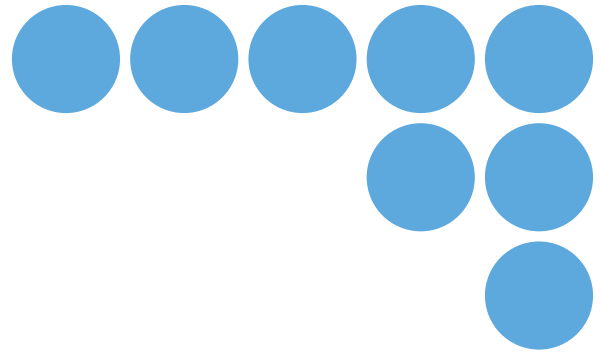


Programmable Controllers

## CP1H/CP1L



CP1H



CP1L-M



CP1L-M

Ethernet Option Board



CP1L-L



CP1L-L

**Wide Lineup of CPU Units with  
USB Port on All Models.  
Multi-functionality Condensed  
into One-package PLCs**

# All in one Package

# All-in-one Package PLCs with Condensed Multi-functionality. A Wide Variety of Built-in Functions Expand Application Capabilities and Shorten the Design Time Required for the Growing Number and Increasing Complexity of Ladder Programs

Programmable Controllers

## SYSMAC CP1H

### The Ultimate High-performance Package-type PLC



Three types of CPU Unit are available to meet applications requiring advanced functionality:

- The CP1H-X with pulse outputs for 4 axes.
- The CP1H-Y with 1-MHz pulse I/O.
- The CP1H-XA with built-in analog I/O.

Programmable Controllers

## SYSMAC CP1L

### A Standard Package-type PLC

Complete with a standard-feature USB port, CP1L CPU Units are available for applications with as few as 10 I/O points. Whether you need simple sequence control or pulse I/O and a serial port, the CP1L PLCs give you an economical choice from among 10-, 14-, 20-, 30-, 40-, and 60-point CPU Units.



I/O Capacity,  
Program Capacity,  
Speed

#### Building-block PLCs

SYSMAC **CJ** Series

SYSMAC **CS** Series

No Backplane



Backplane Construction

#### Package PLCs

SYSMAC **CP** Series

CP1H

CP1L

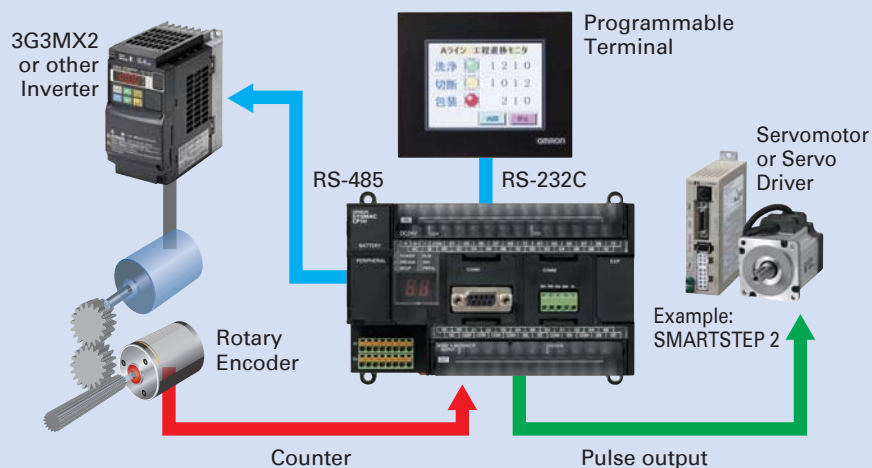


From small-scale to large-scale control, programs can be created incorporating function blocks (FB) and structured text (ST) using the same instructions and with the same easy operation.

