

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 PointsCP1L-EM CPU Units
with 40 PointsCP1L-L CPU Units
with 10 PointsCP1L-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

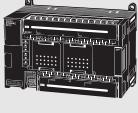
Ordering Information

Applicable standards

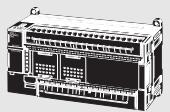
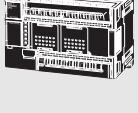
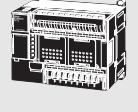
Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

■ 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
			Relay output			CP1L-M40DR-A
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	Transistor output (sinking)	24	16	CP1L-M40DT-A
			Relay output			CP1L-M40DR-D
		DC power supply	Transistor output (sinking)			CP1L-M40DT-D
			Transistor output (sourcing)			CP1L-M40DT1-D
			Relay output			CP1L-M30DR-A
			Transistor output (sinking)			CP1L-M30DT-A
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-D
			Transistor output (sinking)			CP1L-M30DT-D
		DC power supply	Relay output			CP1L-M30DT1-D
			Transistor output (sinking)			CP1L-M30DT1-D

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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	
		AC power supply	Relay output	8	6	CP1L-L14DR-A	
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)		Transistor output (sinking)			CP1L-L14DT-A	
			Relay output			CP1L-L14DR-D	
			Transistor output (sinking)			CP1L-L14DT-D	
	DC power supply	Transistor output (sourcing)	CP1L-L14DT1-D				
		Relay output	6	4	CP1L-L10DR-A		
		Transistor output (sinking)			CP1L-L10DT-A		
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	CP1L-L10DR-D	
					Transistor output (sinking)	CP1L-L10DT-D	
		DC power supply			Relay output	CP1L-L10DT1-D	
					Transistor output (sinking)		
					Transistor output (sourcing)		

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 		CP1W-CIF01
RS-422A/485 Option Board 	Can be mounted in either CPU Unit Option Board slot 1 or 2. *1	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.

■ Programming Devices

Name	Specifications	Number of licenses	Media	Model
FA Integrated Tool Package CX-One Lite Version 4.□	CX-One Lite is a subset of the complete CX-One package that provides only the Support Software required for micro PLC applications. CX-One Lite Ver. 4.□ includes Micro PLC Edition CX-Programmer Ver. 9.□.	1 license	DVD	CXONE-LT01D-V4
FA Integrated Tool Package CX-One Ver. 4.□	CX-One is a package that integrates the Support Software for OMRON PLCs and components. CX-One Ver. 4.□ includes CX-Programmer Ver. 9.□.	1 license *1	DVD	CXONE-AL01D-V4
Programming Device Connecting Cable for CP1W-CIF01 RS-232C Option Board *2	Connects Personal Computers, D-Sub 9-pin (Length: 2.0 m) Connects Personal Computers, D-Sub 9-pin (Length: 5.0 m)	For anti-static connectors		XW2Z-200S-CV
	Connects Personal Computers, D-Sub 9-pin (Length: 2.0 m) Connects Personal Computers, D-Sub 9-pin (Length: 5.0 m)			XW2Z-500S-CV
				XW2Z-200S-V
				XW2Z-500S-V

Note: 1. For details, refer to the CX-One Catalog (Cat. No. R134), visit your local OMRON website.

2. Refer to "Models and Software Versions" about supported software.

3. The CX-One and CX-One Lite cannot be simultaneously installed on the same computer.

*1. Multi licenses (3, 10, 30, or 50 licenses) and DVD media without licenses are also available for the CX-One.

*2. Cannot be used with a peripheral USB port.

To connect to a personal computer via a peripheral USB port, use commercially-available USB cable (A or B type, male).

The following tables lists the Support Software that can be installed from CX-One

Support Software in CX-One	CX-One Lite Ver.4.□	CX-One Ver.4.□	Support Software in CX-One	CX-One Lite Ver.4.□	CX-One Ver.4.□
Micro PLC Edition CX-Programmer Ver.9.□	Yes	No	CX-Drive Ver.3.□	Yes	Yes
CX-Programmer Ver.9.□	No	Yes	CX-Process Tool Ver.5.□	No	Yes
CX-Integrator Ver.2.□	Yes	Yes	Faceplate Auto-Builder for NS Ver.3.□	No	Yes
Switch Box Utility Ver.1.□	Yes	Yes	CX-Designer Ver.3.□	Yes	Yes
CX-Protocol Ver.2.□	No	Yes	NV-Designer Ver.2.□	Yes	Yes
CX-Simulator Ver.2.□	Yes	Yes	CX-Thermo Ver.4.□	Yes	Yes
CX-Position Ver.2.□	No	Yes	CX-ConfiguratorFDT Ver.1.□	Yes	Yes
CX-Motion-NCF Ver.1.□	No	Yes	CX-FLnet Ver.1.□	No	Yes
CX-Motion-MCH Ver.2.□	No	Yes	Network Configurator Ver.3.□	Yes	Yes
CX-Motion Ver.2.□	No	Yes	CX-Server Ver.5.□	Yes	Yes

● Models and Software Versions

The following versions of the CX-One, CX-Programmer are required.

Model	CX-One	CX-Programmer
CP1L-EM40□□-□		
CP1L-EM30□□-□	*1	Ver. 4.25 or higher
CP1L-EL20□□-□		Ver. 9.40 or higher
CP1L-M60□□-□	*2	Ver. 2.11 or higher
CP1L-M40□□-□		Ver. 7.20 or higher
CP1L-M30□□-□		
CP1L-M20□□-□	*2	Ver. 2.10 or higher
CP1L-L14□□-□		Ver. 7.10 or higher
CP1L-L10□□-□	*2	Ver. 2.13 or higher
		Ver. 7.30 or higher

*1. Update The CX-Programmer version automatically from the website using CX-Programmer version 9.0 (included with CX-One version 4.0).

*2. Update The CX-Programmer version automatically from the website using CX-Programmer version 7.0 (included with CX-One version 2.0).

■ 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		8	Relay	CP1W-20EDR1
			Transistor (sinking)	CP1W-20EDT
			Transistor (sourcing)	CP1W-20EDT1
		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
				Resolution: 1/12000
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
	--	4CH		Resolution: 1/6000
	--	4CH		Resolution: 1/12000
	--	4CH		Resolution: 1/12000
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
	4CH	2CH		Resolution: 1/12000
	2CH	1CH		Resolution: 1/6000
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
	12CH	--	Sensor type: Thermocouple (J or K)	CP1W-TS003
CompoBus/S I/O Link Unit	8	8	CompoBus/S slave	CP1W-SRT21 *1

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

*1. Product no longer available to order.

■ 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	Functions	No. of ports	Accessories	Current consumption (A)	Model
Industrial Switching Hubs		Quality of Service (QoS): EtherNet/IP control data priority 10/100BASE-TX, Auto-Negotiation	5	Power supply connector	0.07	W4S1-05D

General Specifications

Item	Type Model	AC power supply models	DC power supply models
		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/s ² 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/s ² 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/s ² 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.

Performance Specifications

● CP1L CPU Unit (EM/EL Type)

Item	Type Models	CP1L-EM40 (40 points)	CP1L-EM30 (30 points)	CP1L-EL20 (20 points)
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 μ s min. Special instructions: 4.1 μ s min.			
Common processing time	0.4ms			
Program capacity	10K steps		5K steps	
	FB program memory	10K 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) (High-speed counter interrupts and interrupt tasks specified by external interrupts can also be executed.)		
Maximum subroutine number	256			
Maximum jump number	256			
	Input Area	1,600 bits (100 words) CIO 0 to CIO 99		
	Built-in Input Area	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
	Output Area	1,600 bits (100 words) CIO 100 to CIO 199		
	Built-in Output Area	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 101.03	8 bits: CIO 100.00 to CIO 100.07
	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	4,800 bits (300 words): CIO 1200.00 to CIO 1499.15 (words CIO 1200 to CIO 1499) 6,400 bits (400 words): CIO 1500.00 to CIO 1899.15 (words CIO 1500 to CIO 1899) 15,360 bits (960 words): CIO 2000.00 to CIO 2959.15 (words CIO 2000 to CIO 2959) 9,600 bits (600 words): CIO 3200.00 to CIO 3799.15 (words CIO 3200 to CIO 3799) 37,504 bits (2,344 words): CIO 3800.00 to CIO 6143.15 (words 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	Built-in Ethernet Port (Connecting Support Software, Message Communications, Socket Service)		
		A maximum of two Serial Communications Option Boards can be mounted.	A maximum of one Serial Communications Option Board can be mounted.	
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.)			
Built-in input terminals	40 (24 inputs, 16 outputs)	30 (18 inputs, 12 outputs)	20 (12 inputs, 8 outputs)	
Number of connectable Expansion Units and Expansion I/O Units	CP-series Expansion Unit and Expansion I/O Units: 3 max.		CP-series Expansion Units and Expansion I/O Units: 1 max.	
Max. number of I/O points	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)	
Interrupt inputs	6 inputs (Response time: 0.3 ms)			
Interrupt inputs counter mode	6 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits Up or down counters			
Quick-response inputs	6 points (Min. input pulse width: 50 μ s max.)			
Scheduled interrupts	1			
High-speed counters	4 inputs/2 axes (24 VDC) Differential phases (4x), 50 kHz 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			

Item	Type	CP1L-EM40 (40 points)	CP1L-EM30 (30 points)	CP1L-EL20 (20 points)
		Models	CP1L-EM40D□-□	CP1L-EM30D□-□
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	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)												
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)												
I/O areas	Scheduled inter- rupt 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)											
Work bits	1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189)												
	TR Area	8,192 bits (512 words): W000.00 to W511.15 (W0 to W511)											
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.)												

