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

## The Standard Package-type PLC

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

CP1L-L CPU Units
with 10 Points

CP1L-EL CPU Units
with 20 Points

CP1L-EM CPU Units
with 40 Points

CP1L-M CPU Units
with 60 Points

## Features

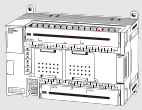
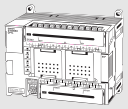
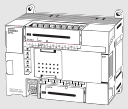
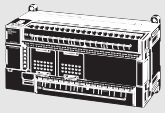
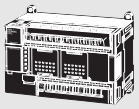
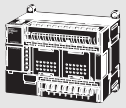
- Complete with a standard-feature Ethernet port. "CP1L-EM" and "CP1L-EL" only.
- Pulse output for two axes. Advanced power for high-precision positioning control.
- High-speed Counters. Differential phases for four axes.
- Eight interrupt inputs are built in. Faster processing of approximately 500 instructions speeds up the entire system.
- Serial Communications. Two ports. Select Option Boards for either RS-232C or RS-485 communications.
- USB Peripheral Port. Another standard feature.
- The Structured Text (ST) Language. Makes math operations even easier.
- Can be used for the CP1W series and CJ series Unit. The extendibility of it is preeminently good.
- LCD displays and settings. Enabled using Option Board.

# Ordering Information

## ● International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details and applicable conditions for these standards.

## ■ CPU Units

| CPU Unit | Specifications | | | | | Model | Standards |
|---|---|---|---|---|---|---|---|
| | CPU type | Power supply | Output method | Inputs | Outputs | | |
| **CP1L-EM CPU Units with 40 Points**  | **Memory capacity: 10K steps<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | DC power supply | Relay output | 24 | 16 | **CP1L-EM40DR-D** | CE |
| | | | Transistor output (sinking) | | | **CP1L-EM40DT-D** | |
| | | | Transistor output (sourcing) | | | **CP1L-EM40DT1-D** | |
| **CP1L-EM CPU Units with 30 Points**  | **Memory capacity: 10K steps<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | DC power supply | Relay output | 18 | 12 | **CP1L-EM30DR-D** | CE |
| | | | Transistor output (sinking) | | | **CP1L-EM30DT-D** | |
| | | | Transistor output (sourcing) | | | **CP1L-EM30DT1-D** | |
| **CP1L-EL CPU Units with 20 Points**  | **Memory capacity: 5K steps<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | DC power supply | Relay output | 12 | 8 | **CP1L-EL20DR-D** | CE |
| | | | Transistor output (sinking) | | | **CP1L-EL20DT-D** | |
| | | | Transistor output (sourcing) | | | **CP1L-EL20DT1-D** | |
| **CP1L-M CPU Units with 60 Points**  | **Memory capacity: 10K steps<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | AC power supply | Relay output | 36 | 24 | **CP1L-M60DR-A** | UC1, N, L, CE |
| | | | 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<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | AC power supply | Relay output | 24 | 16 | **CP1L-M40DR-A** | UC1, N, L, CE |
| | | | 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<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | AC power supply | Relay output | 18 | 12 | **CP1L-M30DR-A** | UC1, N, L, CE |
| | | | 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** | |
| **CP1L-L CPU Units with 20 Points**  | **Memory capacity: 5K steps<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | AC power supply | Relay output | 12 | 8 | **CP1L-L20DR-A** | UC1, N, L, CE |
| | | | 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** | |

| CPU Unit | Specifications | | | | | Model | Standards |
|---|---|---|---|---|---|---|---|
| | CPU type | Power supply | Output method | Inputs | Outputs | | |
| **CP1L-L CPU Units with 14 Points**  | **Memory capacity: 5K steps<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | AC power supply | Relay output | 8 | 6 | **CP1L-L14DR-A** | UC1, N, L, CE |
| | | | 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<br>High-speed counters:<br>100 kHz, 4 axes<br>Pulse outputs: 100 kHz, 2 axes<br>(Models with transistor outputs only)** | AC power supply | Relay output | 6 | 4 | **CP1L-L10DR-A** | UC1, N, L, CE |
| | | | 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.** CP1L PLCs are supported by CX-Programmer version 7.1 or higher, except for EM40, EM30, EL20, M60, and L10 CPU Units.
CP1L-EM40/EM30/EL20 CPU Units are supported by CX-Programmer version @@@ or higher.
The 60-point CPU Units are supported by CX-Programmer version 7.2 or higher.
The 10-point CPU Units are supported by CX-Programmer version 7.3 or higher.
Update The CX-Programmer version automatically from the website using CX-Programmer version 7.0 (included with CX-One version 2.0).
**2.** Purchase an Option Unit (sold separately) if you will use RS-232C, RS-422A/485, Ethernet, or LCD.

## ■ Options for CPU Units

| Name | Specifications | Model | Standards |
|---|---|---|---|
| **RS-232C Option Board**  | Can be mounted in either CPU Unit Option Board slot 1 or 2. *1 | **CP1W-CIF01** | UC1, N, L, CE |
| **RS-422A/485 Option Board**  | | **CP1W-CIF11** | |
| **RS-422A/485 (Isolated-type) Option Board**  | | **CP1W-CIF12** | UC1, N, L, CE |
| **Ethernet Option Board**  | Can be mounted in either CPU Unit Option Board slot 1 or 2. *1 *2 | **CP1W-CIF41** | UC1, N, L, CE |
| **Analog Input Option Board**  | Can be mounted in either CPU Unit Option Board slot 1 or 2. *3<br>2 analog inputs. 0-10V(Resolution:1/4000), 0-20mA (Resolution:1/2000). | **CP1W-ADB21** | CE |
| **Analog Output Option Board**  | Can be mounted in either CPU Unit Option Board slot 1 or 2. *3<br>2 analog outputs. 0-10V (Resolution:1/4000). | **CP1W-DAB21V** | CE |
| **Analog I/O Option Board**  | Can be mounted in either CPU Unit Option Board slot 1 or 2. *3<br>2 analog inputs. 0-10V(Resolution:1/4000), 0-20mA(Resolution:1/2000).<br>2 analog outputs. 0-10V (Resolution:1/4000). | **CP1W-MAB221** | CE |
| **LCD Option Board**  | Can be mounted only in the CPU Unit Option Board slot 1. *1 | **CP1W-DAM01** | UC1, L, N, CE |
| **Memory Cassette**  | Can be used for backing up programs or auto-booting. | **CP1W-ME05M** | UC1, N, L, CE |

***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.

## ■ Programming Devices

| Name | Specifications | Number of licenses | Media | Model | Standards |
|---|---|---|---|---|---|
| **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.<br>CX-One Lite runs on the following OS.<br>OS: Windows XP (Service Pack 3 or higher), Vista or 7<br>Note: Except for Windows XP 64-bit version.<br>CX-One Lite Ver. 4.□ includes Micro PLC Edition CX-Programmer Ver. 9.□. | 1 license | CD | **CXONE-LT01C-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 runs on the following OS.<br>OS: Windows XP (Service Pack 3 or higher), Vista or 7<br>Note: Except for Windows XP 64-bit version.<br>CX-One Ver. 4.□ includes CX-Programmer Ver. 9.□. | 1 license *1 | DVD *2 | **CXONE-AL01D-V4** | --- |
| **Programming Device Connecting Cable for CP1W-CIF01 RS-232C Option Board *3** | Connects Personal Computers, D-Sub 9-pin (Length: 2.0 m) | For anti-static connectors | | **XW2Z-200S-CV** | --- |
| | Connects Personal Computers, D-Sub 9-pin (Length: 5.0 m) | | | **XW2Z-500S-CV** | |
| | Connects Personal Computers, D-Sub 9-pin (Length: 2.0 m) | | | **XW2Z-200S-V** | |
| | Connects Personal Computers, D-Sub 9-pin (Length: 5.0 m) | | | **XW2Z-500S-V** | |
| **USB-Serial Conversion Cable *3** | USB-RS-232C Conversion Cable (Length: 0.5 m) and PC driver (on a CD-ROM disc) are included.<br>Complies with USB Specification 1.1<br>On personal computer side: USB (A plug connector, male)<br>On PLC side: RS-232C (D-sub 9-pin, male)<br>Driver: Supported by Windows 98, Me, 2000, and XP | | | **CS1W-CIF31** | N |

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CP1L-EM40/EM30/EL20 CPU Units are supported by CX-Programmer version @@@ or higher.
The 60-point CPU Units are supported by CX-Programmer version 7.2 or higher.
The 10-point CPU Units are supported by CX-Programmer version 7.3 or higher.
Update The CX-Programmer version automatically from the website using CX-Programmer version 7.0 (included with CX-One version 2.0).
**2.** The CX-One and CX-One Lite cannot be simultaneously installed on the same computer.

***1.** Multi licenses are available for the CX-One (3, 10, 30 or 50 licenses).

***2.** The CX-One is also available on CD (CXONE-AL□□C-V4).

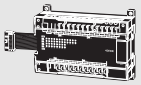
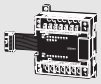
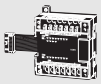
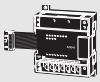
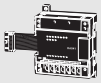
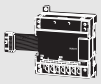
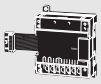
***3.** Cannot be used with a peripheral USB port.
To connect to a personal computer via a peripheral USB port, use commercially-available USB cable (A or B type, male).

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.2.□ | 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.1.□ | No | Yes | NV-Designer | Ver.1.□ | Yes | Yes |
| CX-Simulator | Ver.1.□ | 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.4.□ | Yes | Yes |

**Note:** For details, refer to the CX-One Catalog (Cat. No: R134).

## ■ Expansion Units

| Name | Output method | Inputs | Outputs | Model | Standards |
|---|---|---|---|---|---|
| Expansion I/O Units  | Relay | 24 | 16 | **CP1W-40EDR** | N, L, CE |
| | Transistor (sinking) | | | **CP1W-40EDT** | |
| | Transistor (sourcing) | | | **CP1W-40EDT1** | |
| | Relay | --- | 32 | **CP1W-32ER** | N, L, CE |
| | Transistor (sinking) | | | **CP1W-32ET** | |
| | Transistor (sourcing) | | | **CP1W-32ET1** | |
|  | Relay | 12 | 8 | **CP1W-20EDR1** | U, C, N, L, CE |
| | Transistor (sinking) | | | **CP1W-20EDT** | |
| | Transistor (sourcing) | | | **CP1W-20EDT1** | |
|  | Relay | --- | 16 | **CP1W-16ER** | N, L, CE |
| | Transistor (sinking) | | | **CP1W-16ET** | |
| | Transistor (sourcing) | | | **CP1W-16ET1** | |
| | --- | 8 | --- | **CP1W-8ED** | U, C, N, L, CE |
|  | Relay | --- | 8 | **CP1W-8ER** | |
| | Transistor (sinking) | | 8 | **CP1W-8ET** | |
| | Transistor (sourcing) | | | **CP1W-8ET1** | |
| **Analog Input Unit**  | Analog (resolution: 1/6000) | 4 | --- | **CP1W-AD041** | UC1, N, L, CE |
| **Analog Output Unit**  | Analog (resolution: 1/6000) | --- | 4 | **CP1W-DA041** | |
| | | | 2 | **CP1W-DA021** | UC1, CE |
| **Analog I/O Unit**  | Analog (resolution: 1/6000) | 2 | 1 | **CP1W-MAD11** | U, C, N, L, CE |
| **CompoBus/S I/O Link Unit**  | --- | 8 (I/O link input bits) | 8 (I/O link input bits) | **CP1W-SRT21** | U, C, N, L, CE |
| **Temperature Sensor Unit**  | 2 thermocouple inputs | | | **CP1W-TS001** | |
| | 4 thermocouple inputs | | | **CP1W-TS002** | |
| | 2 platinum resistance thermometer inputs | | | **CP1W-TS101** | |
| | 4 platinum resistance thermometer inputs | | | **CP1W-TS102** | |