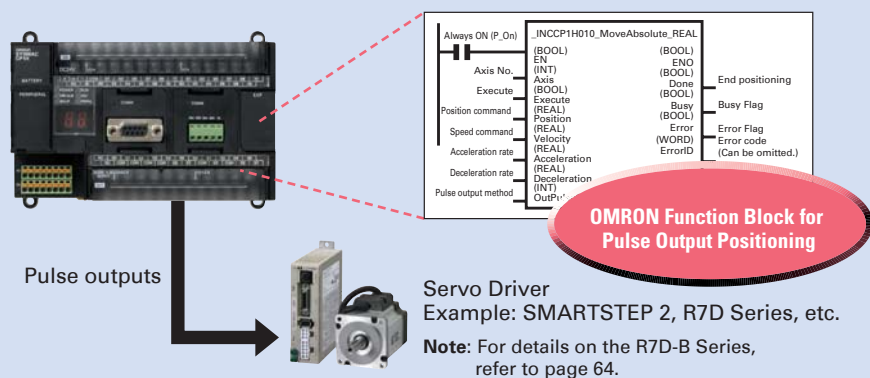
Small-scale Control

Large-scale System Control

## Complete Pulse and Serial Functions for Servo and Inverter Applications and Applications Using Programmable Terminals



For positioning or communications, simply enter the set values for the instructions. Even complicated functions can be easily programmed using the OMRON Function Block (FB) Library.



## Easy Maintenance and Startup Adjustments with LCD Displays and Settings

Attach an LCD Option Board to the CPU Unit to easily monitor or change data values in the PLC to visually check error status.

### CP1W-DAM01 LCD Option Board

The Board can be used only in the option board slot 1.



CP1H/CP1L  
Cannot be used for the CP1L-L10.



## USB Port Standard on all Models

A general-purpose USB cable keeps costs low, including the cable cost.

FA Integrated Tool Package

CX-One



|                                                            |    |
|------------------------------------------------------------|----|
| CP-series Lineup.....                                      | 4  |
| Expandability Applications.....                            | 6  |
| CPU Units.....                                             | 8  |
| Expansion Units.....                                       | 10 |
| Functions.....                                             | 12 |
| • Pulse Outputs.....                                       | 12 |
| • High-speed Counters.....                                 | 14 |
| • Inverter Positioning.....                                | 15 |
| • Serial Communications.....                               | 16 |
| • Ethernet Communications...                               | 18 |
| • Analog I/O.....                                          | 19 |
| • USB Peripheral Port.....                                 | 20 |
| • LCD Displays and Settings...                             | 21 |
| Support Software.....                                      | 22 |
| CPU Unit Functions.....                                    | 24 |
| Connecting Expansion Unit and Expansion I/O Units.....     | 26 |
| CPU Unit Specifications.....                               | 28 |
| Option Unit Specifications...                              | 43 |
| Expansion I/O Unit Specifications.....                     | 44 |
| Expansion Unit Specifications.....                         | 46 |
| Dimensions.....                                            | 48 |
| Instructions.....                                          | 51 |
| Ordering Information.....                                  | 55 |
| OMRON Function Block Library.....                          | 62 |
| SMARTSTEP 2 AC Servo Drivers with Pulse String Inputs..... | 64 |



# A Wide Range of CPU Units Allows You to Select

Program capacity  
Processing speed

A program capacity of 20K steps and 0.1  $\mu$ s high-speed processing provide multi-axis, high-speed positioning control or analog control. CJ-series Special I/O Units and CPU Bus Units can also be used.

## CP1H Series

A Choice of Three Types of CP1H CPU Unit Lets You Select the Functions You Need.

- Program capacity  
20K steps
- Processing speed  
0.1  $\mu$ s  
(basic instructions)

|                                | High-speed Positioning<br>CP1H-Y CPU Units                                                                                                     | Built-in Analog I/O<br>CP1H-XA CPU Units                                           | Standard Type<br>CP1H-X CPU Units                                                   |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                |                                                               |  |  |
| Pulse Outputs for 4 Axes       | Two axes at 1 MHz and two axes at 100 kHz                                                                                                      | Four axes at 100 kHz                                                               |                                                                                     |
| High-speed Counters for 4 Axes | Two axes at 1 MHz for single-phase (500 kHz for differential phases) and two axes at 100 kHz for single-phase (50 kHz for differential phases) | Four axes at 100 kHz for single-phase (50 kHz for differential phases)             |                                                                                     |
| Built-in Analog I/O            |                                                                                                                                                | Four analog inputs and two analog outputs                                          |                                                                                     |
| Serial Communications          | RS-232C Option Board                                                                                                                           | RS-422A/485 Option Board                                                           | Up to two Option Boards can be mounted.                                             |
| Ethernet Communications        | Ethernet Option Board                                                                                                                          | Two Ethernet Option Boards can be mounted.                                         |                                                                                     |
| LCD Display Settings           | LCD Option Board                                                                                                                               | One LCD Option Board can be mounted in option board slot 1.                        |                                                                                     |

- Program capacity  
10K steps
- Processing speed  
0.55  $\mu$ s  
(basic instructions)

Basic package PLCs with serious functions from simple sequence control to 2-axis positioning control.