Item	Type Models	CP1L-M60 (60 points)	CP1L-M40 (40 points)	CP1L-M30 (30 points)	CP1L-L20 (20 points)	CP1L-L14 (14 points)	CP1L-L10 (10 points)								
		CP1L-M60□□-□	CP1L-M40□□-□	CP1L-M30□□-□	CP1L-L20□□-□	CP1L-L14□□-□	CP1L-L10□□-□								
Built-in input terminals		60 (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)								
Number of connectable Expansion Units and Expansion I/O Units	CP-series Expansion Unit and Expansion I/O Units: 3 max.				CP-series Expansion Units and Expansion I/O Units: 1 max.		Not supported.								
Max. number of I/O points		180 (60 built in + 40 per Expansion (I/O) Unit × 3 Units)	160 (40 built in + 40 per Expansion (I/O) Unit × 3 Units)	150 (30 built in + 40 per Expansion (I/O) Unit × 3 Units)	60 (20 built in + 40 per Expansion (I/O) Unit × 1 Unit)	54 (14 built in + 40 per Expansion (I/O) Unit × 1 Unit)	10 (10 built in)								
Interrupt inputs	6 inputs (Response time: 0.3 ms)				4 inputs (Response time: 0.3 ms)	2 inputs (Response time: 0.3 ms)									
Interrupt inputs counter mode	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									
Quick-response inputs	6 points (Min. input pulse width: 50 µs max.)				4 points (Min. input pulse width: 50 µs max.)	2 points (Min. input pulse width: 50 µs max.)									
Scheduled interrupts	1														
High-speed counters	4 inputs/2 axes (24 VDC): Differential phases (4x), 50 kHz 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														
Pulse outputs (models with transistor out- puts 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 control	1 (Setting range: 0 to 255)														
Analog input	1 input (Resolution: 1/256, Input range: 0 to 10 V). Not isolated.														

Built-in Inputs

■ Input Terminal Block Arrangement (Top Block)

● CP1L (60 Inputs)

· AC Power Supply Models

L1	L2/N	COM	01	03	05	07	09	11	01	03	05	07	09	11
()	()		00	02	04	06	08	10	00	02	04	06	08	10

Inputs (CIO 0)

Inputs (CIO 1)

Inputs (CIO 2)

· DC Power Supply Models

+	-	COM	01	03	05	07	09	11	01	03	05	07	09	11
NC	()		00	02	04	06	08	10	00	02	04	06	08	10

Inputs (CIO 0)

Inputs (CIO 1)

Inputs (CIO 2)

● CP1L (40 Inputs)

· AC Power Supply Models

L1	L2/N	COM	01	03	05	07	09	11	01	03	05	07	09	11
()	()		00	02	04	06	08	10	00	02	04	06	08	10

Inputs (CIO 0)

Inputs (CIO 1)

· DC Power Supply Models

+	-	COM	01	03	05	07	09	11	01	03	05	07	09	11
NC	()		00	02	04	06	08	10	00	02	04	06	08	10

Inputs (CIO 0)

Inputs (CIO 1)

● CP1L (30 inputs)

· AC Power Supply Models

L1	L2/N	COM	01	03	05	07	09	11	01	03	05			
()	()		00	02	04	06	08	10	00	02	04	NC	NC	NC

Inputs (CIO 0)

Inputs (CIO 1)

· DC Power Supply Models

+	-	COM	01	03	05	07	09	11	01	03	05			
NC	()		00	02	04	06	08	10	00	02	04	NC	NC	NC

Inputs (CIO 0)

Inputs (CIO 1)

● CP1L (20 Inputs)

· AC Power Supply Models

L1	L2/N	COM	01	03	05	07	09	11						
()	()		00	02	04	06	08	10						

Inputs (CIO 0)

· DC Power Supply Models

+	-	COM	01	03	05	07	09	11						
NC	()		00	02	04	06	08	10						

Inputs (CIO 0)

● CP1L (14 Inputs)

· AC Power Supply Models

L1	L2/N	COM	01	03	05	07	NC	NC						
()	()		00	02	04	06	NC	NC						

Inputs (CIO 0)

· DC Power Supply Models

+	-	COM	01	03	05	07	NC	NC						
NC	()		00	02	04	06	NC	NC						

Inputs (CIO 0)

● CP1L (10 Inputs)

· AC Power Supply Models

L1	L2/N	COM	01	03	05									
()	()		00	02	04									

Inputs (CIO 0)

· DC Power Supply Models

{		COM	01	03	05									
NC	()		00	02	04									

Inputs (CIO 0)

■ Built-in Input Area

Number of inputs	Input terminal block		Input operation			High-speed counter operation		Origin search			
	Word	Bit	Normal inputs	Interrupt inputs	Quick-response inputs	Operation settings • High-speed counters enabled • Phase-Z signal reset	Single-phase (increment pulse input)	Two-phase (differential phase x4, up/down, or pulse plus direction)	CPU Units with 20 to 60 points	CPU Units with 14 points	CPU Units with 10 points
10	CIO 0	00	Normal input 0	---	---	High-speed counter 0 (increment)	High-speed counter 0 (phase-A, increment, or count input)	---	---	---	
		01	Normal input 1	---	---	High-speed counter 1 (increment)	High-speed counter 0 (phase-B, decrement, or direction)	---	---	---	
		02	Normal input 2	---	---	High-speed counter 2 (increment)	High-speed counter 1 (phase-A, increment, or count input)	---	Pulse output 0: Origin proximity input signal	---	
		03	Normal input 3	---	---	High-speed counter 3 (increment)	High-speed counter 1 (phase-B, decrement, or count input)	---	Pulse output 1: Origin proximity input signal	Pulse output 0: Origin proximity input signal	
		04	Normal input 4	Interrupt input 0	Quick-response input 0	Counter 0, phase-Z/reset input	High-speed counter 0 (phase-Z/reset)	---	---	---	
		05	Normal input 5	Interrupt input 1	Quick-response input 1	Counter 1, phase-Z/reset input	High-speed counter 1 (phase-Z/reset)	---	---	Pulse output 0: Origin input signal	
		06	Normal input 6	Interrupt input 2	Quick-response input 2	Counter 2, phase-Z/reset input			Pulse output 0: Origin input signal	---	
		07	Normal input 7	Interrupt input 3	Quick-response input 3	Counter 3, phase-Z/reset input			Pulse output 1: Origin input signal	---	
		08	Normal input 8	Interrupt input 4	Quick-response input 4	---		---	---	---	
		09	Normal input 9	Interrupt input 5	Quick-response input 5	---		---	---	---	
20		10	Normal input 10	---	---	---			Pulse output 0: Origin proximity input signal	---	---
		11	Normal input 11	---	---	---			Pulse output 1: Origin proximity input signal	---	---
30	CIO 1	00	Normal input 12	---	---	---			---	---	---
		to	to	to	to	to	to	to	to	to	to
		05	Normal input 17	---	---	---	---	---	---	---	---
		06	Normal input 18	---	---	---	---	---	---	---	---
		to	to	to	to	to	to	to	to	to	to
		11	Normal input 23	---	---	---	---	---	---	---	---
40		00	Normal input 24	---	---	---	---	---	---	---	---
		to	to	to	to	to	to	to	to	to	to
		11	Normal input 35	---	---	---	---	---	---	---	---
60	CIO 2	00	Normal input 24	---	---	---	---	---	---	---	---
		to	to	to	to	to	to	to	to	to	to
		11	Normal input 35	---	---	---	---	---	---	---	---

Built-in Outputs

■ Output Terminal Block Arrangement (Bottom Block)

● CP1L (60 Outputs)

· AC Power Supply Models

+	00	01	02	04	05	07	00	02	04	05	07	00	02	04	05	07
-	COM	COM	COM	03	COM	06	COM	01	03	COM	06	COM	01	03	COM	06

CIO 100 CIO 101 CIO 102

· DC Power Supply Models

NC	00	01	02	04	05	07	00	02	04	05	07	00	02	04	05	07
NC	COM	COM	COM	03	COM	06	COM	01	03	COM	06	COM	01	03	COM	06

CIO 100 CIO 101 CIO 102

● CP1L (40 Outputs)

· AC Power Supply Models

+	00	01	02	03	04	06	00	01	03	04	05					
-	COM	COM	COM	COM	05	07	COM	02	COM	05	07					

CIO 100 CIO 101

· DC Power Supply Models

CP1L-EM40DR-D/CP1L-M40D□-D

NC	00	01	02	03	04	06	00	01	03	04	06					
NC	COM	COM	COM	COM	COM	05	07	COM	02	COM	05	07				

CIO 100 CIO 101

CP1L-EM40DT-D

V+	00	01	02	03	04	06	00	01	03	04	06					
V-	COM(V-)	COM	05	07	COM	02	COM	05	07							

CIO 100 CIO 101

CP1L-EM40DT1-D

V+	00	01	02	03	04	06	00	01	03	04	06					
V-	COM(V+)	COM	05	07	COM	02	COM	05	07							

CIO 100 CIO 101

● CP1L (30 Outputs)

· AC Power Supply Models

+	00	01	02	04	05	07	00	02								
-	COM	COM	COM	03	COM	06	COM	01	03							

CIO 100 CIO 101

· DC Power Supply Models

CP1L-EM30DR-D/CP1L-M30D□-D

NC	00	01	02	04	05	07	00	02								
NC	COM	COM	COM	03	COM	06	COM	01	03							

CIO 100 CIO 101

CP1L-EM30DT-D

V+	00	01	02	04	05	07	00	02								
V-	COM(V-)	03	COM	06	COM	01	03									

CIO 100 CIO 101

CP1L-EM30DT1-D

V+	00	01	02	04	05	07	00	02								
V-	COM(V+)	03	COM	06	COM	01	03									

CIO 100 CIO 101

● CP1L (20 Outputs)

· AC Power Supply Models

+	00	01	02	04	05	07										
-	COM	COM	COM	03	COM	06	COM	01	03	COM	06					

CIO 100

· DC Power Supply Models

CP1L-EL20DR-D/CP1L-L20D□-D

NC	00	01	02	04	05	07										
NC	COM	COM	COM	03	COM	06	COM	01	03	COM	06					

CIO 100

CP1L-EL20DT-D

V+	00	01	02	04	05	07										
V-	COM(V-)	03	COM	06	COM	01	03									

CIO 100

● CP1L (14 Outputs)

· AC Power Supply Models

+	00	01	02	04	05	07	NC									
-	COM	COM	COM	03	COM	NC										

CIO 100

· DC Power Supply Models

NC	00	01	02	04	05	07	NC									
NC	COM	COM	COM	03	COM	NC										

CIO 100

● CP1L (10 Outputs)