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

## ■ I/O Connecting Cable

| Name | Specifications | Model | Standards |
|---|---|---|---|
| **I/O Connecting Cable** | 80 cm (for CP1W/CPM1A Expansion Units) | **CP1W-CN811** | UC1, N, L, CE |

**Note:** An I/O Connecting Cable (approx. 6 cm) for horizontal connection is provided with CP1W/CPM1A Expansion Units.

## ■ Optional Products, Maintenance Products and DIN Track Accessories

| Name | Specifications | Model | Standards |
|---|---|---|---|
| **DIN Track** | Length: 0.5 m; Height: 7.3 mm | **PFP-50N** | --- |
| | Length: 1 m; Height: 7.3 mm | **PFP-100N** | |
| | Length: 1 m; Height: 16 mm | **PFP-100N2** | |
| **End Plate** | There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track. | **PFP-M** | |

# General Specifications

| Type / Item / 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** | 85 264 VAC | 20.4 to 26.4 VDC |
| **Power consumption** | 50 VA max. (CP1L-M60/-M40/-M30□□-A) (See page 27)<br>30 VA max. (CP1L-L20/-L14/-L10□□-A) | 20 W max. (CP1L-M60/-M40/-M30□□-D) (See page 27)<br>13 W max. (CP1L-L20/-L14/-L10□□-D) |
| **Inrush current *** | 100 to 120 VAC inputs:<br>20 A max. (for cold start at room temperature)<br>8 ms max.<br>200 to 240 VAC inputs:<br>40 A max. (for cold start at room temperature), 8 ms max. | 30 A max. (for cold start at room temperature)<br>20 ms max. |
| **External power supply** | 300 mA at 24 VDC (CP1L-M60/-M40/-M30□□-A)<br>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** | Conforms to JIS C0040. 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) | |
| **Shock resistance** | Conforms to JIS C0041. 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 | | CP1L-EM40 (40 points) | CP1L-EM30 (30 points) | CP1L-EL20 (20 points) |
|---|---|---|---|---|
| Item \ Models | | CP1L-EM40D□-□ | CP1L-EM30D□-□ | CP1L-EL20D□-□ |
| 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<br>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 | | 0.4ms | | |
| 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) | | |
| | | (Interrupt tasks can also be specified and executed for high-speed counter interrupts and executed.) | | |
| Maximum subroutine number | | 256 | | |
| Maximum jump number | | 256 | | |
| I/O areas | Input bits | 24: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11 | 18: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.05 | 12: CIO 0.00 to CIO 0.11 |
| | Output bits | 8: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07 | 12: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.03 | 8: CIO 100.00 to CIO 100.07 |
| | 1:1 Link Area | 1,024 bits (64 words): CIO 3000.00 to CIO 3063.15 (CIO 3000 to CIO 3063) | | |
| | Serial PLC Link Area | 1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189) | | |
| Work bits | | 8,192 bits (512 words): W000.00 to W511.15 (W0 to W511) CIO Area: 37,504 bits (2,344 words): CIO 3800.00 to CIO 6143.15 (CIO 3800 to CIO 6143) | | |
| TR Area | | 16 bits: TR0 to TR15 | | |
| Holding Area | | 8,192 bits (512 words): H0.00 to H511.15 (H0 to H511) | | |
| AR Area | | Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447)<br>Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959) | | |
| Timers | | 4,096 bits: T0 to T4095 | | |
| Counters | | 4,096 bits: 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. | | |
| 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.<br>Battery backup: The Holding Area, DM Area, and counter values (flags, PV) are backed up by a battery. | | |
| Battery service life | | 5 years at 25°C. (Use the replacement battery within two years of manufacture.) | | |
| 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 μs max.) | | |
| Scheduled interrupts | | 1 | | |
| High-speed counters | | 4 counters, 2 axes (24-VDC input) 4 inputs:<br>Differential phases (4x), 50 kHz Single-phase (pulse plus direction, up/down, increment), 100 kHz<br>Value range: 32 bits, Linear mode or ring mode<br>Interrupts: Target value comparison or range comparison | | |
| Pulse outputs (models with transistor outputs only) | Pulse outputs | Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed)<br>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%)<br>2 outputs, 0.1 to 6553.5 Hz or 1 to 32,800 Hz<br>(Accuracy: +1%/0% at 0.1 Hz to 10,000 Hz and +5%/0% at 10,000 Hz to 32,800 Hz) | | |
| External analog input | | 2 input (Resolution: 1/1000, Input range: 0 to 10 V). Not isolated. | | |

* Can be used for program backups and auto-booting.

## ● 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<br>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 bits | 36: CIO 0.00 to CIO 0.11, CIO 1.00 to CIO 1.11, and CIO 2.00 to CIO 2.11 | 24: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11 | 18: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.05 | 12: CIO 0.00 to CIO 0.11 | 8: CIO 0.00 to CIO 0.07 | 6: CIO 0.00 to CIO 0.05 |
| | Output bits | 24: CIO 100.00 to CIO 100.07, CIO 101.00 to CIO 101.07, and CIO 102.00 to CIO 102.07 | 24: CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11 | 12: CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.03 | 8: CIO 100.00 to CIO 100.07 | 6: CIO 100.00 to CIO 100.05 | 4: CIO 100.00 to CIO 100.03 |
| | 1:1 Link Area | 1,024 bits (64 words): CIO 3000.00 to CIO 3063.15 (CIO 3000 to CIO 3063) | | | | | |
| | Serial PLC Link Area | 1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189) | | | | | |
| Work bits | | 8,192 bits (512 words): W000.00 to W511.15 (W0 to W511)<br>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)<br>Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959) | | | | | |
| Timers | | 4,096 bits: T0 to T4095 | | | | | |
| Counters | | 4,096 bits: 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),<br>−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.<br>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.<br>Battery backup: The Holding Area, DM Area, and counter values (flags, PV) are backed up by a battery. | | | | | |
| Battery service life | | 5 years at 25°C. (Use the replacement battery within two years of manufacture.) | | | | | |
| Built-in input terminals | | 60 (36 inputs, 24 outputs) | 40 (24 inputs, 16 outputs) | 30 (184 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) |

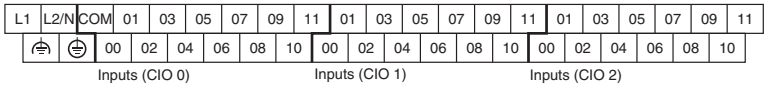
| Item | Type / Models | CP1L-M60 (60 points) CP1L-M60□□-□ | CP1L-M40 (40 points) CP1L-M40□□-□ | CP1L-M30 (30 points) CP1L-M30□□-□ | CP1L-L20 (20 points) CP1L-L20□□-□ | CP1L-L14 (14 points) CP1L-L14□□-□ | CP1L-L10 (10 points) CP1L-L10□□-□ |
|---|---|---|---|---|---|---|---|
| Interrupt inputs counter 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 counters, 2 axes (24-VDC input) 4 inputs: Differential phases (4x), 50 kHz<br>Single-phase (pulse plus direction, up/down, increment), 100 kHz<br>Value range: 32 bits, Linear mode or ring mode<br>Interrupts: Target value comparison or range comparison | | | | | |
| Pulse outputs (models with transistor outputs only) | Pulse outputs | Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed)<br>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%)<br>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) | | | | | |
| External analog input | | 1 input (Resolution: 1/256, Input range: 0 to 10 V). Not isolated. | | | | | |

# Built-in Inputs

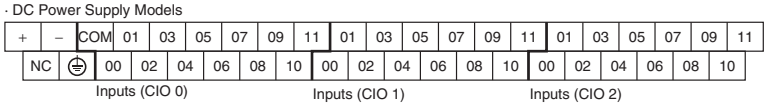
## ■ Input Terminal Block Arrangement (Top Block)

### ● CP1L (60 Inputs)

· AC Power Supply Models

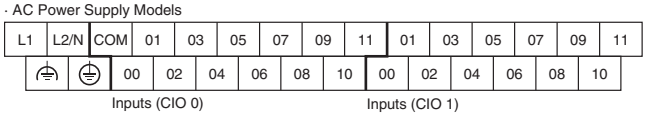



· DC Power Supply Models

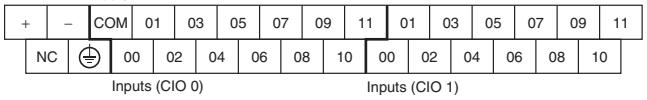



### ● CP1L (40 Inputs)

· AC Power Supply Models

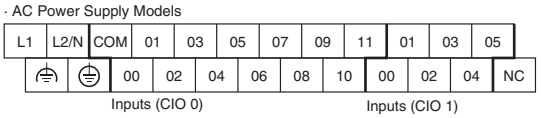



· DC Power Supply Models

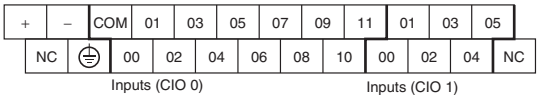



### ● CP1L (30 inputs)

· AC Power Supply Models

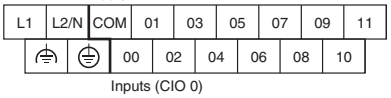



· DC Power Supply Models

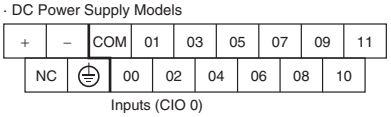



### ● CP1L (20 Inputs)

· AC Power Supply Models

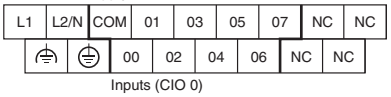



· DC Power Supply Models

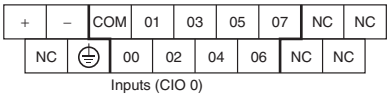



### ● CP1L (14 Inputs)

· AC Power Supply Models

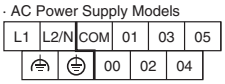



· DC Power Supply Models

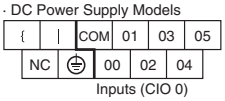



### ● CP1L (10 Inputs)

· AC Power Supply Models




· DC Power Supply Models



## ■ Built-in Input Area

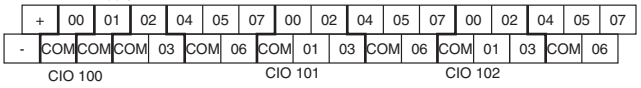
| Number of inputs | Input terminal block | | Input operation | | | High-speed counter operation | | Origin search | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Operation settings<br>• High-speed counters enabled<br>• Phase-Z signal reset | | Origin searches enabled for pulse outputs 0 and 1 | | |
| | Word | Bit | Normal inputs | Interrupt inputs | Quick-response inputs | 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 count input) | --- | --- | --- |
| | | 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- |
| 14 | | 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 | | --- |
| 20 | | 08 | Normal input 8 | Interrupt input 4 | Quick-response input 4 | --- | | --- | --- | --- |
| | | 09 | Normal input 9 | Interrupt input 5 | Quick-response input 5 | --- | | --- | --- | --- |
| | | 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 |
| | | 05 | Normal input 17 | --- | --- | --- | --- | --- | --- | --- |
| 40 | | 06 | Normal input 18 | --- | --- | --- | --- | --- | --- | --- |
| | | to | to | to | to | to | to | to | to | to |
| | | 11 | Normal input 23 | --- | --- | --- | --- | --- | --- | --- |
| 60 | CIO 2 | 00 | Normal input 24 | --- | --- | --- | --- | --- | --- | --- |
| | | to | to | to | to | to | to | to | to | to |
| | | 11 | Normal input 35 | --- | --- | --- | --- | --- | --- | --- |