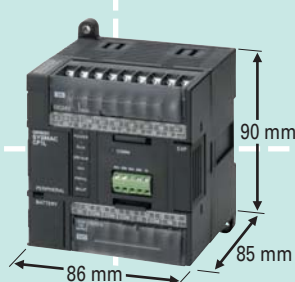
## CP1L Series

- Program capacity  
5K steps
- Processing speed  
0.55  $\mu$ s  
(basic instructions)



CP1L-L10D□-□

10 points



CP1L-L14D□-□

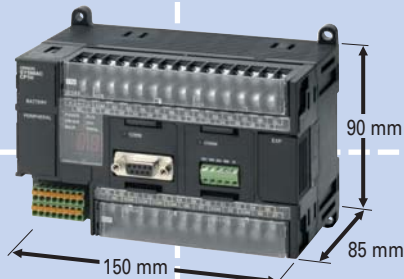
14 points



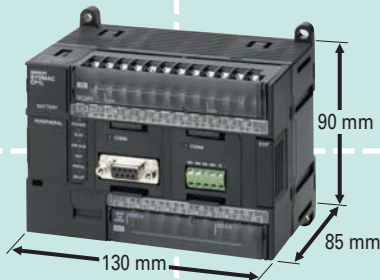
CP1L-L20D□-□

20 points

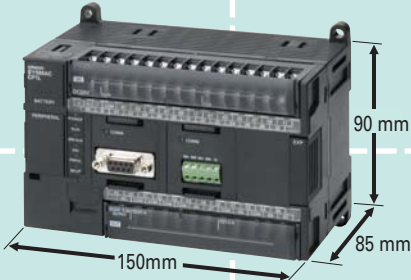
# the Ideal Model.



CP1H-40D



CP1L-M30D



CP1L-M40D



CP1L-M60D

- Pulse Outputs**  
Four-axis control is a standard feature.
- Counters**  
Four-axis differential-phase control is a standard feature.
- USB Peripheral Port**  
Another standard feature.
- Serial Communications**  
Two ports. Select Option Boards for either RS-232C or RS-485 communications.
- Ethernet Communications**  
Enabled by using an Option Board.
- LCD Displays and Settings**  
Enabled using Option Board.
- Built-in Analog I/O**  
XA CPU Units provide 4 input words and 2 output words.

- Pulse Outputs**  
Two-axis control at 100 kHz is a standard feature.
- Counters with 2-axis differential-phase control**  
are standard features.  
Single-phase: 4 axes at 100 kHz
- USB Peripheral Port**  
Another standard feature.
- Serial Communications**  
Two ports (See note.). Select Option Boards for either RS-232C or RS-485 communications.
- Ethernet Communications**  
Enabled by using an Option Board.
- LCD Displays and Settings**  
Enabled using Option Board. (See note.)

**Note:** CP1L-L CPU Units with 14 and 20 points support only one port. Cannot be used for the CP1L-L10.

**Note:** Cannot be used for the CP1L-L10.

**Note:** Cannot be used for the CP1L-L10.

30 points

40 points

60 points

I/O capacity

# Expansion Units Provide for a Wider Range

## Programmable Controllers SYSMAC CP1H

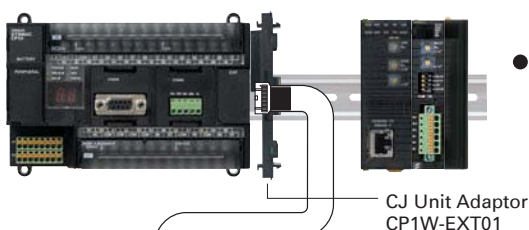
### ● Using Only CP1W Units with the CP1H



- Up to 7 CP1W/CPM1A Expansion Units and Expansion I/O Units can be connected.

**Note:** Some Expansion Units and Expansion I/O Units have certain restrictions on use.  
(For details, refer to page 24.)

### ● Using CJ-series Special I/O Units, CJ-series CPU Bus Units, and CP1W Units with the CP1H



- Up to two CJ-series CPU Bus Units or Special I/O Units can be connected.

- Up to 7 CP1W/CPM1A Expansion Units and Expansion I/O Units can be connected.