· AC Power Supply Models

{	00	01	02													
	COM	COM	COM	03												

CIO 100

· DC Power Supply Models

NC	00	01	02													
NC	COM	COM	COM	03												

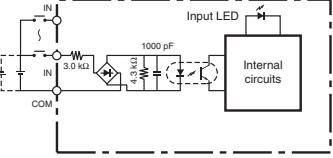
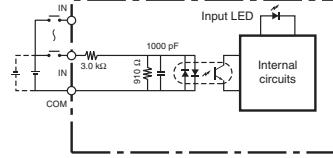
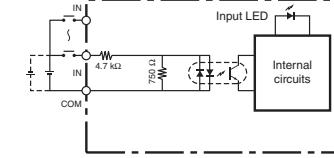
CIO 100

■ Built-in Output Area

Number of outputs	Output Terminal Block		When the instructions to the right are not executed	When a pulse output instruction (SPED, ACC, PLS2, or ORG) is executed		When the origin search function is set to be used in the PLC Setup, and an origin search is executed by the ORG instruction		When the PWM instruction is executed		
	Word	Bit		Fixed duty ratio pulse output						
				CW/CCW	Pulse plus direction	When the origin search function is used				
			00	Normal output 0	Pulse output 0 (CW)	Pulse output 0 (pulse)	---	---		
			01	Normal output 1	Pulse output 0 (CCW)	Pulse output 0 (direction)	---	---		
			02	Normal output 2	Pulse output 1 (CW)	Pulse output 1 (pulse)	---	---		
			03	Normal output 3	Pulse output 1 (CCW)	Pulse output 1 (direction)	---	Origin search 0 (Error counter reset output)		
	10	CIO 100	04	Normal output 4	---	---	Origin search 0 (Error counter reset output)	PWM output 1		
	14		05	Normal output 5	---	---	Origin search 1 (Error counter reset output)	---		
	20		06	Normal output 6	---	---	---	---		
	30	CIO 101	07	Normal output 7	---	---	---	---		
	40		00	Normal output 8	---	---	---	---		
			to	to	to	to	to	to		
			03	Normal output 11	---	---	---	---		
			04	Normal output 12	---	---	---	---		
	60	CIO 102	to	to	to	to	to	to		
			07	Normal output 15	---	---	---	---		
			01	Normal output 16	---	---	---	---		
			to	to	to	to	to	to		
			07	Normal output 23	---	---	---	---		

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			

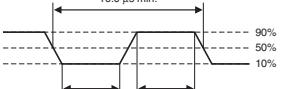
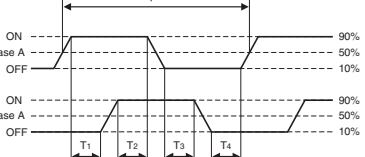
*1. High-speed counter inputs, interrupt inputs, and quick-response inputs can also be used as normal inputs.

*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.

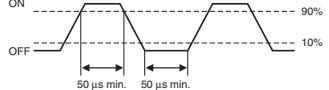
● High-speed Counter Function Input Specifications

Input bits: CIO 0.00 to CIO 0.03

Item	Specifications
ON/OFF delay	<ul style="list-style-type: none"> Pulse plus direction input mode Increment mode Up/down input mode  

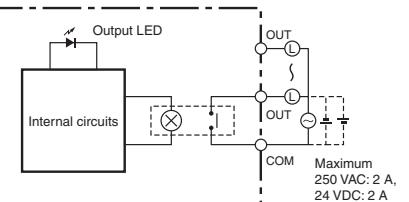
● Interrupt Input Counter Mode

Input bits: CIO 0.04 to CIO 0.09

Item	Specifications
ON/OFF delay	

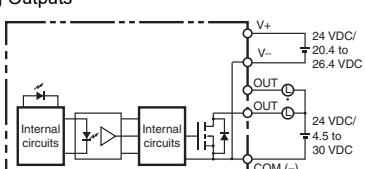
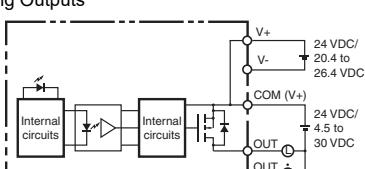
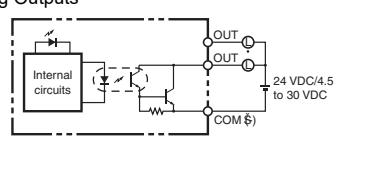
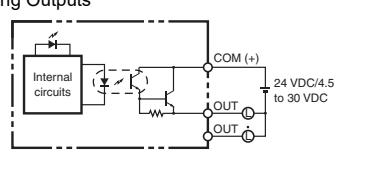
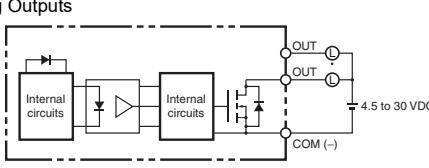
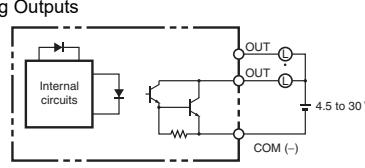
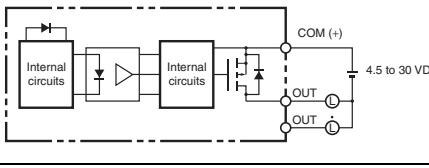
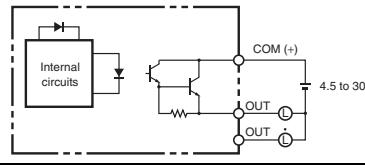
■ Output Specifications

● CPU Units with Relay Outputs

Item			Specifications
Max. switching capacity			2 A, 250 VAC ($\cos\phi = 1$), 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, $\cos\phi = 0.4$)
	Mechanical		20,000,000 operations
ON delay		15 ms max.	
OFF delay		15 ms max.	
Circuit configuration			Maximum 250 VAC: 2 A, 24 VDC: 2 A

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).

● CPU Units with Transistor Outputs (Sinking/Sourcing)

Item	Specifications		
	CIO 100.00 to CIO 100.03 *1	CIO 100.04 to CIO 100.07 *2	
Max. switching capacity	4.5 to 30 VDC, 300 mA/output, 0.9 A/common, EM40D□-D 3.6 A/Unit EM30D□-D 2.7 A/Unit EL20D□-D 1.8 A/Unit M60D□-D 5.4 A/Unit M40D□-D 3.6 A/Unit M30D□-D 2.7 A/Unit L20D□-D 1.8 A/Unit L14D□-D 1.5 A/Unit L10D□-D 0.9 A/Unit		
Min. switching capacity	4.5 to 30 VDC, 1 mA		
Leakage current	0.1 mA max.		
Residual voltage	0.6 V max.	1.5 V max.	
ON delay	0.1 ms max.		
OFF delay	0.1 ms max.	1 ms max.	
Fuse	CP1L-L/M CPU Unit: 1/common *3 CP1L-EL/EM CPU Unit: None		
Circuit configuration	CP1L-EL/EM CPU Unit	Sinking Outputs	
		Sourcing Outputs	
		Sinking Outputs	
		Sourcing Outputs	
	CP1L-L/M CPU Unit	Sinking Outputs	
		Sourcing Outputs	
		Sinking Outputs	
		Sourcing Outputs	

Note: Do not apply a voltage or connect a load to an output terminal exceeding the maximum switching capacity.

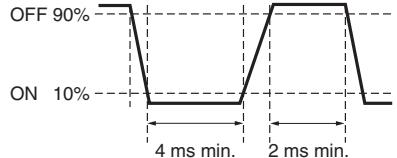
*1. Also do not exceed 0.9 A for the total of CIO 100.00 to CIO 100.03, which are different common.

*2. The bits that can be used depend on the model of the CPU Unit.

*3. The fuse cannot be replaced by the user.

● Pulse outputs

Output bits CIO 100.00 to CIO 100.03

Item	Specifications
Max. switching capacity	30 mA at 4.75 to 26.4 VDC
Min. switching capacity	7 mA at 4.75 to 26.4 VDC
Max. output frequency	100 kHz
Output waveform	

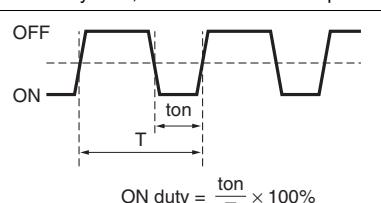
Note: 1. The above values assume a resistive load and do not consider the impedance of the cable connecting the load.

2. The pulse widths during actual use may be smaller than the ones shown above due to pulse distortion caused by connecting cable impedance.

3. The OFF and ON refer to the output transistor. The output transistor is ON at level "L".

● PWM outputs

Output bits CIO100.01, CIO 100.03

Item	Specifications
Max. switching capacity	30 mA at 4.75 to 26.4 VDC
Max. output frequency	32.8 kHz
PWM output precision	For ON duty +1%, "0%:10 kHz output For ON duty +5%, "0%: 0 to 32.8 kHz output
Output waveform	

Note: The OFF and ON refer to the output transistor. The output transistor is ON at level "L".

■ External Analog Setting Input Specifications

Item	Specifications
Number of analog inputs	1
Input signal range	0 to 10V
Resolution	1/256 (full scale)
Isolation method	None

Note: CP1L-L CPU Unit or CP1L-M CPU Unit only.

■ Analog Input Specifications

Item	Specifications
Number of inputs	2 inputs (2 words allocated in the AR Area)
Input signal range	Voltage input: 0 V to 10 V
Max. rated input	0 V to 15 V
External input impedance	100 kΩ min.
Resolution	1/1000 (full scale)
Overall accuracy	25°C: ± 2.0% (full scale) 0 to 55°C: ± 3.0% (full scale)
A/D conversion data	0000 to 03E8 hex
Averaging function	Not supported
Conversion time	Same as PLC cycle time
Isolation method	None

Note: CP1L-EL CPU Unit or CP1L-EM CPU Unit only.