# Built-in Outputs

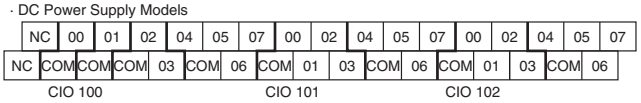
## ■ Output Terminal Block Arrangement (Bottom Block)

### ● CP1L (60 Outputs)

· AC Power Supply Models

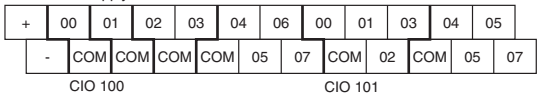



· DC Power Supply Models



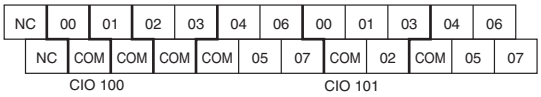

### ● CP1L (40 Outputs)

· AC Power Supply Models

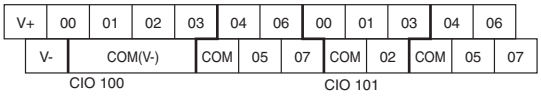



· DC Power Supply Models

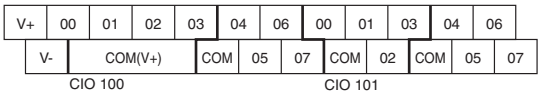
CP1L-EM40DR-D/CP1L-M40D□-D




CP1L-EM40DT-D

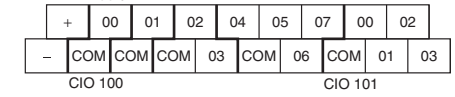



CP1L-EM40DT1-D



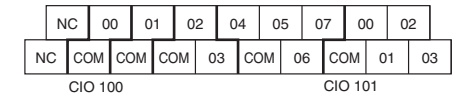

### ● CP1L (30 Outputs)

· AC Power Supply Models

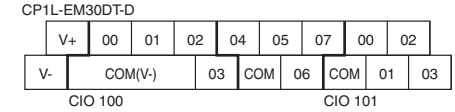



· DC Power Supply Models

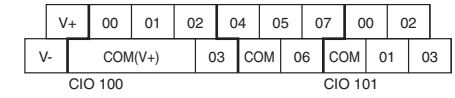
CP1L-EM30DR-D/CP1L-M30D□-D




CP1L-EM30DT-D

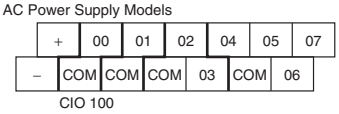



CP1L-EM30DT1-D



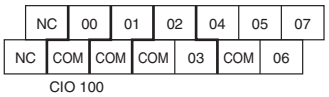

### ● CP1L (20 Outputs)

· AC Power Supply Models

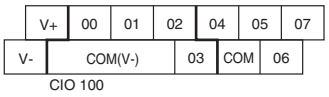



· DC Power Supply Models

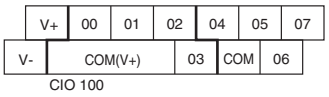
CP1L-EL20DR-D/CP1L-L20D□-D




CP1L-EL20DT-D

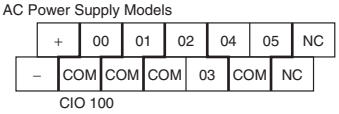



CP1L-EL20DT1-D

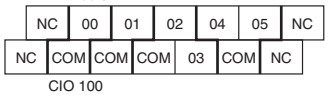



### ● CP1L (14 Outputs)

· AC Power Supply Models

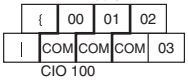



· DC Power Supply Models

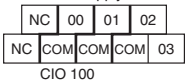



### ● CP1L (10 Outputs)

· AC Power Supply Models




· DC Power Supply Models

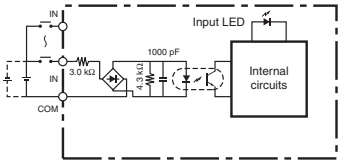
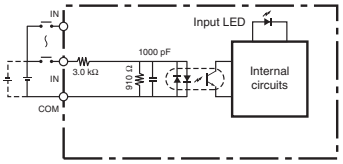
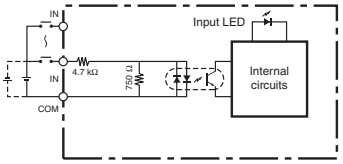


## ■ Built-in Output Area

| 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 |
|---|---|---|---|---|---|---|---|---|
| | | | | Fixed duty ratio pulse output | | | | Variable duty ratio pulse output |
| | Word | Bit | Normal output | CW/CCW | Pulse plus direction | When the origin search function is used | | PWM output |
| | | | | | | CPU Units with 14 to 60 points | CPU Units with 10 point | |
| 10 | CIO 100 | 00 | Normal output 0 | Pulse output 0 (CW) | Pulse output 0 (pulse) | --- | --- | --- |
| | | 01 | Normal output 1 | Pulse output 0 (CCW) | Pulse output 0 (direction) | --- | --- | PWM output 0 |
| | | 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) | PWM output 1 |
| 14 | | 04 | Normal output 4 | --- | --- | Origin search 0 (Error counter reset output) | --- | --- |
| | | 05 | Normal output 5 | --- | --- | Origin search 1 (Error counter reset output) | --- | --- |
| 20 | | 06 | Normal output 6 | --- | --- | --- | --- | --- |
| | | 07 | Normal output 7 | --- | --- | --- | --- | --- |
| 30 | CIO 101 | 00 | Normal output 8 | --- | --- | --- | --- | --- |
| | | to | to | to | to | to | to | to |
| | | 03 | Normal output 11 | --- | --- | --- | | --- |
| 40 | | 04 | Normal output 12 | --- | --- | --- | | --- |
| | | to | to | to | to | to | to | to |
| | | 07 | Normal output 15 | --- | --- | --- | --- | --- |
| 60 | CIO 102 | 01 | Normal output 16 | --- | --- | --- | --- | --- |
| | | to | to | to | to | to | to | to |
| | | 07 | Normal output 23 | --- | --- | --- | --- | --- |

# I/O Specifications for CPU Units

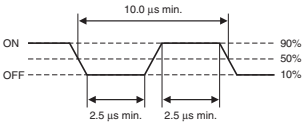
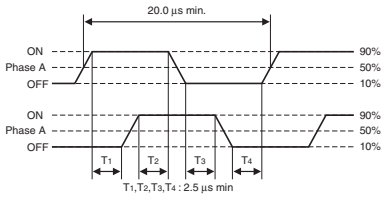
## ■ Input Specifications

| ITEM | Specifications | | |
|---|---|---|---|
| | High-speed counter inputs (phases A and B) | Interrupt inputs and quick-response inputs | Normal inputs |
| | CIO 0.00 to CIO 0.03 | CIO 0.04 to CIO 0.09 | CIO 0.10, CIO 0.11, CIO 1.00 to CIO 1.11, and CIO 2.00 to 2.11 |
| 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 | 2.5 μs max. | 50 μs max. | 1 ms max. |
| OFF delay | 2.5 μs max. | 50 μs max. | 1 ms max. |
| Circuit configuration |  |  |  |



### ● High-speed Counter Function Input Specifications

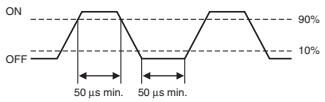
Input bits: CIO 0.00 to CIO 0.03

| Item | Specifications |
|---|---|
| ON/OFF delay | • Pulse plus direction input mode<br>• Increment mode<br>• Up/down input mode<br>  <br>• Differential phase input mode<br>  |



### ● Interrupt Input Counter Mode

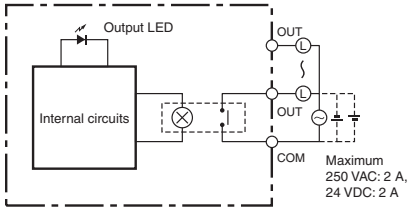
Input bits: CIO 0.04 to CIO 0.09

| Item | Specifications |
|---|---|
| ON/OFF delay |  |



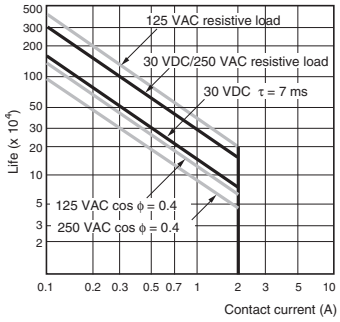
## ■ Output Specifications

### ● CPU Units with Relay Outputs

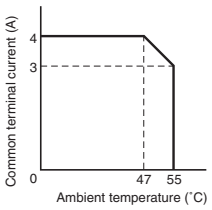
| Item | | | Specifications |
|---|---|---|---|
| Max. switching capacity | | | 2 A, 250 VAC (cosϕ = 1), 2 A, 24 VDC 4 A/common) |
| Min. switching capacity | | | 5 VDC, 10 mA |
| Service life of relay | Electrical | Resistive load | 100,000 operations (24 VDC) |
| | | Inductive load | 48,000 operations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



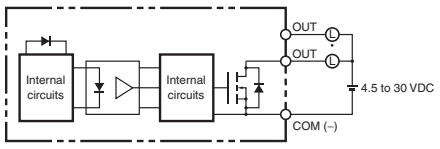
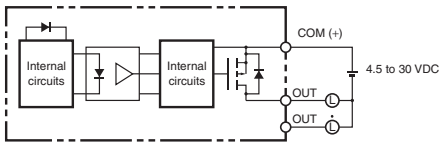
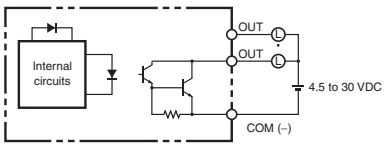
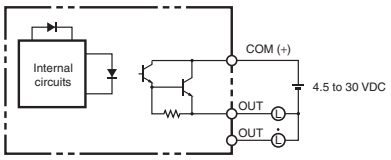
**Note:** Under the worst conditions, the service life of output contacts is as showr on the left.
The service life of relays is as shown in the following diagram as a guide· line.