CP1W/CPM1A Expansion Units and Expansion I/O Units and CJ Units can be used simultaneously.  
CP1W-CN811 I/O Connecting Cable is required.

## ■ CP1H Application Examples

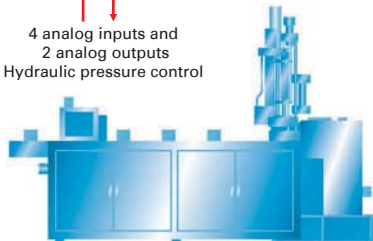
### Built-in Analog I/O: 4 Analog Inputs and 2 Analog Outputs

#### Forming Machine

CP1H-XA CPU Unit    Temperature Sensor Unit

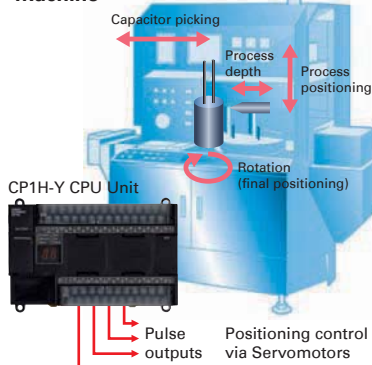


4 analog inputs and  
2 analog outputs  
Hydraulic pressure control



### Four-axis, 1-MHz High-speed Pulse Outputs

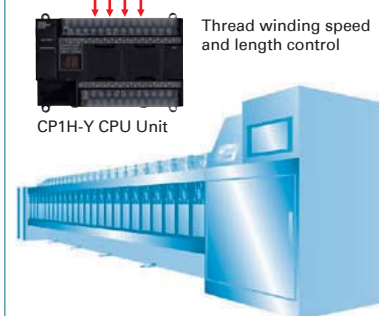
#### Electronic Parts Assembly Machine



### 4-axis, 1-MHz High-speed Counters

#### Spinning Machine

High-speed counters  
Thread winding speed  
and length control



Programmable Controllers

# SYSMAC CP1L

●CP1L-M30D□-□/CP1L-M40D□-□/CP1L-M60D□-□



●Up to three CP1W/CPM1A Expansion Units and Expansion I/O Units can be connected.

●CP1L-L14D□-□/CP1L-L20D□-□

Note: Cannot be used for the CP1L-L10.



●One CP1W/CPM1A Expansion Unit or Expansion I/O Unit can be connected.

## ■CP1H/CP1L Communications Interface Options

Two Optional Serial Ports

Two Optional Ethernet Ports



CP1H/CP1L

Standard Feature:  
USB peripheral port

### Option Boards



RS-232C  
Interface  
CP1W-CIF01



RS-422A/485  
Interface  
CP1W-CIF11



RS-422A/485  
(Isolated-type) Interface  
CP1W-CIF12



Ethernet  
Interface  
CP1W-CIF41

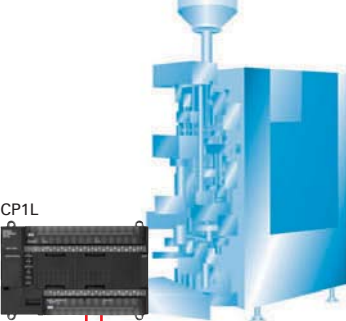
Two types of communications are available.  
Either two RS-232C ports , two RS-422A/485  
ports or two Ethernet ports can be used.

Note: 1. Only one board is supported by CP1L-L CPU Units (14 or 20 points).  
Cannot be used for the CP1L-L10.  
2. When using CP1W-CIF41 Ver.1.0, one Ethernet port can be added.

## ■CP1L Application Examples

### Two-axis Pulse Outputs

#### Packing Machine



Sheet feeding  
control via  
Servomotors

### Sequence Control

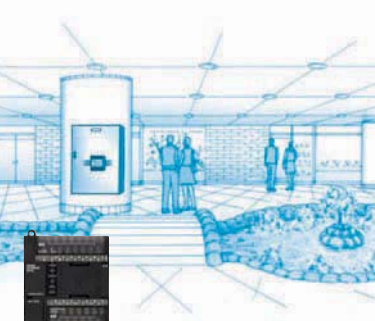
#### Air Cleaner Control



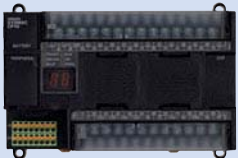
Cleaner fan motor control  
(Inverter)