■ Built-in Ethernet Specifications (CP1H-EL CPU Units or CP1H-EM CPU Unit Only)

Item	Specifications
Protocol used	TCP/IP, UDP, ARP, ICMP (ping only), BOOTP
Applications	FINS, Socket, SNTP, DNS (client)
Media access method	CSMA/CD
Modulation method	Baseband
Transmission paths	Star form
Baud rate	100 Mbit/s (100Base-TX), 10 Mbit/s (10Base-T)
Transmission media	100 Mbit/s <ul style="list-style-type: none"> Unshielded twisted-pair (UTP) cable Categories: 5, 5e Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e
	10 Mbit/s <ul style="list-style-type: none"> Unshielded twisted-pair (UTP) cable Categories: 3, 4, 5, 5e Shielded twisted-pair (STP) cable Categories: 100 Ω at 3, 4, 5, 5e
Transmission Distance	100 m (distance between hub and node)

Item	FINS Communications Service Specifications	
Number of nodes	254	
Message length	1016 bytes max.	
Size of buffer	8k	
Communications Function	FINS Communications Service (UDP/IP, TCP/IP)	
FINS/UDP method	Protocol used	UDP/IP
	Port number	9600 (default) Can be changed.
	Protection	No
FINS/TCP method	Protocol used	TCP/IP
	Number of connections	Up to 2 simultaneous connections and only one connection can be set to client
	Port number	9600 (default) Can be changed.
	Protection	Yes (Specification of client IP addresses when unit is used as a server)

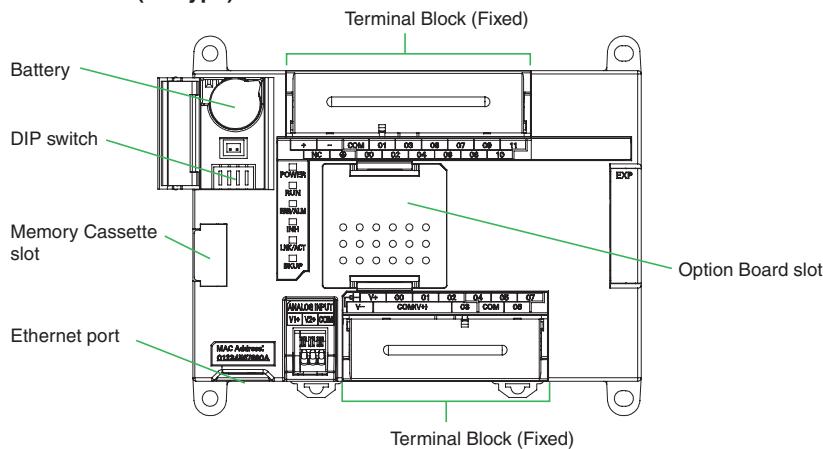
*1. CX-One version 4.3 or higher is required.

*2. To connect the CP1L CPUs with the NS-series Programmable Terminals via Ethernet, make sure that the system version of NS Series is 8.2 or higher.

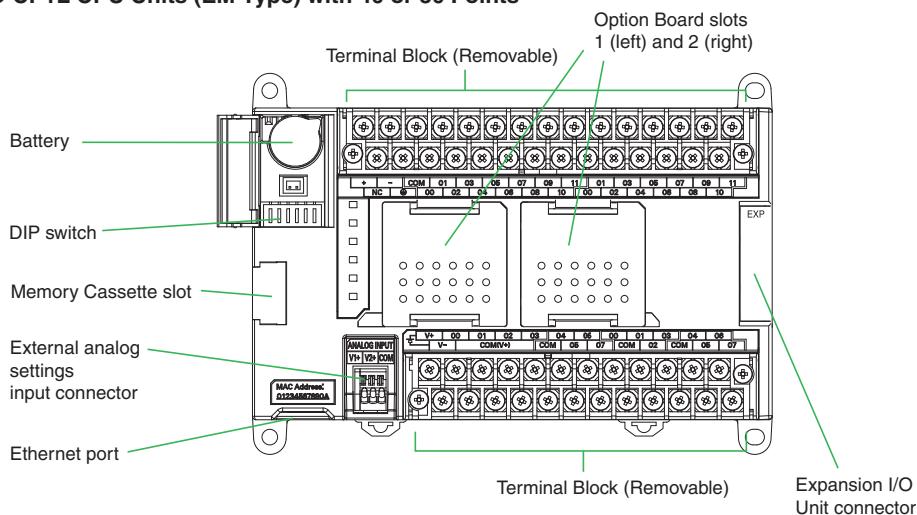
External Interfaces

■ CP1L CPU Unit Nomenclature

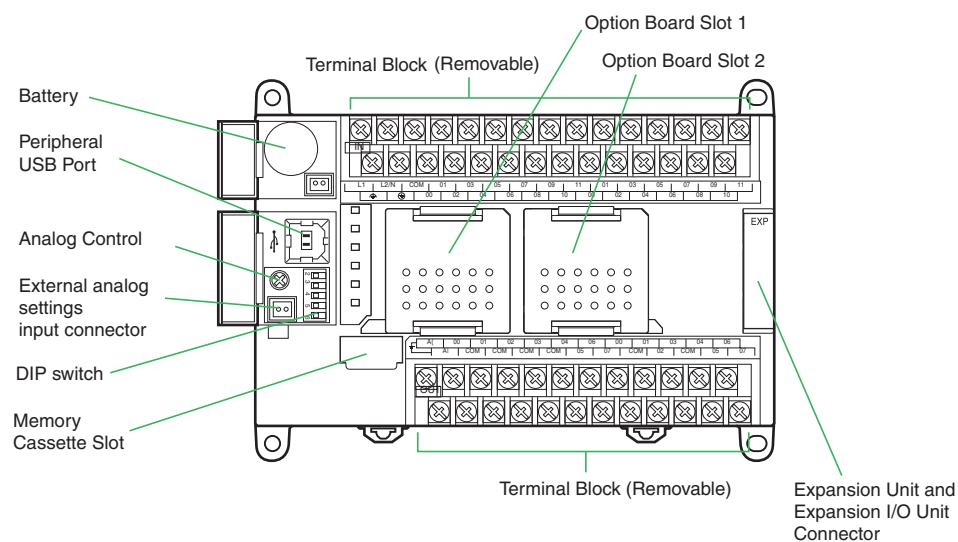
● CP1L CPU Units (EL Type) with 20 Points



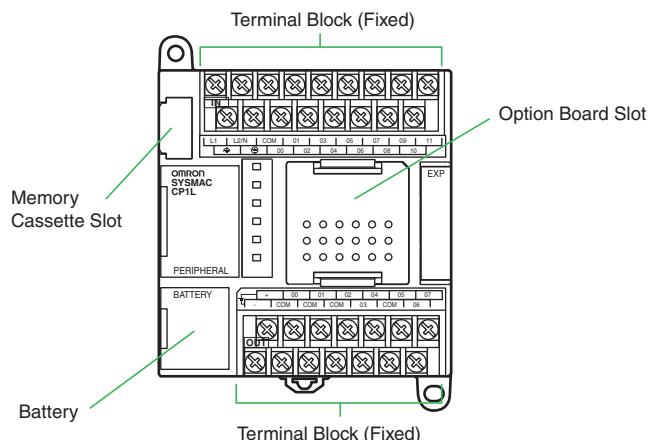
● CP1L CPU Units (EM Type) with 40 or 30 Points



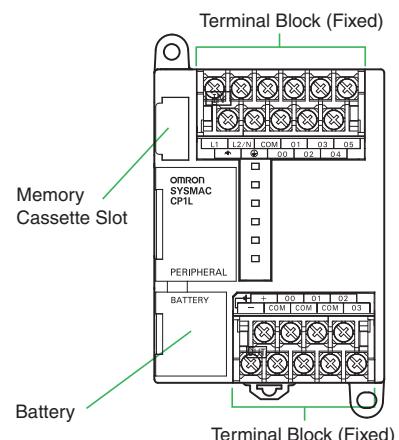
● CP1L CPU Units (MType) with 40 Points



● CP1L CPU Units (L Type) with 20 or 14 Points



● CP1L CPU Units (L Type) with 10 Points



Connection Methods

■ Built-in Standard Features

Yes : Supported, No : Not supported

Item	Interface	Applicable CPU Units				
		CP1L-EM Type	CP1L-EL Type	CP1L-M Type	CP1L-L14/L20	CP1L-L10
Ethernet port	Connecting Support Software, Message Communications, and the other.	Yes	Yes	No	No	No
Peripheral USB port	Bus for communications with various kinds of Support Software running on a personal computer.	No	No	Yes	Yes	Yes

■ Option Unit Specifications

Yes : Supported, No : Not supported

Item	Option Boards	Applicable CPU Units				
		CP1L-EM Type	CP1L-EL Type	CP1L-M Type	CP1L-L14/L20	CP1L-L10
Serial port 1 * (Option board slot 1)	Serial Communications Option Boards (CP1W-CIF01/CIF11/CIF12-V1)	Yes	Yes	Yes	Yes	No
	Ethernet Option Boards (CP1W-CIF41)	No	No	Yes	Yes	No
	Analog I/O Option Boards (CP1W-MAB21/ADB21/DAB21V)	Yes	Yes	No	No	No
	LCD Option Boards (CP1W-DAM01)	Yes	Yes	Yes	Yes	No
Serial port 2 * (Option board slot 2)	Serial Communications Option Boards (CP1W-CIF01/CIF11/CIF12-V1)	Yes	No	Yes	No	No
	Ethernet Option Boards (CP1W-CIF41)	No	No	Yes	No	No
	Analog I/O Option Boards (CP1W-MAB21/ADB21/DAB21V)	Yes	No	No	No	No

* You can choose one from among "Yes".

