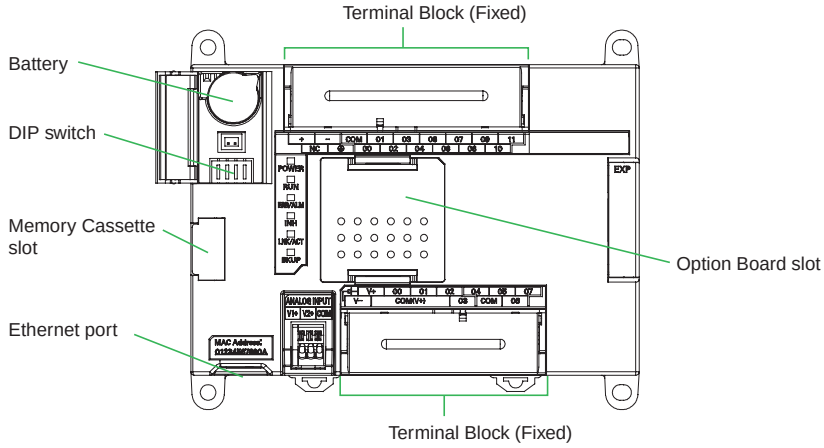
Item			Specifications
Max. switching capacity			2 A, 250 VAC (cosϕ = 1), 2 A, 24 VDC 4 A/common)
Min. switching capacity			5 VDC, 10 mA
Service life of relay	**Electrical**	**Resistive load**	100,000 operations (24 VDC)
		Inductive load	48,000 operations (250 VAC, cosϕ = 0.4)
	Mechanical		20,000,000 operations
ON delay			15 ms max.
OFF delay			15 ms max.
Circuit configuration			

Note: There are restrictions in the power supply voltage and output load current imposed by the ambient temperature for CPU Units with DC power. Refer to the CP1L CPU Unit Operation Manual (Cat. No. W462) or the CP Series CP1L-EL/EM CPU Unit Operation Manual (Cat. No. W516).

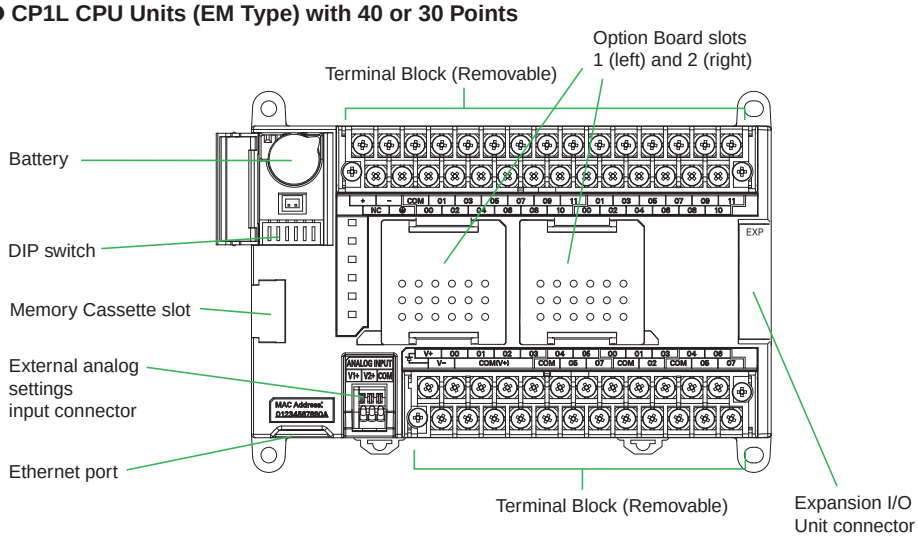
External Interfaces

■ CP1L CPU Unit Nomenclature

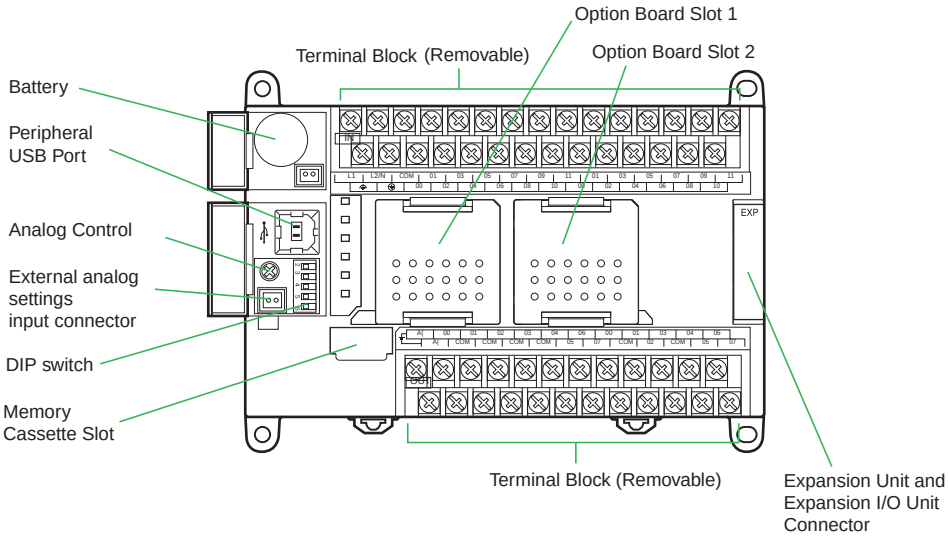
● CP1L CPU Units (EL Type) with 20 Points