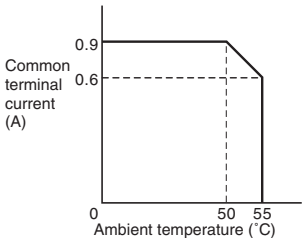




## ● CPU Units with Transistor Outputs (Sinking/Sourcing)

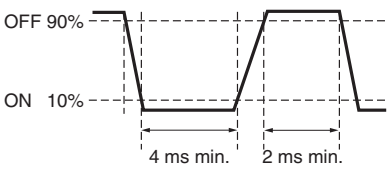
| Item | | Specifications | | |
|---|---|---|---|---|
| | | CIO 100.00 to CIO 100.03 | --- | CIO 100.04 to CIO 101.07<br>CIO 102.00 to CIO 102.11 |
| Max. switching capacity | | 4.5 to 30 VDC: 300 mA/point, 0.9 A/common, 3.6 A/Unit (See notes 3 and 4.) | | |
| Min. switching capacity | | 4.5 to 30 VDC, 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 | | 1/common (See note 2.) | | |
| Circuit configuration | CP1L-EL/EM CPU Unit | Sinking Outputs<br><br>Sourcing Outputs | Sinking Outputs<br><br>Sourcing Outputs | |
| | CP1L-L/M CPU Unit | Sinking Outputs<br>  <br><br>Sourcing Outputs<br>  <br> | Sinking Outputs<br>  <br><br>Sourcing Outputs<br>  <br> | |

**Note: 1.** Do not apply a voltage or connect a load to an output terminal exceeding the maximum switching capacity.
**2.** Fuses cannot be replaced by the user.
**3.** Also do not exceed 0.9 A for the total for CIO 100.00 to CIO 100.03. (CIO 100.00 to CIO 100.03 is different common.)
**4.** A maximum of 0.9 A per common can be switched at an ambient temperature of 50°C.




## ● Pulse outputs

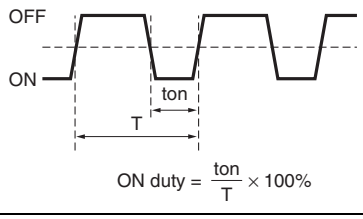
Output bits CIO 100.00 to CIO 100.03

| 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".

## ● Pulse 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 | CP1L: 32.8 kHz |
| PWM output precision | ON duty +5%, –0% at output frequency of 1 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".

## ■ Analog Input Specifications

| Item | Specifications |
|---|---|
| **Number of analog inputs** | 1 *1<br>2 *2 |
| **Input signal range** | 0 to 10V |
| **Max. rated input** | 0 to 15V |
| **External input impedance** | 100KΩ min. |
| **Resolution** | 1/256 *1<br>1/1000 (full scale) *2 |
| **Overall accuracy** | 0 to 55°C ±3% (full scale) |
| **A/D conversion data** | Full scale for 0000 to 1023 (03FF) Hex |
| **Isolation method** | - |

***1.** CP1L-EL CPU Unit or CP1L-EM CPU Unit only.
***2.** CP1L-L CPU Unit or CP1L-M 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** | • Unshielded twisted-pair (UDP) cable<br>Categories: 5, 5e<br>• Shielded twisted-pair (STP) cable<br>Categories: 100 Ω at 5, 5e |
| | **10 Mbit/s** | • Unshielded twisted-pair (UDP) cable<br>Categories: 3, 4, 5, 5e<br>• Shielded twisted-pair (STP) cable<br>Categories: 100 Ω at 3, 4, 5, 5e |
| **Transmission Distance** | | 100 m (distance between hub and node) |

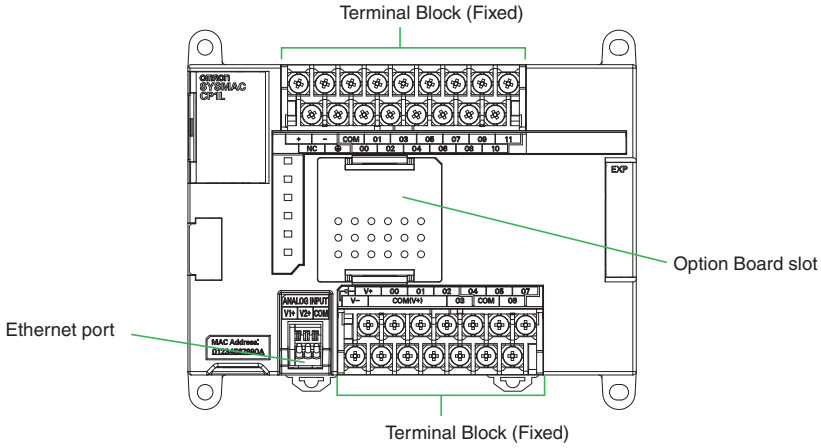
| Item | | FINS Communications Service Specifications |
|---|---|---|
| **Number of nodes** | | 254 |
| **Message length** | | 1016 bytes max. |
| **Size of buffer** | | 8k |
| **Communications Function** | | FINS Communications Service (UDP/IP, TCP/IP) |
| **FINS/UDP method** | **Protocol used** | UDP/IP |
| | **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

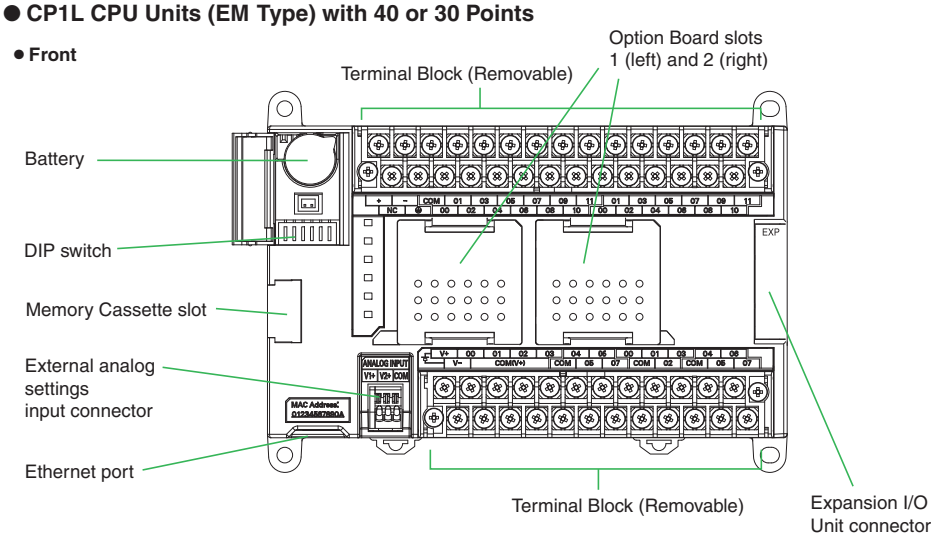
## ■ CP1L CPU Unit Nomenclature

### ● CP1L CPU Units (EL Type) with 20 Points



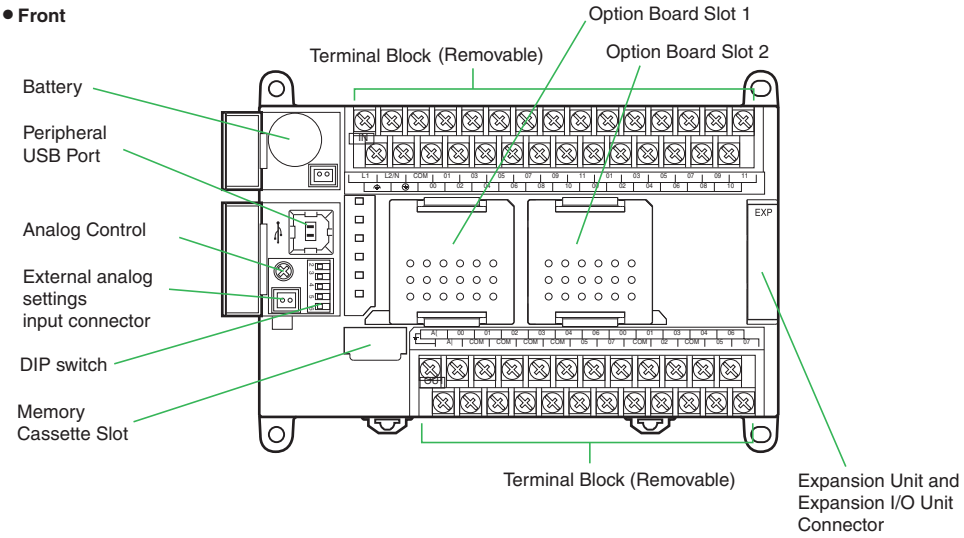

### ● CP1L CPU Units (EM Type) with 40 or 30 Points

● **Front**

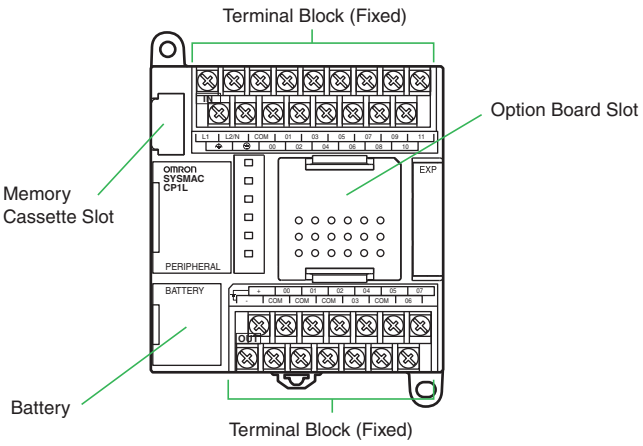



### ● CP1L CPU Units (MType) with 40 Points

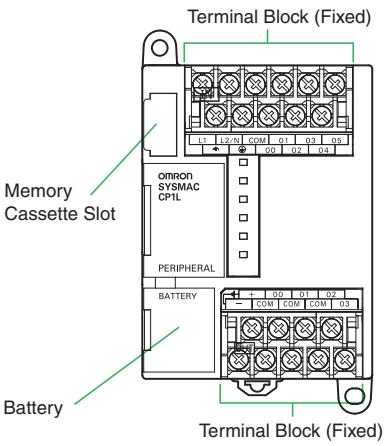
● **Front**



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




● **CP1L CPU Units (L Type) with 10 Points**



# Option Unit Specifications

## ■ Option Unit Specifications

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 |
| **Serial port 1 * (Option board slot 1)** | Serial Communications Option Boards (CP1W-CIF01/CIF11/CIF12) | 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) | 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)

| Product name | Model | Specifications | Serial communications mode * |
|---|---|---|---|
| **RS-232C Option Board** | CP1W-CIF01 | One RS-232C port<br>Connector: D-Sub, 9 pin, female<br>Maximum transmission distance: 15m<br>One RS-232C connector (D-Sub, 9 pin, male) is included. (Plug: XM2A-0901, Hood: XM2S-0911-E) | 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<br>Terminal block: using ferrules<br>Maximum transmission distance: 50m | |
| **RS-422A/485 Isolated-type Option Board** | CP1W-CIF12 | One RS-422A/485 port (Isolated)<br>Terminal block: using ferrules<br>Maximum transmission distance: 500m | |

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

## ■ Ethernet Communications Specifications (CP1W-CIF41)

| Item | | | Specifications |
|---|---|---|---|
| Applicable PLCs | | | CP1L CPU Units<br>**Note:** The Ethernet Option Board cannot be used for the CP1L-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 |
| Applications | | | FINS |
| Transfer | 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 | • Unshielded twisted-pair (UDP) cable<br>Categories: 5, 5e<br>• Shielded twisted-pair (STP) cable<br>Categories: 100 Ω at 5, 5e |
| | | 10 Mbit/s | • Unshielded twisted-pair (UDP) cable<br>Categories: 3, 4, 5, 5e<br>• Shielded twisted-pair (STP) cable<br>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.