■ Serial Communications Option Boards (CP1W-CIF01/CIF11/CIF12-V1)

Product name	Model	Specifications	Serial communications mode
RS-232C Option Board	CP1W-CIF01	One RS-232C port Connector: D-Sub, 9 pin, female Maximum transmission distance: 15m	Host Link, 1:N NT Link, 1:1 NT Link, Noprotocol, Serial PLC Link Slave, Serial PLC Link Master, Serial Gateway converted to CompoWay/F, and Tool Bus, 1:1 Link Master, and 1:1 Link Slave.
RS-422A/485 Option Board	CP1W-CIF11	One RS-422A/485 port Terminal block: using ferrules Maximum transmission distance: 50m	
RS-422A/485 Isolated-type Option Board	CP1W-CIF12-V1	One RS-422A/485 port (Isolated) Terminal block: using ferrules Maximum transmission distance: 500m	

Note: 1. Serial PLC Link can be used with either serial port 1 or serial port 2.

2. Cannot be used for the CP1L-L10.

■ Ethernet Communications Specifications (CP1W-CIF41)

Item	Specifications	
Applicable PLCs	CP1L CPU Units Note: The Ethernet Option Board cannot be used for the CP1L-EM/EL/L10.	
Number of Units that can be mounted	2 sets. (The CP1W-CIF41 Ver.1.0 and Ver.2.0 can be combined and used with one CPU Unit. When using CP1W-CIF41 Ver.1.0, only one unit can be mounted in an option board slot.)	
Protocol used	TCP/IP, UDP	
Server/Client	Only server (Cannot be used as a client)	
Applications	FINS	
Media access method	CSMA/CD	
Modulation method	Baseband	
Transmission paths	Star form	
Baud rate	100 Mbit/s (100Base-TX), 10 Mbit/s (10Base-T)	
Transfer	100 Mbit/s	• Unshielded twisted-pair (UDP) cable Categories: 5, 5e • Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e
	10 Mbit/s	• Unshielded twisted-pair (UDP) cable Categories: 3, 4, 5, 5e • Shielded twisted-pair (STP) cable Categories: 100 Ω at 3, 4, 5, 5e
Transmission Distance	100 m (distance between hub and node)	

Item	FINS Communications Service Specifications	
Number of nodes	254	
Message length	1016 bytes max.	
Size of buffer	8k	
Communications Function	FINS Communications Service (UDP/IP, TCP/IP)	
FINS/UDP method	Protocol used	UDP/IP
	Port number	9600 (default) Can be changed.
	Protection	No
FINS/TCP method	Protocol used	TCP/IP
	Number of connections	Up to 2 simultaneous connections and only one connection can be set to client
	Port number	9600 (default) Can be changed.
	Protection	Yes (Specification of client IP addresses when unit is used as a server)

Note:

1. CX-Programmer version 8.1 or higher (CX-One version 3.1 or higher) is required.
2. Use CX-Integrator version 2.33 or higher (CX-One version 3.1 or higher) when the system needs to be set the routing tables. However, CX-Integrator does not support the other functions, using CP1W-CIF41, such as transferring the parameters and network structure.
3. To connect the CP1H/CP1L CPUs with the NS-series Programmable Terminals via Ethernet using CP1W-CIF41, make sure that the system version of NS Series is 8.2 or higher.

■ Analog I/O Option Board (CP1W-ADB21/DAB21V/MAB221)

Product name	Model	Specifications		
		Input		Output
		Voltage Input 0V to 10V	Current Input 0mA to 20mA	Voltage Output 0V to 10V
		Resolution:1/4000	Resolution:1/2000	Resolution:1/4000
Analog Input Option Board	CP1W-ADB21	2CH		-
Analog Output Option Board	CP1W-DAB21V	-		2CH
Analog I/O Option Board	CP1W-MAB221	2CH		2CH

Note: CP1L-EL CPU Unit or CP1L-EM CPU Unit only.

■ Analog Option Board Refresh Time

Analog Option Board	Cycle time		
	1 ms	10 ms	20 ms
CP1W-ADB21	40 ms ±30%	50 ms ±30%	80 ms ±30%
CP1W-DAB21V	30 ms ±40%	40 ms ±50%	70 ms ±40%
CP1W-MAB221(AD)	60 ms ±40%	80 ms ±60%	100 ms ±50%
CP1W-MAB221(DA)	40 ms ±80%	60 ms ±60%	90 ms ±50%

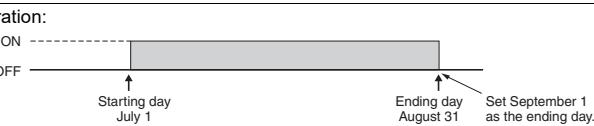
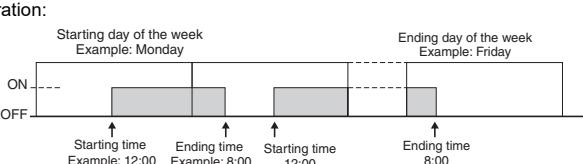
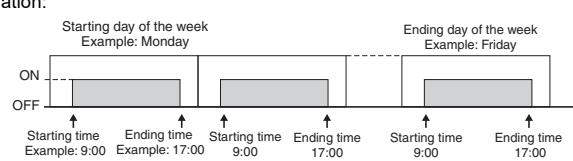
■LCD Option board (CP1W-DAM01)

● Specifications

Item	Function
Mounting port	CP1L: Option board slot 1 Note: The LCD Option Board cannot be used for the CP1L-L10.
Communications protocol	Peripheral bus (Turn ON DIP switch pin 4.)
Weight	30 g max.
Number of display characters	4 rows × 12 characters: 48 characters max.
Display characters	5 × 7 dots (alphanumeric and symbols).
Backlight	Electroluminescence (EL): Normal: Lit green; Error: Flashing red

● LCD Functions

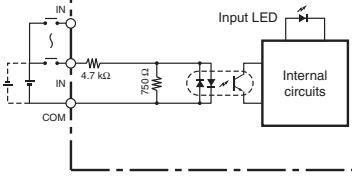
Operation	Description
Changing operating modes	Change the PLC operating mode without using the CX-Programmer.
I/O memory	Read and change the present values in the memory areas and force-set or force-reset bits.
PLC Setup operations	Read and change the PLC Setup.
Analog I/O monitor	Monitor the analog adjustment and present value for the external analog setting input.
Error log display	Read the log of errors that have occurred.
Memory cassette operation	Transfer and verify user programs between the PLC and memory cassette.
User monitor settings	Read the status of up to 16 words and bits with comments. You can use this setting to read data on the startup display.
Message display function settings	Display a user-set message of up to 48 characters on the LCD Option Board when a specified bit turns ON. A maximum of 16 screens can be registered for display.
Timers	Day timer Use this timer for ON/OFF switching at a specified times every day from the starting day of the week to the ending day of the week. Sixteen timers can be set from timer 01 to timer 16.
	Weekly timer Use this timer for ON/OFF operation in intervals of one week that starts one day and ends another day. Sixteen timers can be set from timer No. 01 to timer No. 16.
	Calendar timer Use the calendar timers for ON or OFF operation in intervals of one year from the starting day to the ending day. Sixteen timers can be set from timer 01 to timer 16.
Saving setting	
Language	
Other functions	



Expansion I/O Unit Specifications

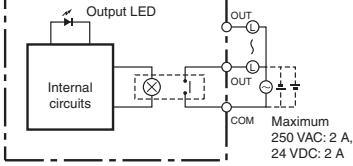
■ CP1W-40EDR/40EDT/40EDT1/32ER/32ET/32ET1/20EDR1/20EDT/20EDT1/16ER/16ET/16ET1/8ED/8ER/8ET/8ET1 Expansion I/O Units
Expansion I/O Units can be connected to the CPU Unit to configure the required number of I/O points.

● DC Inputs (CP1W-40EDR/40EDT/40EDT1/20EDR1/20EDT/20EDT1/8ED)

Item	Specifications
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	0 to 32 ms max. (Default: 8 ms) (See note 1.)
OFF delay	0 to 32 ms max. (Default: 8 ms) (See note 1.)
Circuit configuration	

Note: 1. Do not apply a voltage exceeding the rated voltage to an input terminal.
2. Can be set in the PLC Setup to 0, 0.5, 1, 2, 4, 8, 16 or 32 ms. The CP1W-40EDR/EDT/EDT1 are fixed at 16 ms.
1ms min. (hardware delay value)

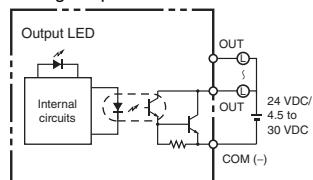
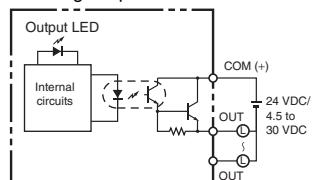
● Relay Outputs (CP1W-40EDR/32ER/20EDR1/16ER/8ER)

Item	Specifications
Max. switching capacity	2 A, 250 VAC ($\cos\phi = 1$), 24 VDC 4 A/common
Min. switching capacity	5 VDC, 10 mA
Service life of relay	150,000 operations (24 VDC)
	100,000 operations (24 VAC $\cos\phi = 0.4$)
	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.
Use the CPU Unit within the following ranges of power supply voltage and output load current.
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).

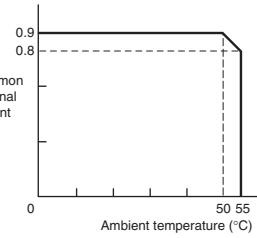
● Transistor Outputs (Sinking/Sourcing)

(CP1W-40EDT/-40EDT1/-32ET/-32ET1/-20EDT/-20EDT1/-16ET/-16ET1/-8ET/-8ET1)

Item	Specifications				
	CP1W-40EDT CP1W-40EDT1	CP1W-32E CP1W-32ET1	CP1W-20EDT CP1W-20EDT1	CP1W-16ET CP1W-16ET1	CP1W-8ET CP1W-8ET1
Max. switching capacity (See note 3.)	4.5 to 30 VDC: 0.3 A/point		24 VAC +10%/-5%: 0.3 A/point	4.5 to 30 VDC: 0.3 A/point	• OUT00/01 4.5 to 30 VDC, 0.2 A/output • OUT02 to 07 4.5 to 30 VDC, 0.3 A/output
	0.9 A/common 3.6 A/Unit	0.9 A/common 7.2 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 3.6 A/Unit	0.9 A/common 1.8 A/Unit
Leakage current	0.1mA max.				
Residual voltage	1.5 V max.				
ON delay	0.1ms max.				
OFF delay	1 ms max. at 24 VDC +10%/-5%, 5 to 300 mA				
Max. number of Simultaneously ON Points of Output	16 pts (100%)	24 pts (75%)	8 pts (100%)	16 pts (100%)	8 pts (100%)
Fuse (See note 2.)	1/common				
Circuit configura-tion	Sinking Outputs			Sourcing Outputs	
					

Note:

1. Do not apply a voltage or connect a load to an output terminal exceeding the maximum switching capacity.
2. The fuses cannot be replaced by the user.
3. A maximum of 0.9 A per common can be switched at an ambient temperature of 50°C.