● CP1L CPU Units (EM Type) with 40 or 30 Points



● CP1L CPU Units (MType) with 40 Points



■ CP1W-AD041/AD042/DA021/DA041/DA042/MAD11/MAD42/MAD44 Analog Units

Analog values that are input are converted to binary data and stored in the input area, or binary data is output as analog values.

● Analog Input Units

Model		CP1W-AD041		CP1W-AD042	
Item		Voltage Input	Current Input	Voltage Input	Current Input
Number of inputs		4 inputs (4 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	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	±15 V	±30 mA
External input impedance		1 MΩ min.	Approx. 250 Ω	1 MΩ min.	Approx. 250 Ω
Resolution		1/6000 (full scale)		1/12000 (full scale)	
Overall accuracy	25°C	0.3% full scale	0.4% full scale	0.2% full scale	0.3% full scale
	0 to 55°C	0.6% full scale	0.8% full scale	0.5% full scale	0.7% 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		16-bit binary (4-digit hexadecimal) Full scale for –10 to 10 V: E890 to 1770 Hex Full scale for other ranges: 0000 to 2EE0 Hex	
Averaging function		Supported (Set in output words n+1 and n+2.)			
Open-circuit detection function		Supported			
Conversion time		2 ms/point (8 ms/all points)		1 ms/point (4 ms/all points)	
Isolation method		Photocoupler isolation between analog I/O terminals and internal circuits. No isolation between analog I/O signals.			
Current consumption		5 VDC: 100 mA max.; 24 VDC: 90 mA max.		5 VDC: 80 mA max.; 24 VDC: 40 mA max.	

● Analog Output Units

Model			CP1W-DA021/CP1W-DA041		CP1W-DA042	
Item			Voltage Output	Current Output	Voltage Output	Current Output
Analog output section	Number of outputs		CP1W-DA021: 2 outputs (2 words allocated) CP1W-DA041: 4 outputs (4 words allocated)		4 outputs (4 words 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	1 to 5 VDC, 0 to 10 VDC, or –10 to 10 VDC	0 to 20 mA or 4 to 20 mA
	External output allowable load resistance		2 kΩ min.	350 Ω max.	2 kΩ min.	350 Ω max.
	External output impedance		0.5 Ω max.	---	0.5 Ω max.	---
	Resolution		1/6000 (full scale)		1/12000 (full scale)	
	Overall accuracy	25°C	0.4% full scale		0.3% full scale	
		0 to 55°C	0.8% full scale		0.7% full scale	
	D/A 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		16-bit binary (4-digit hexadecimal) Full scale for –10 to 10 V: E890 to 1770 Hex Full scale for other ranges: 0000 to 2EE0 Hex	
Conversion time			CP1W-DA021: 2 ms/point (4 ms/all points) CP1W-DA041: 2 ms/point (8 ms/all points)		1 ms/point (4 ms/all points)	
Isolation method			Photocoupler isolation between analog I/O terminals and internal circuits. No isolation between analog I/O signals.			
Current consumption			CP1W-DA021: 5 VDC: 40 mA max.; 24 VDC: 95 mA max. CP1W-DA041: 5 VDC: 80 mA max.; 24 VDC: 124 mA max.		5 VDC: 80 mA max.; 24 VDC: 160 mA max.	