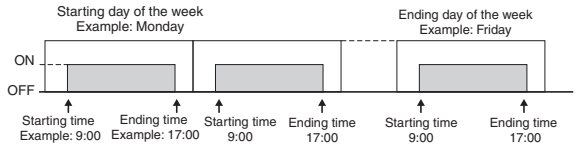
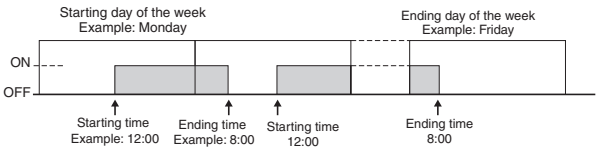
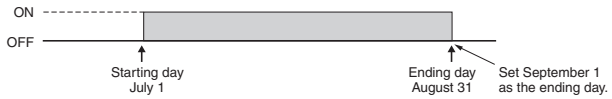
| Product name | Model | Specifications | | | | |
|---|---|---|---|---|---|---|
| | | Input | | Output | Conversion time | Current consumption |
| | | Voltage Input 0V to 10V | Current Input 0mA to 20mA | Voltage Output 0V to 10V | | |
| | | Resolution: 1/4000 | Resolution: 1/2000 | Resolution: 1/4000 | | |
| Analog Input Option Board | CP1W-ADB21 | 2CH | | - | 2ms/point | DC 5V 40mA max. |
| Analog Output Option Board | CP1W-DAB21V | - | | 2CH | 2ms/point | DC 5V 150mA max. |
| Analog I/O Option Board | CP1W-MAB221 | 2CH | | 2CH | 6ms/4point | DC 5V 150mA max. |

## ■ LDC Option Board (CP1W-DAM01)

### ● Specifications

| Item | Function |
|---|---|
| **Mounting port** | CP1L: Option board slot 1<br>**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, Japanese kana, and symbols). Display switchable between Japanese katakana and English. |
| **Backlight** | Electroluminescence (EL): Normal: Lit green; Error: Flashing red |

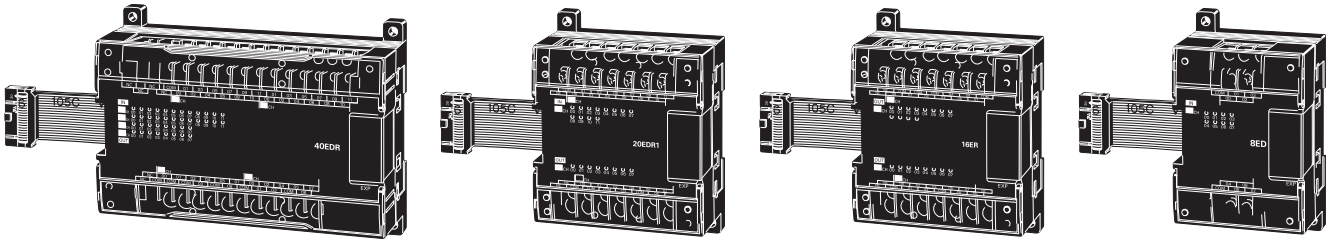
### ● LCD Functions

| 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.<br>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 cam be set from timer 01 to timer 16. | Operation:<br>  <br> |
| | **Weekly timer** | Use this timer for ON/OFF operation in intervals of one week that starts one day and ends another day. Sixteen timers cam be set from timer No. 01 to timer No. 16. | Operation:<br>  <br> |
| | **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. | Operation:<br>  <br> |
| **Saving setting** | | Save the various settings that you set with the LCD Option Board to the DM Area of the PLC. You can also write the settings saved in the PLC to the LCD Option Board. | |
| **Language** | | Changing the display language (Japanese/English) | |
| **Other functions** | | • Setting the time of the PLC's built-in clock<br>• Reading system data (e.g., unit version and lot number)<br>• Setting the backlight lighting time<br>• Adjusting LCD contrast<br>• Reading cycle time (e.g., average, maximum, and minimum)<br>• Clearing data for the LCD Option Board | |

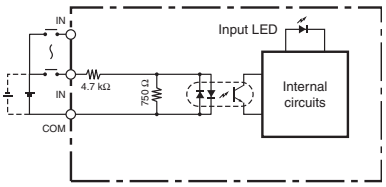
# Expansion I/O Unit Specifications

## ■ 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.



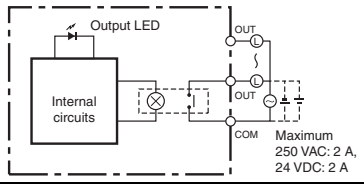

### ● DC Inputs (CP1W-40EDR/40EDT/40EDT1/20EDR1/20EDT/20EDT1/8ED)

| 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 |  |



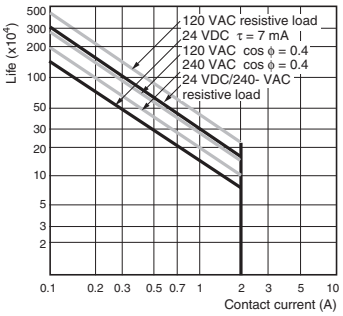
**Note: 1.** Do not apply a voltage exceeding the rated voltage to an input terminal.
**2.** Can be set in the PLC Setup to 0, 0.5, 1, 2, 4, 8, 16 or 32 ms. The CP1W-40EDR/EDT/EDT1 are fixed at 16 ms.

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

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

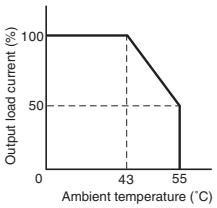


**Note:** Under the worst conditions, the service life of output contacts is as shown on the left. The service life of relays is as shown in the following diagram as a guideline.



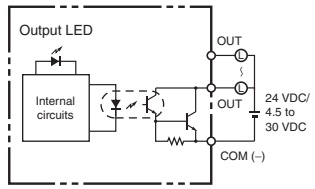
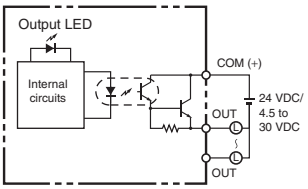

Switching frequency: 1,800 operations/h

Relationship between Output Load Current and Ambient Temperature (CP1W-16ER/32ER)

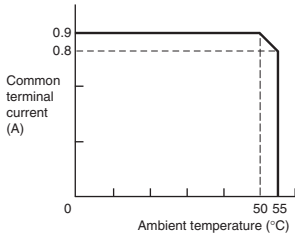



When using the CP1W-32ER, do not allow more than 24 outputs to be ON simultaneously regardless of the ambient temperature.

## ● Transistor Outputs (Sinking/Sourcing) (CP1W-40EDT/-40EDT1/-32ET/-32ET1/-20EDT/-20EDT1/-16ET/-16ET1/-8ET/-8ET1)

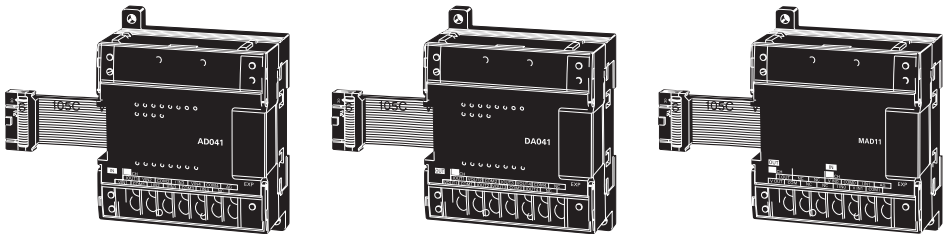
| Item | Specifications | | | | |
|---|---|---|---|---|---|
| | CP1W-40EDT<br>CP1W-40EDT1 | CP1W-32E<br>CP1W-32ET1 | CP1W-20EDT<br>CP1W-20EDT1 | CP1W-16ET<br>CP1W-16ET1 | CP1W-8ET<br>CP1W-8ET1 |
| Max. switching capacity (See note 3.) | 4.5 to 30 VDC: 0.3 A/point | | 24 VAC +10%/ −5%: 0.3 A/point | 4.5 to 30 VDC: 0.3 A/point | • OUT00/01 4.5 to 30 VDC, 0.2 A/output<br>• OUT02 to 07 4.5 to 30 VDC, 0.3 A/output |
| | 0.9 A/common<br>3.6 A/common | | 0.9 A/common<br>1.8 A/common | 0.9 A/common<br>3.6 A/common | 0.9 A/common<br>1.8 A/common |
| 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 Simultaneosly 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 configuration | Sinking Outputs<br>  | | Sourcing Outputs<br>  | | |

**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/DA041/DA021/MAD11 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 Unit: CP1W-AD041

| Item \ Model | | CP1W-AD041 | |
|---|---|---|---|
| | | Input voltage | Input current |
| Number of inputs | | 4 | |
| Input signal range | | 0 to 5 V, 1 to 5 V, 0 to 10 V, −10 to 10 V | 0 to 20 mA 4 to 20 mA |
| Max. rated input | | ±15 V | ±30 mA |
| External input impedance | | 1 MΩ min. | Approx. 250 Ω |
| Resolution | | 6000 | |
| Overall accuracy | 25°C | ±0.3% of full scale | ±0.4% of full scale |
| | 0 to 55°C | ±0.6% of full scale | ±0.8% of full scale |
| Conversion time | | 2.0 ms/point | |
| A/D conversion data | | Binary data with resolution of 6,000<br>Full scale for −10 to 10 V: F448 to 0BB8 hex<br>Full scale for other ranges: 0000 to 1770 hex | |
| Averaging | | Supported. | |
| Open-circuit detection | | Supported. | |
| Insulation resistance | | 20 MΩ min. (at 250 VDC, between isolated circuits) | |
| Dielectric strength | | 500 VAC for 1 min (between isolated circuits) | |
| Isolation method | | Photocoupler isolation (between analog inputs and secondary internal circuits).<br>No isolation between input signals. | |