■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 to 55°C	0.6% full scale	0.8% full scale	0.5% 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)			
	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	
	External output allowable load resistance	2 kΩ min.	350 Ω max.	2 kΩ min.	
	External output impedance	0.5 Ω max.	---	0.5 Ω max.	
	Resolution	1/6000 (full scale)			
	Overall accuracy	0.4% full scale	0.3% full scale		
		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 to 55°C	0.5% full scale	0.7% full scale	0.6% 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.		

■Temperature Sensor Units: CP1W-TS001/TS002/TS101/TS102

By mounting a Temperature Sensor Unit to the PLC, inputs can be obtained from thermocouples or platinum resistance thermometers, and temperature measurements can be converted to binary data and stored in the input area of the CPU Unit.

Item	CP1W-TS001	CP1W-TS002	CP1W-TS101	CP1W-TS102		
	Thermocouples		Platinum resistance thermometer			
Temperature sensors	Switchable between K and J, but same type must be used for all inputs.		Switchable between Pt100 and JPt100, but same type must be used for all inputs.			
Number of inputs	2	4	2	4		
Allocated input words	2	4	2	4		
Accuracy	(The larger of $\pm 0.5\%$ of converted value or $\pm 2^\circ\text{C}$) ± 1 digit max. *		(The larger of $\pm 0.5\%$ of converted value or $\pm 1^\circ\text{C}$) ± 1 digit max.			
Conversion time	250 ms for 2 or 4 input points					
Converted temperature data	16-bit binary data (4-digit hexadecimal)					
Isolation	Photocouplers between all temperature input signals					
Current consumption	5 VDC: 40 mA max., 24 VDC: 59 mA max.		5 VDC: 54 mA max., 24 VDC: 73 mA max.			

* Accuracy for a K-type sensor at -100°C or less is $\pm 4^\circ\text{C} \pm 1$ digit max.

The rotary switch is used to set the temperature range.

Setting	CP1W-TS001/TS002			CP1W-TS101/TS102			
	Input type	Range ($^\circ\text{C}$)	Range ($^\circ\text{F}$)	Input type	Range ($^\circ\text{C}$)	Range ($^\circ\text{F}$)	
	0	K	-200 to 1,300	-300 to 2,300	Pt100	-200.0 to 650.0	-300.0 to 1,200.0
	1		0.0 to 500.0	0.0 to 900.0	JPt100	-200.0 to 650.0	-300.0 to 1,200.0
	2	J	-100 to 850	-100 to 1,500	---	Cannot be set.	
	3		0.0 to 400.0	0.0 to 750.0	---		
	4 to F	---	Cannot be set.		---		

● Main Specifications

Item		CP1W-TS003
Temperature sensors		Thermocouples or analog input *1
		Switchable between K and J, but same type must be used for all inputs.
Number of inputs		4
Accuracy at 25°C	Thermocouple inputs	(The larger of $\pm 0.5\%$ of converted value or $\pm 2^\circ\text{C}$) ± 1 digit max. *2
	Analog voltage inputs	0.5% full scale
	Analog inputs	0.6% full scale
Accuracy at 0 to 55°C	Thermocouple inputs	(The larger of $\pm 1\%$ of converted value or $\pm 4^\circ\text{C}$) ± 1 digit max. *3
	Analog voltage inputs	1.0 % full scale
	Analog inputs	1.2 % full scale
Input signal range	Thermocouple inputs	K: -200.0 to 1300.0°C or .300.0 to 2300.0°F J: -100.0 to 850.0°C or .100.0 to 1500.0°F
	Analog voltage inputs	0 to 10V/1 to 5V
	Analog inputs	4 to 20mA
Resolution	Thermocouple inputs	0.1°C or 0.1°F
	Analog inputs	1/12000 (full scale)
Max. rated input	Analog voltage inputs	$\pm 15\text{V}$
	Analog inputs	$\pm 30\text{mA}$
External input impedance	Analog voltage inputs	1MΩ min.
	Analog inputs	Approx. 250Ω
Open-circuit detection function		Supported
Averaging function		Unsupported
Conversion time		250 ms for 4 input points
Converted temperature data		16-bit binary data (4-digit hexadecimal)
Converted AD data		16-bit binary data (4-digit hexadecimal)
Isolation		Photocouplers between all temperature and analog input signals
Current consumption		5 VDC: 70 mA max., 24 VDC: 30 mA max.

*1 Only last two channels can be used as analog input.

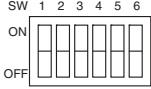
*2 Accuracy for a K-type sensor at -100°C or less is $\pm 4^\circ\text{C} \pm 1$ digit max.

*3 Accuracy for a K-type sensor at -100°C or less is $\pm 10^\circ\text{C} \pm 1$ digit max.

DIP Switch Settings

The DIP switch is used to set the input type (temperature or analog input), the input thermocouple type (K or J) and the temperature unit (°C or °F).

Note: Set the temperature range according to the type of temperature sensor connected to the Unit. Temperature data will not be converted correctly if the temperature range does not match the sensor.

SW		Setting		
SW 1 2 3 4 5 6	1	Thermocouple type of temperature sensor	ON	J
			OFF	K
	2	Temperature unit	ON	°F
			OFF	°C
ON  OFF	3	NC		
	4	Input type selection for the third input (Input 2)	ON	Analog input
			OFF	Thermocouple
	5	Input type selection for the fourth input (Input 3)	ON	Analog input
			OFF	Thermocouple
	6	Analog input signal range	ON	1 to 5V/4 to 20mA
			OFF	0 to 10V

Temperature input		
Input type	Range (°C)	Range (°F)
K	-200.0 to 1300.0	-300 to 2300
J	-100.0 to 850.0	-100.0 to 1500

● Main Specifications

Item		CP1W-TS004
Temperature sensors		Thermocouples
Switchable between K and J, but same type must be used for all inputs.		
Number of inputs		12
Accuracy	25°C	(The larger of $\pm 0.5\%$ of converted value or $\pm 2^\circ\text{C}$) ± 1 digit max. *1
	0 to 55°C	(The larger of $\pm 1\%$ of converted value or $\pm 4^\circ\text{C}$) ± 1 digit max. *2
Conversion time		500 ms for 12 input points
Converted temperature data		16-bit binary data (4-digit hexadecimal) 2-decimal-place mode is not supported
Isolation		Photocouplers between any two input signals
Current consumption		5 VDC: 80 mA max., 24 VDC: 50 mA max.

*1 Accuracy for a K-type sensor at -100°C or less is $\pm 4^\circ\text{C} \pm 1$ digit max.

*2 Accuracy for a K-type sensor at -100°C or less is $\pm 10^\circ\text{C} \pm 1$ digit max.

DIP Switch Settings

The DIP switch is used to set the temperature unit and to set the temperature input range.

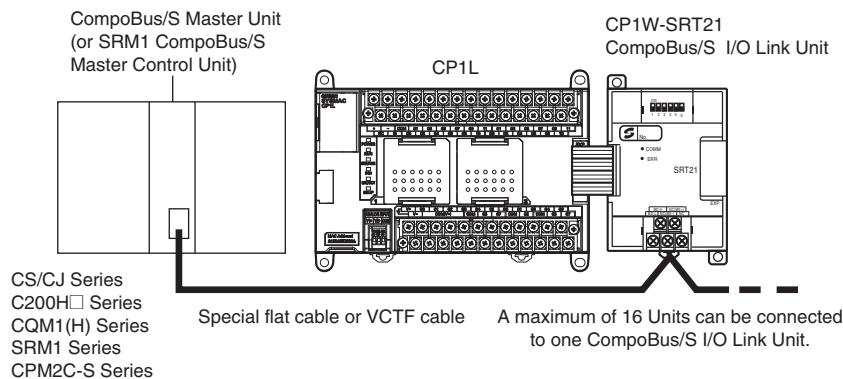
Note: Set the temperature range according to the type of temperature sensor connected to the Unit. Temperature data will not be converted correctly if the temperature range does not match the sensor.

SW		Setting			
SW 1 2 ON OFF	1	Input type	ON	J	
			OFF	K	
	2	Temperature unit	ON	${}^\circ\text{F}$	
			OFF	${}^\circ\text{C}$	

Temperature input		
Input type	Range (${}^\circ\text{C}$)	Range (${}^\circ\text{F}$)
K	-200.0 to 1300.0	-300 to 2300
J	-100.0 to 850.0	-100.0 to 1500

■ CP1W-SRT21 CompoBus/S I/O Link Unit

The CompoBus/S I/O Link Unit functions as a slave for a CompoBus/S Master Unit (or an SRM1 CompoBus/S Master Control Unit) to form an I/O Link with 8 inputs and 8 outputs between the CompoBus/S I/O Link Unit and the Master Unit.



● Specifications

Item	Model	CP1W-SRT21
Master/Slave	CompoBus/S Slave	
Number of I/O bits	8 input bits, 8 output bits	
Number of words occupied in CP1L I/O memory	1 input word, 1 output word (Allocated in the same way as for other Expansion Units)	
Node number setting	Set using the DIP switch (before the CPU Unit is turned ON.)	