● Analog I/O Units

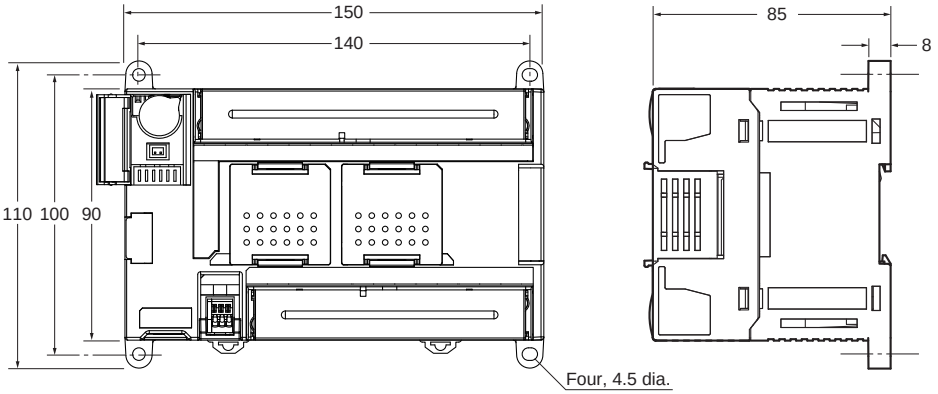
Model			CP1W-MAD42/CP1W-MAD44		CP1W-MAD11	
Item			Voltage I/O	Current I/O	Voltage I/O	Current I/O
Analog Input Section	Number of inputs		4 inputs (4 words allocated)		2 inputs (2 words allocated)	
	Input signal range		0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, or –10 to 10 VDC	0 to 20 mA or 4 to 20 mA	0 to 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	±15 V	±30 mA
	External input impedance		1 MΩ min.	Approx. 250 Ω	1 MΩ min.	Approx. 250 Ω
	Resolution		1/12000 (full scale)		1/6000 (full scale)	
	Overall accuracy	25°C	0.2% full scale	0.3% full scale	0.3% full scale	0.4% full scale
		0 to 55°C	0.5% full scale	0.7% full scale	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: E890 to 1770 hex Full scale for other ranges: 0000 to 2EE0 hex		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		Supported (Settable for individual inputs via DIP switch)	
	Open-circuit detection function		Supported			
Analog Output Section	Number of outputs		CP1W-MAD42: 2 outputs (2 words allocated) CP1W-MAD44: 4 outputs (4 words allocated)		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	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		2 kΩ min.	350 Ω max.	1 kΩ min.	600 Ω max.
	External output impedance		0.5 Ω max.	---	0.5 Ω max.	---
	Resolution		1/12000 (full scale)		1/6000 (full scale)	
	Overall accuracy	25°C	0.3% full scale		0.4% full scale	
		0 to 55°C	0.7% full scale		0.8% full scale	
	Set data (D/A conversion)		16-bit binary (4-digit hexadecimal) Full scale for –10 to 10 V: E890 to 1770 hex Full scale for other ranges: 0000 to 2EE0 hex		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			CP1W-MAD42: 1 ms/point (6 ms/all points) CP1W-MAD44: 1 ms/point (8 ms/all points)		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.			
Current consumption			CP1W-MAD42: 5 VDC: 90 mA max., 24 VDC: 120 mA max. CP1W-MAD44: 5 VDC: 90 mA max., 24 VDC: 170 mA max.		5 VDC: 83 mA max., 24 VDC: 110 mA max.	

Dimensions

(Unit: mm)

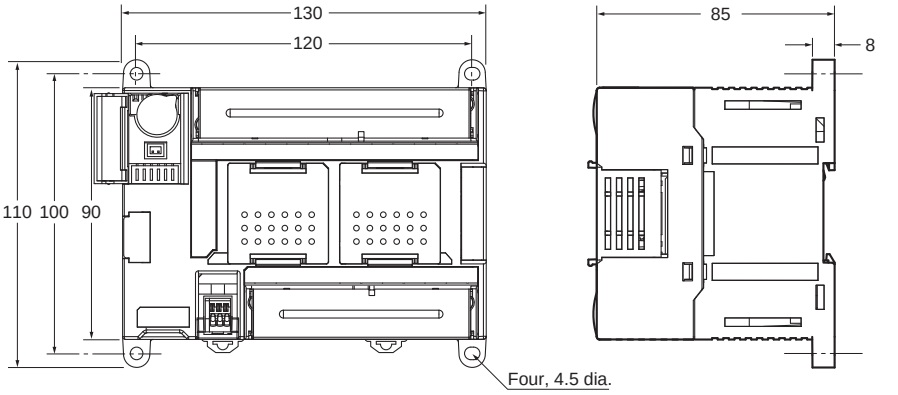
■ CPU Units

CP1L-EM CPU Units with 40 Points



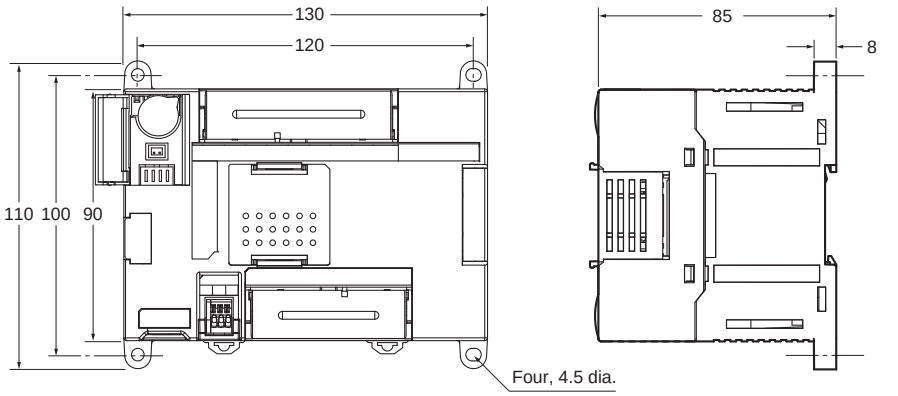
Weight:
675 g max.

CP1L-EM CPU Units with 30 Points



Weight:
610 g max.

CP1L-EL CPU Units with 20 Points



Weight:
610 g max.