### ■ Analog Output Unit: CP1W-DA041/DA021

| Item \ Model | | CP1W-DA041/DA021 | |
|---|---|---|---|
| | | Input voltage | Input current |
| Number of outputs | | DA041: 4, DA021: 2 | |
| Output signal range | | 0 to 5 V, 0 to 10 V, or −10 to 10 V | 0 to 20 mA or 4 to 20 mA |
| Allowable external output load resistance | | 2 kΩ min. | 350 Ω max. |
| External output impedance | | 0.5 Ω max. | --- |
| Resolution | | 6000 | |
| Overall accuracy | 25°C | ±0.4% of full scale | |
| | 0 to 55°C | ±0.8% of full scale | |
| Conversion time | | 2.0 ms/point | |
| D/A conversion data | | Binary data with resolution of 6,000<br>Full scale for −10 to 10 V: F448 to 0BB8 hex<br>Full scale for other ranges: 0000 to 1770 hex | |
| Insulation resistance | | 20 MΩ min. (at 250 VDC between isolated circuits) | |
| Dielectric strength | | 500 VAC for 1 min between isolated circuits | |
| Isolation method | | Photocoupler isolation between analog inputs and secondary internal circuits.<br>No isolation between analog input signals. | |

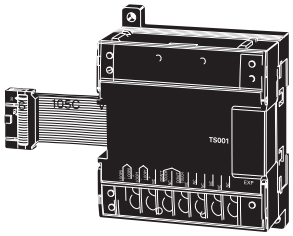
### ■ Analog I/O Unit: CP1W-MAD11

| Item \ Model | | | CP1W-MAD11 | |
|---|---|---|---|---|
| | | | Voltage I/O | Current I/O |
| Analog Input Section | Number o f inputs | | 2 inputs | |
| | Input signal range | | 0 to 5 V, 1 to 5V, 0 to 10 V, or −10 to 10V | 0 to 20 mA, 4 to 20 mA |
| | Max. rated input | | ±15 V | ±30 mA |
| | External input impedance | | 1 MΩ min. | 250 Ω |
| | Resolution | | 1/6000 (full scale) | |
| | Overall accuracy | 25°C | ±0.3% of full scale | ±0.4% of full scale |
| | | 0 to 55°C | ±0.6% of full scale | ±0.8% of full scale |
| | A/D conversion data | | Binary data (hexadecimal, 4 digits)<br>−10 to 10 V: F448 to 0BB8 hex<br>Full scale for other ranges: 0000 to 1770 hex | |
| | Averaging | | Supported (Set for each input using a DIP switch.) | |
| | Disconnection detection | | Supported | |
| Analog Output Section | Number of outputs | | 1 output | |
| | Output signal range | | 1 to 5 V, 0 to 10 V, −10 to 10 V | 0 to 20 mA, 4 to 20 mA |
| | External output max. current | | --- | |
| | Allowable external output load resistance | | 1 kΩ min. | 600 Ω max. |
| | External input impedance | | 0.5 Ω max. | --- |
| | Resolution | | 1/6000 (full scale) | |
| | Overall accuracy | 25°C | ±0.4% of full scale | |
| | | 0 to 55°C | ±0.8% of full scale | |
| | Data setting | | --- | |
| | D/A conversion data | | Binary data (hexadecimal, 4 digits)<br>−10 to 10 V: F448 to 0BB8 hex<br>Full scale for other ranges: 0000 to 1770 hex | |
| Conversion time* | | | 2 ms/point (6 ms for all points) | |
| Isolation method | | | Photocoupler isolation between analog I/O and internal circuits (There is no isolation between the analog I/O signals.) | |

* The conversion time is the total time for 2 analog inputs and 1 analog output.

## ■ 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 (4-digit hexadecimal) and stored in the input area of the CPU Unit.



### ● Specifications

| Item / Model | CP1W-TS001/002 | CP1W-TS101/102 |
|---|---|---|
| Number of inputs | 2 (TS001), 4 (TS002) | 2 (TS101), 4 (TS102) |
| Input types | K, J switchable (Note: Same for all inputs.) | Pt100, JPt100 switchable (Note: Same for all inputs.) |
| Indication accuracy | (The larger of the indicated value: ±0.5% and ±2°C (See note.)) ±1 digit max. | (The larger of the indicated value: ±0.5% and ±1°C) ±1 digit max. |
| Conversion time | 250 ms/2 points (TS001, TS101); 250 ms/4 points (TS002, TS102) | |
| Converted temperature data | Binary (4-digit hexadecimal) | |
| Isolation method | Photocoupler isolation between the temperature input signals. | |

**Note:** The indication accuracy when using a K-type thermocouple for temperature less than −100°C is ±4°C±1 digit max.

### ● Input Temperature Ranges for CP1W-TS001/002
**(The rotary switch can be used to make the following range and input type settings.)**

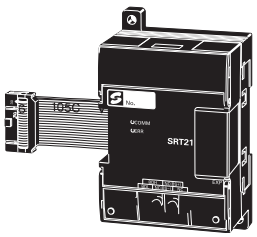
| Input type | Range (°C) | Range (°F) |
|---|---|---|
| K | −200 to 1300 | −300 to 2300 |
| | 0.0 to 500.0 | 0.0 to 900.0 |
| J | −100 to 850 | −100 to 1500 |
| | 0.0 to 400.0 | 0.0 to 750.0 |

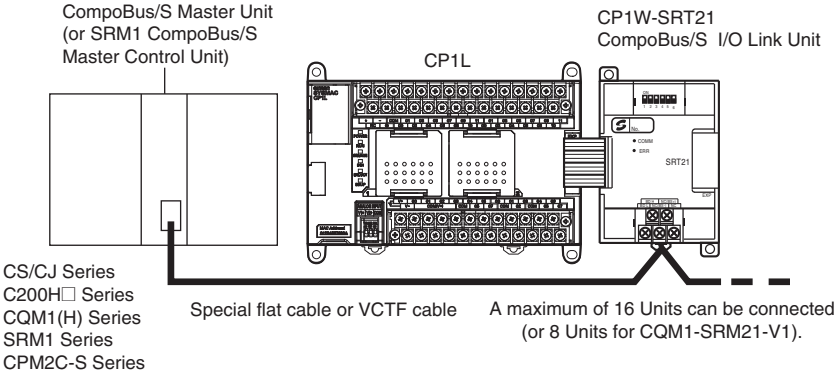
### ● Input Temperature Ranges for CP1W-TS101/102
**(The rotary switch can be used to make the following range and input type settings.)**

| Input type | Range (°C) | Range (°F) |
|---|---|---|
| Pt100 | −200.0 to 650.0 | −300 to 1200.0 |
| JPt100 | −200.0 to 650.0 | −300 to 1200.0 |

## ■ 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.) |

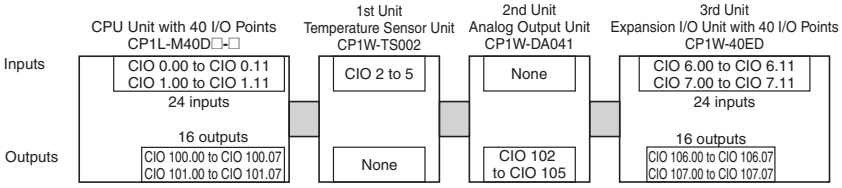
# I/O Bits and I/O Allocations

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**

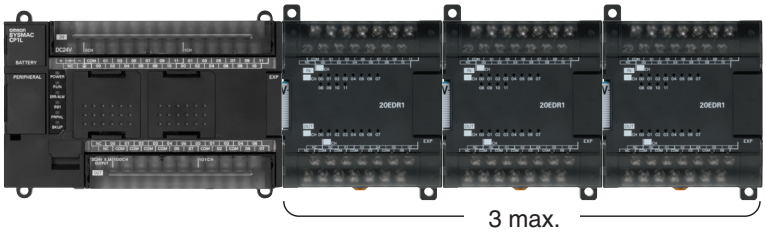
CPU Unit with 40 I/O Points + Temperature Sensor Unit + Analog Output Unit + Expansion I/O Unit with 40 I/O Points



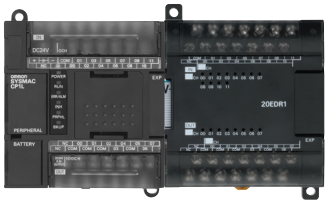

# Expansion Unit and Expansion I/O Units Specifications

**■ Maximum Number of CP1W/CPM1A Expansion Unit and Expansion I/O Units**

**● CP1L (EM, EL, M) CPU Units with 60, 40, or 30 Points**




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



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

# Current Consumption

The power consumption shown on page 6 is the maximum power consumption. To obtain the correct power consumption for the system configuration, calculate the power consumption for the external power supply from the current consumption given below for the CPU Unit, Expansion Units, and Expansion I/O Units.

### ● CPU Units

| Model | Current consumption | | External power supply |
|---|---|---|---|
| | 5 VDC | 24 VDC | 24 VDC * |
| **CP1L-EM40DR-D** | @@@ | @@@ | --- |
| **CP1L-EM40DT-D** | @@@ | @@@ | --- |
| **CP1L-EM40DT1-D** | @@@ | @@@ | --- |
| **CP1L-EM30DR-D** | @@@ | @@@ | --- |
| **CP1L-EM30DT-D** | @@@ | @@@ | --- |
| **CP1L-EM30DT1-D** | @@@ | @@@ | --- |
| **CP1L-EL20DR-D** | @@@ | @@@ | --- |
| **CP1L-EL20DT-D** | @@@ | @@@ | --- |
| **CP1L-EL20DT1-D** | @@@ | @@@ | --- |
| **CP1L-M60DR-A** | 0.25 A | 0.14 A | 0.3 A max. (0.5 A max.) |
| **CP1L-M60DT-A** | 0.39 A | 0.03 A | 0.3 A max. (0.6 A max.) |
| **CP1L-M60DR-D** | 0.25 A | 0.14 A | --- |
| **CP1L-M60DT-D** | 0.39 A | 0.03 A | --- |
| **CP1L-M60DT1-D** | 0.39 A | 0.03 A | --- |
| **CP1L-M40DR-A** | 0.22 A | 0.08 A | 0.3 A max. (0.6 A max.) |
| **CP1L-M40DT-A** | 0.31 A | 0.03 A | 0.3 A max. (0.6 A max.) |
| **CP1L-M40DR-D** | 0.22 A | 0.08 A | --- |
| **CP1L-M40DT-D** | 0.31 A | 0.03 A | --- |
| **CP1L-M40DT1-D** | 0.31 A | 0.03 A | --- |
| **CP1L-M30DR-A** | 0.21 A | 0.07 A | 0.3 A max. (0.6 A max.) |
| **CP1L-M30DT-A** | 0.28 A | 0.03 A | 0.3 A max. (0.6 A max.) |
| **CP1L-M30DR-D** | 0.21 A | 0.07 A | --- |
| **CP1L-M30DT-D** | 0.28A | 0.03 A | --- |
| **CP1L-M30DT1-D** | 0.28 A | 0.03 A | --- |
| **CP1L-L20DR-A** | 0.20 A | 0.05 A | 0.2 A max. |
| **CP1L-L20DT-A** | 0.24 A | 0.03 A | 0.2 A max. |
| **CP1L-L20DR-D** | 0.20A | 0.05 A | --- |
| **CP1L-L20DT-D** | 0.24 A | 0.03 A | --- |
| **CP1L-L20DT1-D** | 0.24 A | 0.03 A | --- |
| **CP1L-L14DR-A** | 0.18 A | 0.04 A | 0.2 A max. |
| **CP1L-L14DT-A** | 0.21 A | 0.03 A | 0.2 A max. |
| **CP1L-L14DR-D** | 0.18 A | 0.04 A | --- |
| **CP1L-L14DT-D** | 0.21 A | 0.03 A | --- |
| **CP1L-L14DT1-D** | 0.21 A | 0.03A | --- |
| **CP1L-L10DR-A** | 0.16 A | 0.03 A | 0.2 A max. |
| **CP1L-L10DT-A** | 0.18 A | 0.03 A | 0.2 A max. |
| **CP1L-L10DR-D** | 0.16 A | 0.03A | --- |
| **CP1L-L10DT-D** | 0.18 A | 0.03 A | --- |
| **CP1L-L10DT1-D** | 0.18 A | 0.03 A | --- |

**Note: 1.** The current consumption of the CP1W-ME05M Memory Cassette and the CP1W-CIF01/CIF11 Option Boards are included in the current consumption of the CPU Unit.