### Sequence Control with Clock Function

#### Shopping Mall Fountain Control



# Maximize Efficiency by Selecting the Optimu

|                                                                                                                                                                       | CP1H                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                                                                                                       | Y CPU Units                                                                                                                                                                                                                                          | XA CPU Units                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | X CPU Units                                                                                                                                                                                                                                                                                                                                                              | M Type 60 Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|                                                                                                                                                                       | <div></div> <div><b>CP1H-Y20DT-D</b><br/>DC power supply, 12 DC inputs, 8 transistor (sinking) outputs<br/>Two line-driver inputs<br/>Two line-driver outputs</div> | <div></div> <div><b>CP1H-XA40DR-A</b><br/>AC power supply, 24 DC inputs, 16 relay outputs, 4 analog inputs, 2 analog outputs<br/><b>CP1H-XA40DT-D</b><br/>DC power supply, 24 DC inputs, 16 transistor (sinking) outputs, 4 analog inputs, 2 analog outputs<br/><b>CP1H-XA40DT1-D</b><br/>DC power supply, 24 DC inputs, 16 transistor (sourcing) outputs, 4 analog inputs, 2 analog outputs</div> | <div></div> <div><b>CP1H-X40DR-A</b><br/>AC power supply, 24 DC inputs, 16 relay outputs<br/><b>CP1H-X40DT-D</b><br/>DC power supply, 24 DC inputs, 16 transistor (sinking) outputs<br/><b>CP1H-X40DT1-D</b><br/>DC power supply, 24 DC inputs, 16 transistor (sourcing) outputs</div> | <div></div> <div><b>CP1L-M60DR-A</b><br/>AC power supply, 36 DC inputs, 24 relay outputs<br/><b>CP1L-M60DT-A</b><br/>AC power supply, 36 DC inputs, 24 transistor (sinking) outputs<br/><b>CP1L-M60DR-D</b><br/>DC power supply, 36 DC inputs, 24 relay outputs<br/><b>CP1L-M60DT-D</b><br/>DC power supply, 36 DC inputs, 24 transistor (sinking) outputs<br/><b>CP1L-M60DT1-D</b><br/>DC power supply, 36 DC inputs, 24 transistor (sourcing) outputs</div> |  |
| <div></div> <div><b>Pulse outputs</b><br/>(only for transistor outputs)</div>      | 1 MHz for two axes (line driver outputs), 100 kHz for two axes (four axes total)                                                                                                                                                                     | 100 KHz for four axes                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>Counters</b></div>                                             | 1 MHz (single-phase), 500 kHz (differential phases) for two axes (line driver outputs), 100 kHz (single-phase), 50 kHz (differential phases) for two axes (four axes total)                                                                          | 100 kHz (single-phase), 50 kHz (differential phases)                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>Serial communications</b></div>                                | Two serial ports can be added as options (either RS-232C or RS-422A/485 Option Boards).                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>Ethernet communications</b></div>                              | Two Ethernet ports can be added as an option. When using CP1W-CIF41 Ver.1.0, one Ethernet port can be added.                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>USB peripheral port</b></div>                                  | Yes                                                                                                                                                                                                                                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                                      | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <div></div> <div><b>Built-in analog I/O</b></div>                                  | —                                                                                                                                                                                                                                                    | 4 analog inputs and 2 analog outputs (resolution: 6,000 or 12,000)                                                                                                                                                                                                                                                                                                                                                                                                                  | —                                                                                                                                                                                                                                                                                                                                                                        | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <div></div> <div><b>Memory Cassette</b></div>                                      | Yes                                                                                                                                                                                                                                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                                      | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <div></div> <div><b>LCD display settings</b></div>                                 | An LCD Option Board can be added as an option to option board slot 1.                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>Function blocks</b><br/>(ladder diagrams or ST language)</div> | Yes                                                                                                                                                                                                                                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                                      | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <div></div> <div><b>Inverter positioning</b></div>                                 | —                                                                                                                                                                                                                                                    | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | —                                                                                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <div></div> <div><b>7-segment display</b></div>                                    | Yes                                                                                                                                                                                                                                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                                      | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <div></div> <div><b>Program capacity</b></div>                                     | 20K steps                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>Data memory capacity</b></div>                                 | 32K words                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <div></div> <div><b>High-speed processing</b></div>                                | 0.1 μs/LD instruction, 0.3 μs/MOV instruction                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |



# m CPU Unit for Your Applications.

| CP1L                                                                                                    |                                                                                         |                                                                                        |                                                                                       |                                                                                       |     |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|
| M Type 40 Points                                                                                        | M Type 30 Points                                                                        | L Type 20 Points                                                                       | L Type 14 Points                                                                      | L Type 10 Points                                                                      |     |
|                        |        |       |    |    |     |
| <b>CP1L-M40DR-A</b><br>AC power supply, 24 DC inputs, 16 relay outputs                                  | <b>CP1L-M30DR-A</b><br>DC power supply, 18 DC inputs, 12 relay outputs                  | <b>CP1L-L20DR-A</b><br>AC power supply, 12 DC inputs, 8 relay outputs                  | <b>CP1L-L14DR-A</b><br>AC power supply, 8 DC inputs, 6 relay outputs                  | <b>CP1L-L10DR-A</b><br>AC power supply, 6 DC inputs, 4 relay outputs                  |     |
| <b>CP1L-M40DT-A</b><br>AC power supply, 24 DC inputs, 16 transistor (sinking) outputs                   | <b>CP1L-M30DT-A</b><br>AC power supply, 18 DC inputs, 12 transistor (sinking) outputs   | <b>CP1L-L20DT-A</b><br>AC power supply, 12 DC inputs, 8 transistor (sinking) outputs   | <b>CP1L-L14DT-A</b><br>AC power supply, 8 DC inputs, 6 transistor (sinking) outputs   | <b>CP1L-L10DT-A</b><br>AC power supply, 6 DC inputs, 4 transistor (sinking) outputs   |     |
| <b>CP1L-M40DR-D</b><br>DC power supply, 24 DC inputs, 16 relay outputs                                  | <b>CP1L-M30DR-D</b><br>DC power supply, 18 DC inputs, 12 relay outputs                  | <b>CP1L-L20DR-D</b><br>DC power supply, 12 DC inputs, 8 relay outputs                  | <b>CP1L-L14DR-D</b><br>DC power supply, 8 DC inputs, 6 relay outputs                  | <b>CP1L-L10DR-D</b><br>DC power supply, 6 DC inputs, 4 relay outputs                  |     |
| <b>CP1L-M40DT-D</b><br>DC power supply, 24 DC inputs, 16 transistor (sinking) outputs                   | <b>CP1L-M30DT-D</b><br>DC power supply, 18 DC inputs, 12 transistor (sinking) outputs   | <b>CP1L-L20DT-D</b><br>DC power supply, 12 DC inputs, 8 transistor (sinking) outputs   | <b>CP1L-L14DT-D</b><br>DC power supply, 8 DC inputs, 6 transistor (sinking) outputs   | <b>CP1L-L10DT-D</b><br>DC power supply, 6 DC inputs, 4 transistor (sinking) outputs   |     |
| <b>CP1L-M40DT1-D</b><br>DC power supply, 24 DC inputs, 16 transistor (sourcing) outputs                 | <b>CP1L-M30DT1-D</b><br>DC power supply, 18 DC inputs, 12 transistor (sourcing) outputs | <b>CP1L-L20DT1-D</b><br>DC power supply, 12 DC inputs, 8 transistor (sourcing) outputs | <b>CP1L-L14DT1-D</b><br>DC power supply, 8 DC inputs, 6 transistor (sourcing) outputs | <b>CP1L-L10DT1-D</b><br>DC power supply, 6 DC inputs, 4 transistor (sourcing) outputs |     |
| 100 kHz for two axes                                                                                    |                                                                                         |                                                                                        |                                                                                       |                                                                                       |     |
| 100 kHz (single-phase) for four axes, or 50 kHz (differential phases) for two axes                      |                                                                                         |                                                                                        |                                                                                       |                                                                                       |     |
| Two optional serial ports can be added (either RS-232C or RS-422A/485 Option Boards).                   |                                                                                         | One optional serial port can be added (either an RS-232C or RS-422A/485 Option Board). |                                                                                       | —                                                                                     |     |
| Two Ethernet ports can be added as an option. When using CP1W-CIF41 Ver.1.0, one Ethernet can be added. |                                                                                         | One Ethernet port can be added as an option.                                           |                                                                                       | —                                                                                     |     |
|                                                                                                         | Yes                                                                                     | Yes                                                                                    | Yes                                                                                   | Yes                                                                                   | Yes |
|                                                                                                         | —                                                                                       | —                                                                                      | —                                                                                     | —                                                                                     | —   |
|                                                                                                         | Yes                                                                                     | Yes                                                                                    | Yes                                                                                   | Yes                                                                                   | Yes |
| An LCD Option Board can be added as an option to option board slot 1.                                   |                                                                                         | An LCD Option Board can be added as an option to option board slot 1.                  |                                                                                       | —                                                                                     |     |
|                                                                                                         | Yes                                                                                     | Yes                                                                                    | Yes                                                                                   | Yes                                                                                   | Yes |
|                                                                                                         | Yes                                                                                     | Yes                                                                                    | Yes                                                                                   | Yes                                                                                   | Yes |
|                                                                                                         | —                                                                                       | —                                                                                      | —                                                                                     | —                                                                                     | —   |
| 10K steps                                                                                               |                                                                                         | 5K steps                                                                               |                                                                                       |                                                                                       |     |
| 32K words                                                                                               |                                                                                         | 10K words                                                                              |                                                                                       |                                                                                       |     |
| 0.55 μs/LD instruction, 1.84 μs/MOV instruction                                                         |                                                                                         |                                                                                        |                                                                                       |                                                                                       |     |