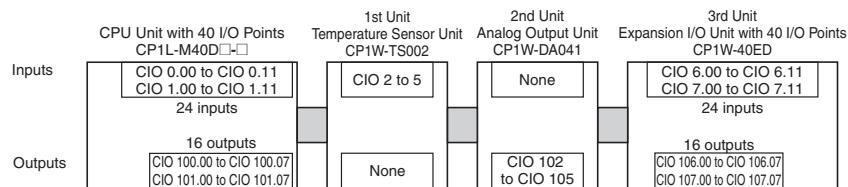
I/O Bits and I/O Allocations

With CP1L CPU Units, the beginning input and output words (CIO 0 and CIO 100) are allocated by the CPU Unit one or two words at a time. I/O bits are allocated in word units in order of connection to Expansion Units and Expansion I/O Units connected to a CPU Unit.

CPU Unit	Allocated words	
	Inputs	Outputs
CP1L CPU Unit with 10, 14, or 20 I/O points	CIO 0	CIO 100
CP1L CPU Unit with 30 or 40 I/O points	CIO 0 and CIO 1	CIO 100 and CIO 101
CP1L CPU Unit with 60 I/O points	CIO 0, CIO 1, and CIO 2	CIO 100, CIO 101, and CIO102

● Example: I/O Bit Allocations When Expansion Units Are Connected

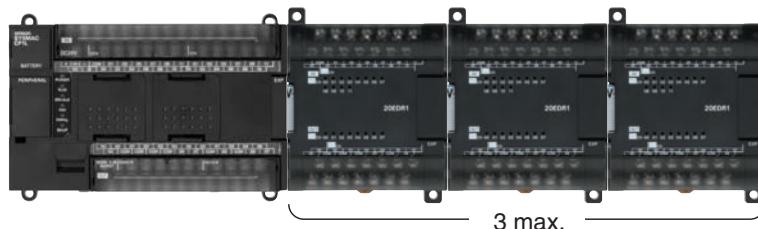
CPU Unit with 40 I/O Points + Temperature Sensor Unit + Analog Output Unit + Expansion I/O Unit with 40 I/O Points



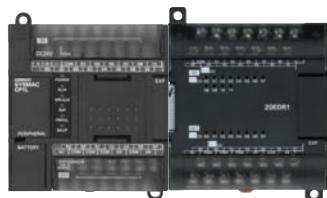
The Number of the Maximum Connect of Expansion Unit

■ Maximum Number of CP1W Expansion Unit and Expansion I/O Units

● CP1L (EM, M) CPU Units



● CP1L (EL) CPU Units or CP1L (L) CPU Units with 20 or 14 Points

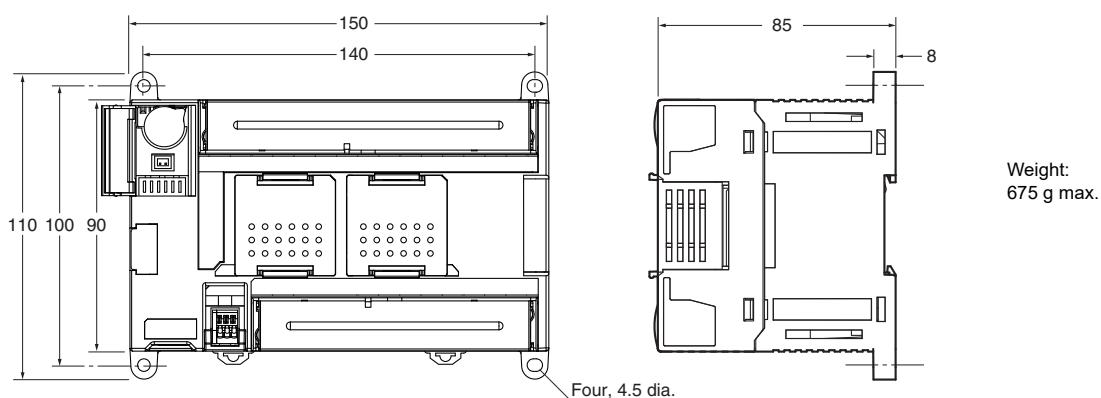


Dimensions

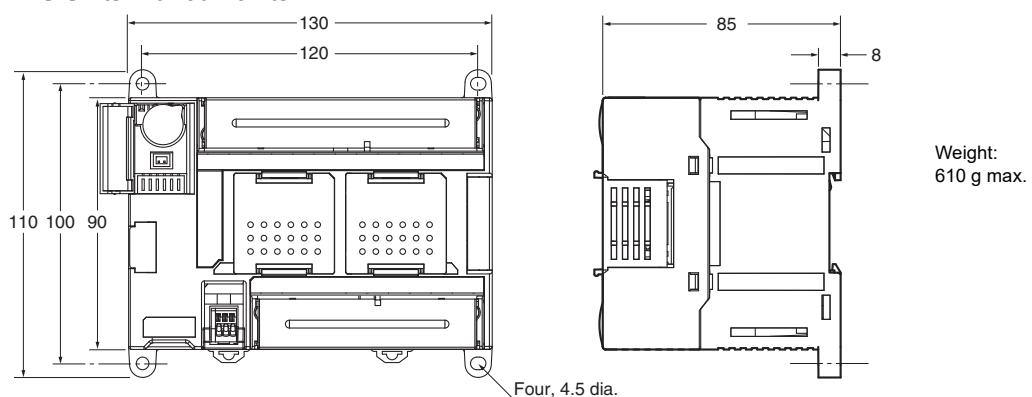
(Unit: mm)

■CPU Units

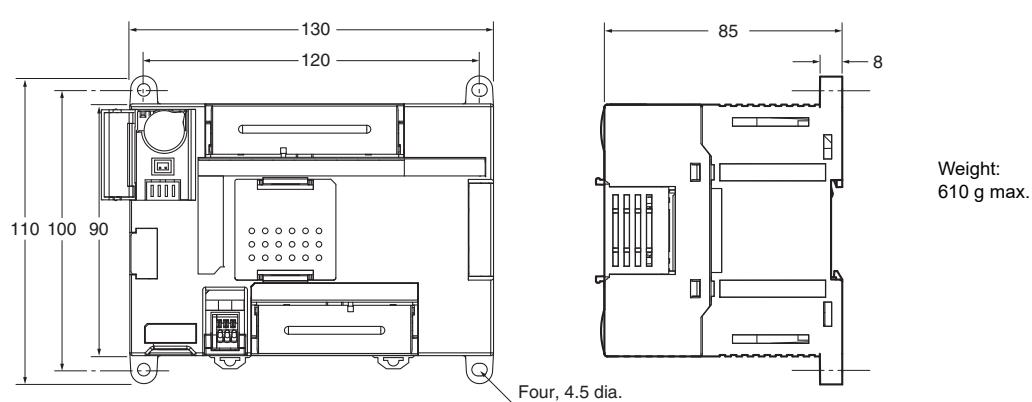
CP1L-EM CPU Units with 40 Points

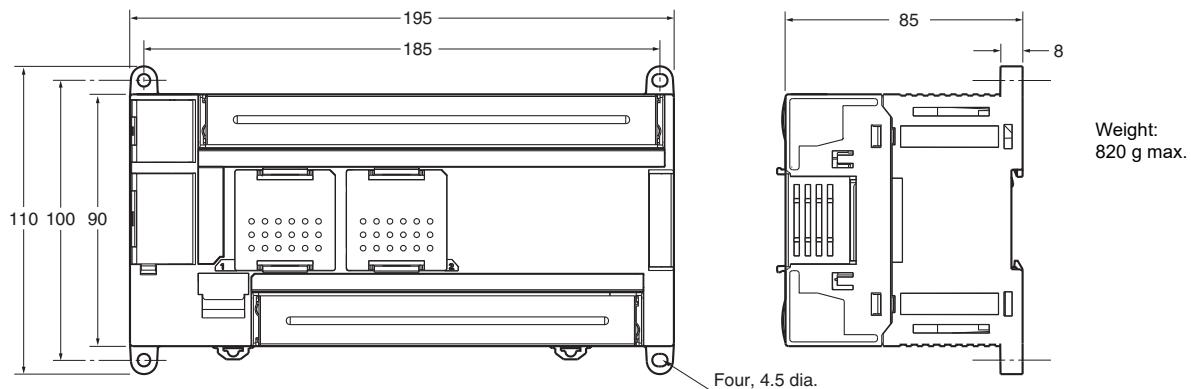
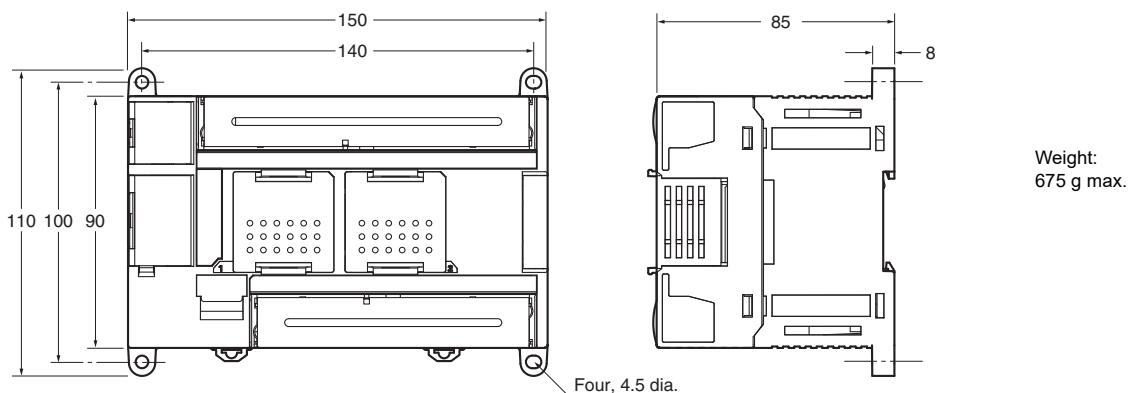
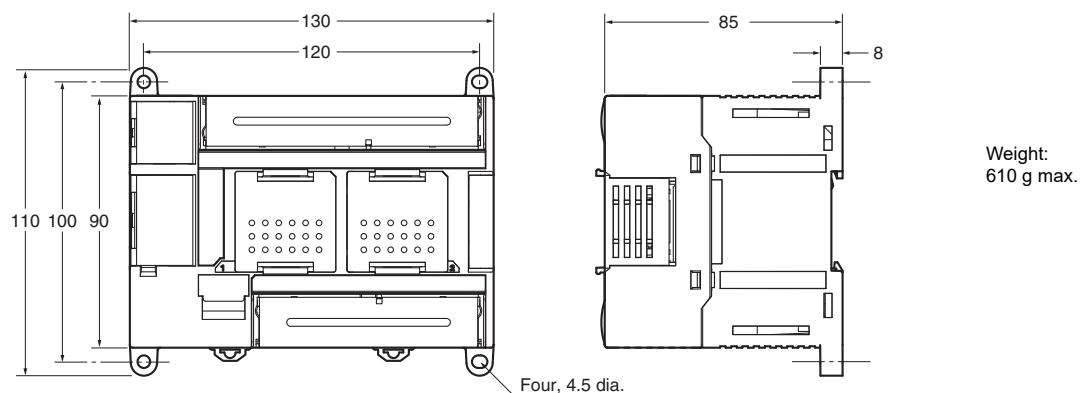