**2.** The current consumption of the following is not included with the current consumption of the CPU Unit: CP1W-CIF12.

| Unit | Model | Curent consumption | | EXternal power supply |
|---|---|---|---|---|
| | | 5 VDC | 24 VDC | |
| Interface Unit | **CP1W-CIF12** | 0.075A | --- | --- |

**3.** CPU Units with DC power do not provide an external power supply.

**4.** The current consumptions given in the following table must be added to the current consumption of the CPU Unit if an Expansion Unit or Expansion I/O Unit is connected.

**5.** The external power supply cannot be used if an Expansion Unit or Expansion I/O Unit is connected to a CPU Unit with 14 or 20 I/O points.

***** Values in parentheses are the maximum external power supply for a CPU Unit to which an Expansion I/O Unit is not connected. Refer to the *CP1L CPU Unit Operation Manual* (Cat. No. W462).

## ● Expansion Units and Expansion I/O Units

| Unit name | | Model | Current consumption | |
|---|---|---|---|---|
| | | | 5 VDC | 24 VDC |
| Expansion I/O Units | 40 I/O points<br>24 inputs<br>16 outputs | **CP1W-40EDR** | 0.080 A | 0.090 A |
| | | **CP1W-40EDT** | 0.160 A | --- |
| | | **CP1W-40EDT1** | | |
| | 32 outputs* | **CP1W-32ER** | 0.049 A | 0.131 A |
| | | **CP1W-32ET** | 0.113 A | --- |
| | | **CP1W-32ET1** | | |
| | 20 I/O points<br>12 inputs<br>8 outputs | **CP1W-20EDR1** | 0.103 A | 0.044 A |
| | | **CP1W-20EDT** | 0.130 A | --- |
| | | **CP1W-20EDT1** | | |
| | 16 outputs | **CP1W-16ER** | 0.042 A | 0.090 A |
| | | **CP1W-16ET** | 0.076 A | --- |
| | | **CP1W-16ET1** | | |
| | 8 inputs | **CP1W-8ED** | 0.018 A | --- |
| | 8 outputs | **CP1W-8ER** | 0.026 A | 0.044 A |
| | | **CP1W-8ET** | 0.075 A | --- |
| | | **CP1W-8ET1** | | |
| Analog Input Unit | 4 inputs | **CP1W-AD041** | 0.100 A | 0.090 A |
| Analog Output Unit | 4 outputs | **CP1W-DA041** | 0.080 A | 0.124 A |
| | 2 outputs | **CP1W-DA021** | 0.095 A | 0.040 A |
| Analog I/O Unit | 2 inputs and 1 output | **CP1W-MAD11** | 0.083 A | 0.110 A |
| Temperature Sensor Units | K or J thermocouple inputs | **CP1W-TS001** | 0.040 A | 0.059 A |
| | | **CP1W-TS002** | | |
| | Pt or JPt platinum resistance thermometer inputs | **CP1W-TS101** | 0.054 A | 0.073 A |
| | | **CP1W-TS102** | | |
| CompoBus/S I/O Link Unit | 8 inputs and 8 outputs | **CP1W-SRT21** | 0.029 A | --- |

* CP1W-32ER/32ET/32ET1's maximum number of simultaneously ON points is 24 (75%).

## ● Others : Equipment that Users internal power supply of PLC

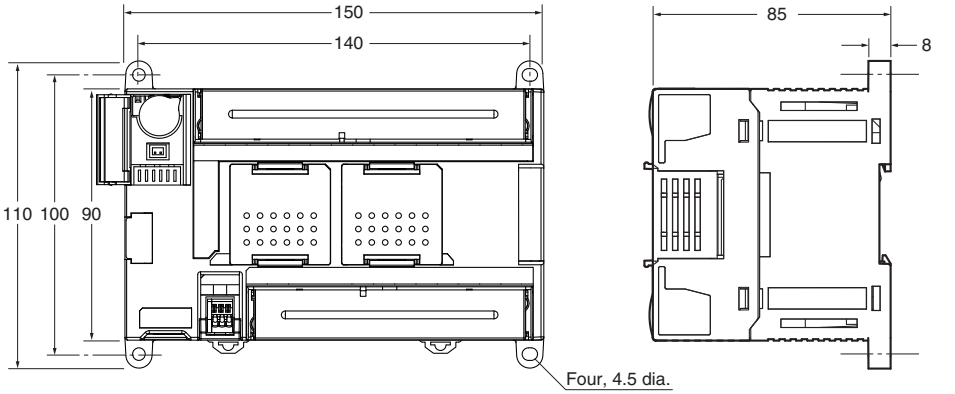
| Unit name | | Model | Current consumption | |
|---|---|---|---|---|
| | | | 5 VDC | 24 VDC |
| Link Adapter | | **CJ1W-CIF11** | 0.04A | --- |
| | | **NT-AL001** | 0.15A | --- |
| Programable Terminal NV3W | Backlight (Green/Orange/red) | **NV3W-MG20L** | 0.2A | --- |
| | Backlight (White/Pink/Red) | **NV3W-MR20L** | 0.2A | --- |

# Dimensions

(Unit: mm)

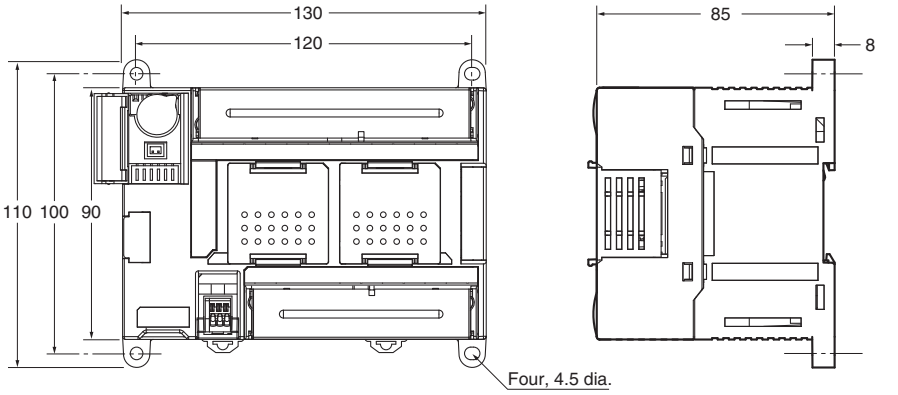
## ■ CPU Units

### CP1L-EM CPU Units with 40 Points



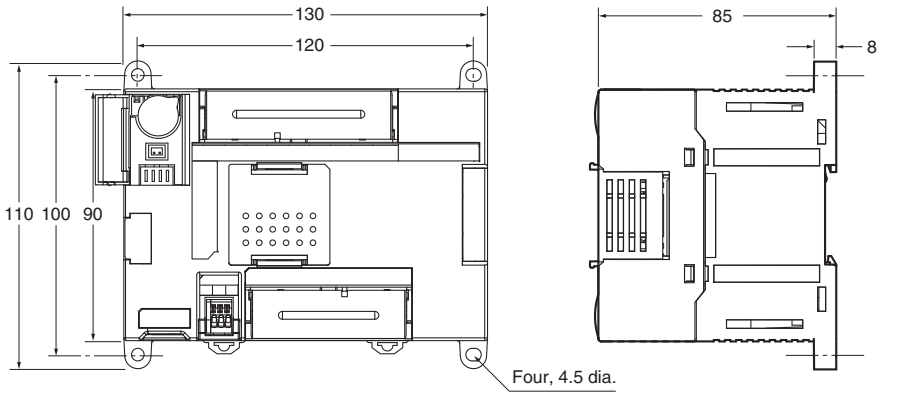

Weight:
675 g max.

### CP1L-EM CPU Units with 30 Points



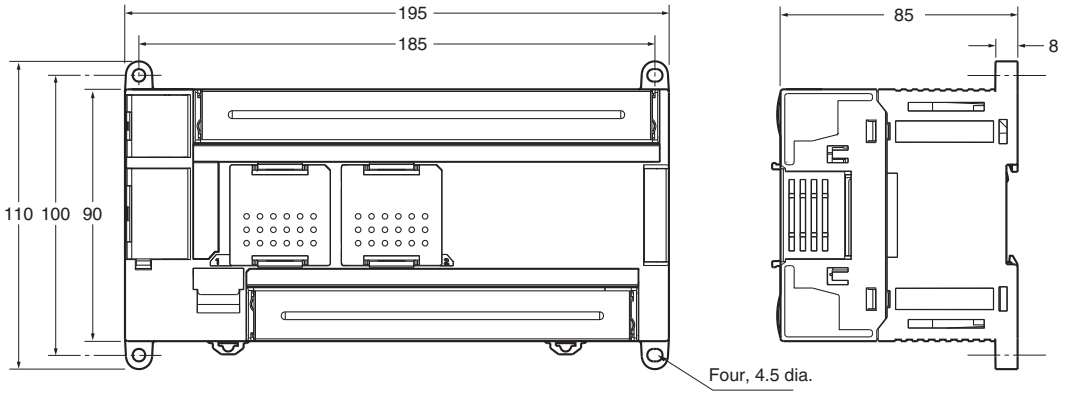

Weight:
610 g max.

### CP1L-EL CPU Units with 20 Points



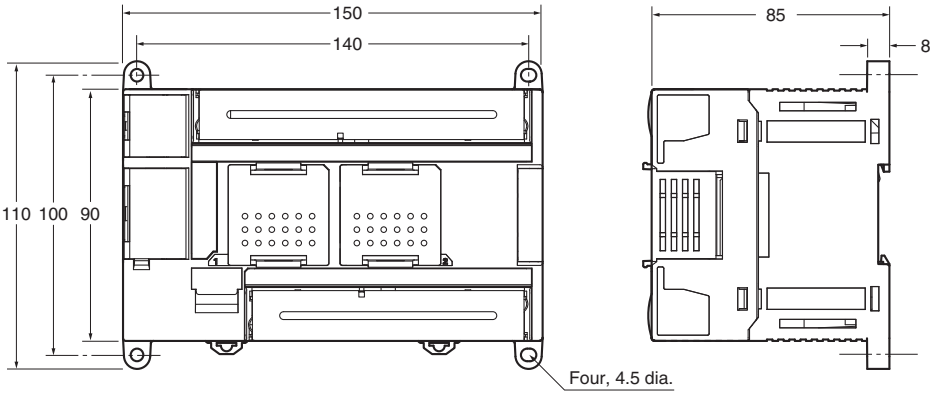

Weight:
610 g max.