CP1L-EM CPU Units with 30 Points



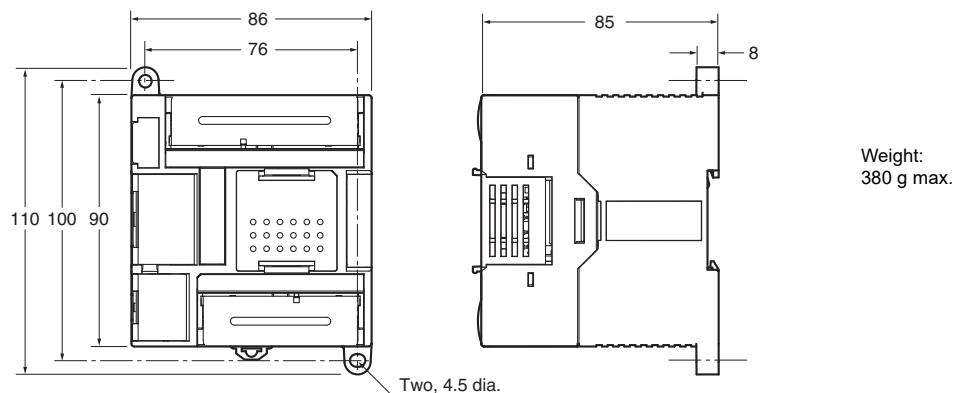
CP1L-EL CPU Units with 20 Points



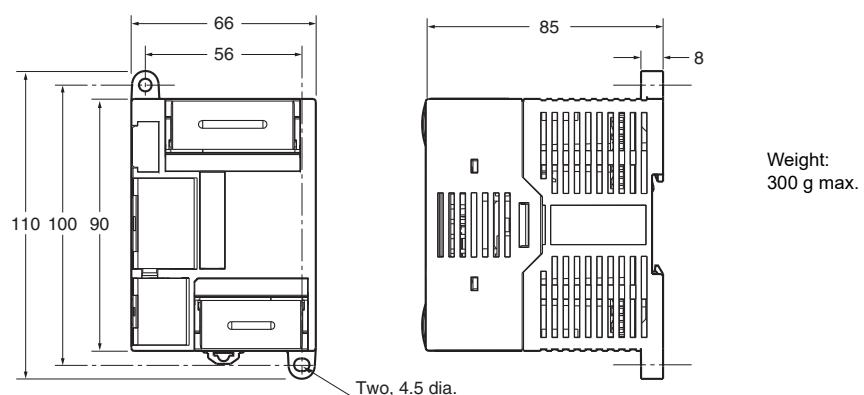
CP1L CPU Units with 60 I/O Points**CP1L CPU Units with 40 I/O Points****CP1L CPU Units with 30 I/O Points**

CP1L

CP1L CPU Units with 14 or 20 I/O Points



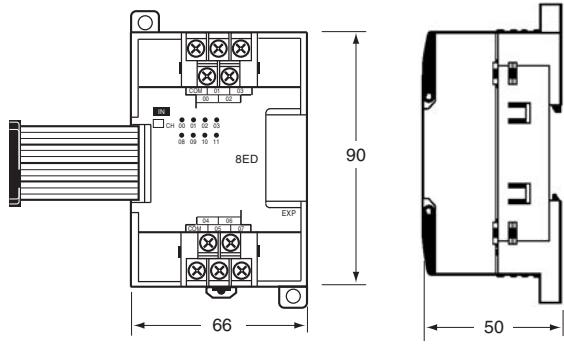
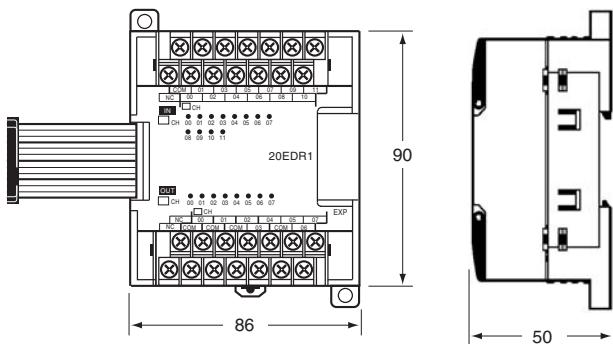
CP1L CPU Units with 10 I/O Points



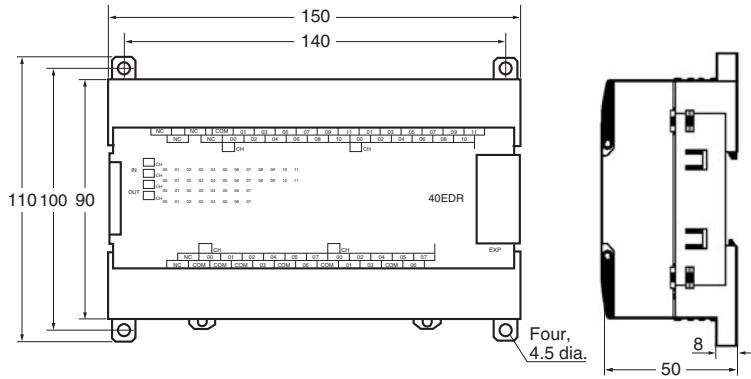
■ Expansion Units and Expansion I/O Units

CP1W-20ED□□, CP1W-16E□□,
CP1W-AD04□, CP1W-DA021/04□,
CP1W-MAD□□, CP1W-TS□□1/□□2/□□3

CP1W-8E□□
CP1W-SRT21



CP1W-40ED□
CP1W-32E□□
CP1W-TS004



Unit name	Model number	Weight
Expansion I/O Units	CP1W-40EDR	380 g
	CP1W-40EDT/-40EDT1	320 g
	CP1W-32ER	465 g
	CP1W-32ET/-32ET1	325 g
	CP1W-20EDR1/-20EDT/-20EDT1	300 g
	CP1W-16ER	280 g
	CP1W-16ET/-16ET1	225 g
	CP1W-8ED	200 g
	CP1W-8ER/-8ET/-8ET1	250 g
Analog Units	CP1W-AD041/-DA041/-DA021	200 g
	CP1W-AD042/-DA042	250 g
	CP1W-MAD11	150 g
	CP1W-MAD44/-MAD42	250 g
Temperature Sensor Units	CP1W-TS001/-TS002/-TS101/-TS102	250 g
	CP1W-TS003	240 g
	CP1W-TS004	570 g
CompoBus/S I/O Link Unit	CP1W-SRT21	200 g

Related Manuals

Cat. No.	Model numbers	Manual name	Description
W516	CP1L-EL20D□-□ CP1L-EM30D□-□ CP1L-EM40D□-□	CP Series CP1L-EL/EM CPU Unit Operation Manual	Provides the following information on the CP Series: <ul style="list-style-type: none"> • Overview, design, installation, maintenance, and other basic specifications • Features • System configuration • Mounting and wiring • I/O memory allocation • Troubleshooting
W462	CP1L-L10D□-□ CP1L-L14D□-□ CP1L-L20D□-□ CP1L-M30D□-□ CP1L-M40D□-□ CP1L-M60D□-□	CP Series CP1L CPU Unit Operation Manual	Use this manual together with the <i>CP1H Programmable Controllers Programming Manual</i> (W451).
W451	CP1H-X40D□-□ CP1H-XA40D□-□ CP1H-Y20DT-D CP1L-L10D□-□ CP1L-L14D□-□ CP1L-L20D□-□ CP1L-M30D□-□ CP1L-M40D□-□ CP1L-M60D□-□	CP Series CP1H/CP1L CPU Unit Programming Manual	Provides the following information on programming the CP Series: <ul style="list-style-type: none"> • Programming methods • Tasks • Programming instructions
W461	CP1L-L10D□-□ CP1L-L14D□-□ CP1L-L20D□-□ CP1L-M30D□-□ CP1L-M40D□-□ CP1L-M60D□-□	CP Series CP1L CPU Unit Introduction Manual	Describes basic setup methods of CP1L PLCs: <ul style="list-style-type: none"> • Basic configuration and component names • Mounting and wiring • Programming, data transfer, and debugging using the CX-Programmer • Application program examples
W342	SYSMAC CS/CJ/CP/NSJ Series CS1G/H-CPU□□□-EV1, CS1G/H-CPU□□□H, CS1D-CPU□□□HA, CS1D-CPU□□□SA, CS1D-CPU□□□H, CS1D-CPU□□□S, CJ1H-CPU□□□H-R, CJ1G-CPU□□□, CJ1M-CPU□□□, CJ1G-CPU□□□P, CJ1G/H-CPU□□□H, CJ2H-CPU6□-EIP, CJ2H-CPU6□, CJ2M-CPU□□□, CS1W-SCU□□□-V1, CS1W-SCB□□□-V1, CJ1W-SCU□□□-V1, CP1H-X□□□□□-□, CP1H-XA□□□□□-□, CP1H-Y□□□□□-□, CP1L-M/L□□□□-□, CP1E-E□□□D□-□, CP1E-N□□□D□-□, NSJ□-□□□□□(B)-G5D, NSJ□-□□□□□(B)-M3D	CS/CJ/CP/NSJ Series Communications Commands REFERENCE MANUAL	Describes the communications commands used with CS-series, CJ-series, and CP-series PLCs and NSJ Controllers.

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