### CP1L CPU Units with 60 I/O Points



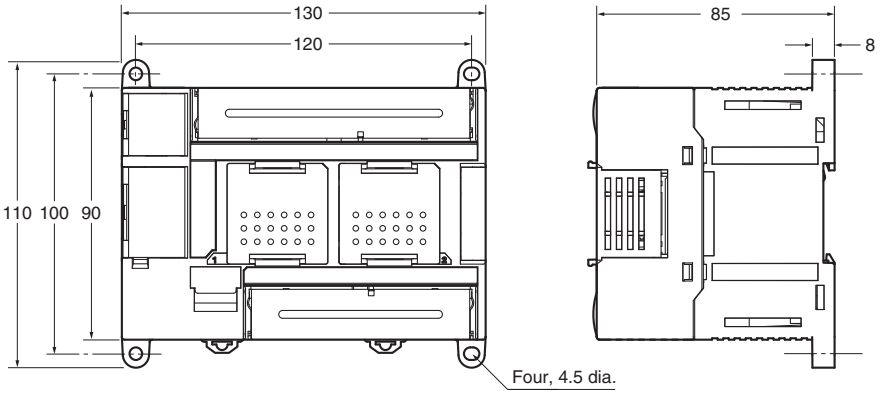

Weight:
820 g max.

### CP1L CPU Units with 40 I/O Points



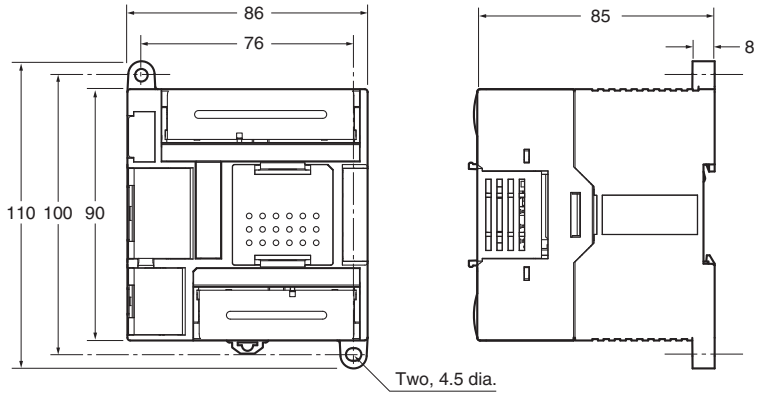

Weight:
675 g max.

### CP1L CPU Units with 30 I/O Points



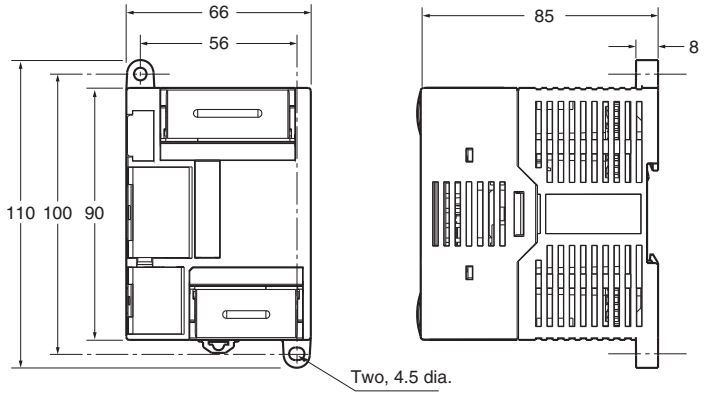

Weight:
610 g max.

### CP1L CPU Units with 14 or 20 I/O Points




Weight:
380 g max.

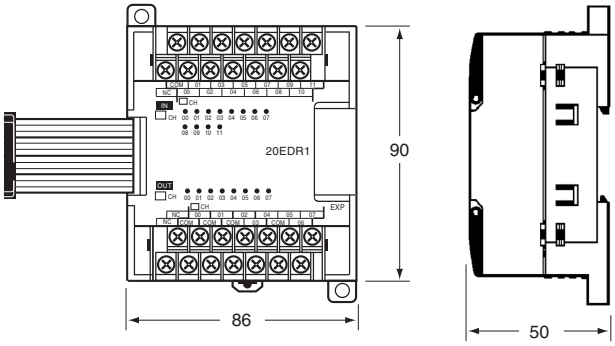
### CP1L CPU Units with 10 I/O Points



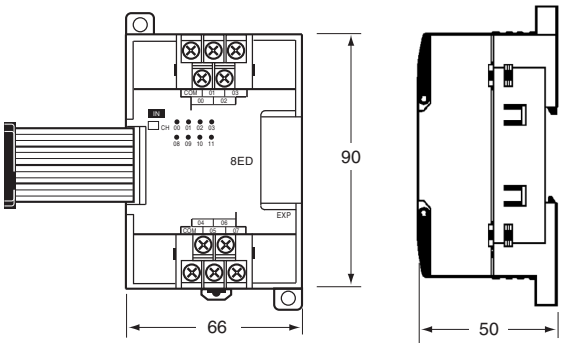

Weight:
300 g max.

## ■ Expansion Units and Expansion I/O Units

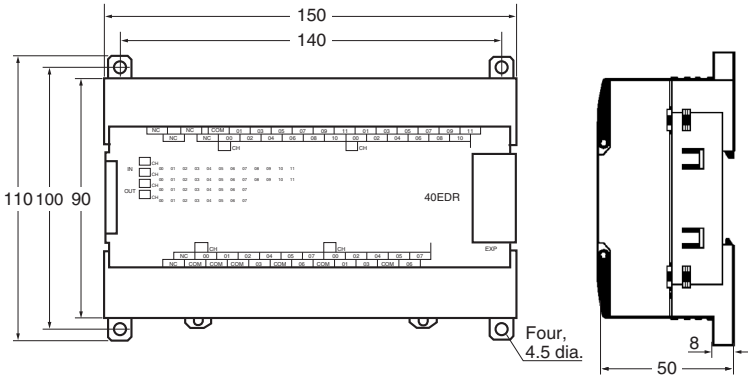
**CP1W-20ED□**
**CP1W-16E□□**
**CP1W-AD041/CP1W-DA041/CP1W-DA021**
**CP1W-MAD11/CP1W-TS□□□**




**CP1W-8E□□**
**CP1W-SRT21**

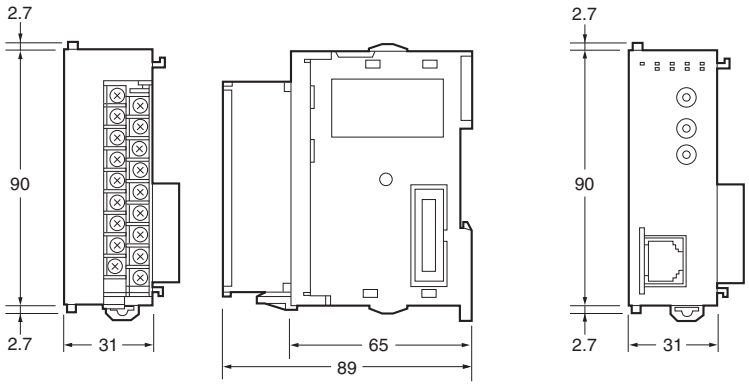



**CP1W-40ED□**
**CP1W-32E□□**



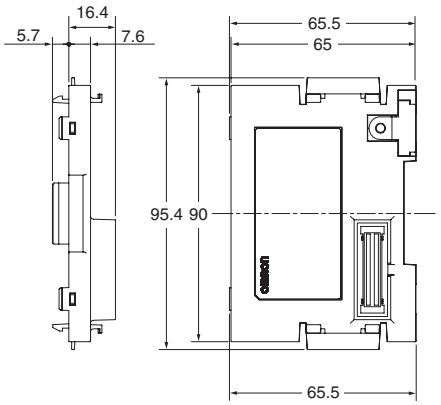

| Unit name | Model number | Weight |
|---|---|---|
| Expansion I/O Units | CP1W-40ER | 380 g |
| | CP1W-40EDT/-40EDT1 | 320 g |
| | CP1W-32ER | 465 g |
| | CP1W-32ET/-32ET1 | 325 g |
| | CP1W-20EDR1/-20EDT/-20EDT1 | 300 g |
| | CP1W-16ER | 280 g |
| | CP1W-16ET/-16ET1 | 225 g |
| | CP1W-8ED | 200 g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

## ■ CJ-series Special I/O Units and CPU Bus Units




## ■ CJ Unit Adaptor

**CP1W-EXT01**



# Related Manuals

| Cat. No. | Model numbers | Manual name | Description |
|---|---|---|---|
| W462 | CP1L-L10D□-□<br>CP1L-L14D□-□<br>CP1L-L20D□-□<br>CP1L-M30D□-□<br>CP1L-M40D□-□<br>CP1L-M60D□-□ | CP Series<br>CP1L CPU Unit<br>Operation Manual | Provides the following information on the CP Series:<br>• Overview, design, installation, maintenance, and other basic specifications<br>• Features<br>• System configuration<br>• Mounting and wiring<br>• I/O memory allocation<br>• Troubleshooting<br>Use this manual together with the *CP1H Programmable Controllers Programming Manual* (W451). |
| W451 | CP1H-X40D□-□<br>CP1H-XA40D□-□<br>CP1H-Y20DT-D<br>CP1L-L10D□-□<br>CP1L-L14D□-□<br>CP1L-L20D□-□<br>CP1L-M30D□-□<br>CP1L-M40D□-□<br>CP1L-M60D□-□ | CP Series<br>CP1H/CP1L CPU Unit Programming Manual | Provides the following information on programming the CP Series:<br>• Programming methods<br>• Tasks<br>• Programming instructions |
| W461 | CP1L-L10D□-□<br>CP1L-L14D□-□<br>CP1L-L20D□-□<br>CP1L-M30D□-□<br>CP1L-M40D□-□<br>CP1L-M60D□-□ | CP Series<br>CP1L CPU Unit Introduction Manual | Describes basic setup methods of CP1L PLCs:<br>• Basic configuration and component names<br>• Mounting and wiring<br>• Programming, data transfer, and debugging using the CX-Programmer<br>• Application program examples |
| W342 | SYSMAC CS/CJ/CP/NSJ Series<br>CS1G/H-CPU□□-EV1, CS1G/H-CPU□□H, 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 Communications Commands Reference Manual | CS1G/CS1H/CS1D/CS1W/CJ2H/CJ2M/ CJ1G/CJ1H/CJ1M/CJ1W/CP1H/CP1L/ CP1E/NSJ SYSMAC 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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