## Option Boards

### ● Options



■ RS-232C  
Option Board  
CP1W-CIF01



■ RS-422A/485  
Option Board  
CP1W-CIF11



■ RS-422A/485  
(Isolated-type)  
Option Board  
CP1W-CIF12

■ Ethernet Option  
Board  
CP1W-CIF41



■ LCD Option  
Board  
CP1W-DAM01



■ Memory Cassette  
CP1W-ME05M

## CP1H and CP1L

### ● Expansion I/O Units



**CP1W-8ED**

- 8 DC inputs



**CP1W-16ER**

- 16 relay outputs



**CP1W-20EDR1**

- 12 DC inputs
- 8 relay outputs

**CP1W-8ER**

- 8 relay outputs

**CP1W-16ET**

- 16 transistor outputs  
(sinking)

**CP1W-20EDT**

- 12 DC inputs
- 8 transistor outputs  
(sinking)

**CP1W-8ET**

- 8 transistor outputs  
(sinking)

**CP1W-16ET1**

- 16 transistor outputs  
(sourcing)

**CP1W-20EDT1**

- 12 DC inputs
- 8 transistor outputs  
(sourcing)

**CP1W-8ET1**

- 8 Transistor outputs  
(sourcing)



**CP1W-32ER**

- 32 relay outputs

**CP1W-32ET**

- 32 transistor outputs (sinking)

**CP1W-32ET1**

- 32 transistor outputs (sourcing)



**CP1W-40EDR**

- 24 DC inputs
- 16 relay outputs

**CP1W-40EDT**

- 24 DC inputs
- 16 transistor outputs (sinking)

**CP1W-40EDT1**

- 24 DC inputs
- 16 transistor outputs (sourcing)

### ● Analog Units



■ Analog Input Unit  
**CP1W-AD041**

- Analog inputs: 4 (resolution: 6,000)



■ Analog Output Unit  
**CP1W-DA041**

- Analog outputs: 4 (resolution: 6,000)

**CP1W-DA021** *NEW*

- Analog outputs: 2 (resolution: 6,000)



■ Analog I/O Unit  
**CP1W-MAD11**

- Analog inputs: 2 (resolution: 6,000)
- Analog outputs: 1 (resolution: 6,000)

### ● Temperature Sensor Unit



■ Temperature Sensor Unit  
**CP1W-TS001**

- Thermocouple inputs: 2  
**CP1W-TS002**
- Thermocouple inputs: 4



■ Temperature Sensor Unit  
**CP1W-TS101**

- Platinum-resistance thermometer inputs: 2  
**CP1W-TS102**
- Platinum-resistance thermometer inputs: 4

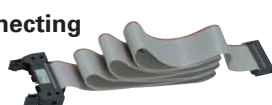
### ● CompoBus/S I/O Link Unit



■ CompoBus/S I/O Link Unit  
**CP1W-SRT21**

- Inputs: 8
- Outputs: 8

### ● I/O Connecting Cable



■ **CP1W-CN811** I/O Connecting Cable: 80 cm

**Note:** CP1W/CPM1A Expansion Units include I/O Connection Cables (in lengths of approx. 6 cm) for side-by-side connection.

### ● CPM1A Expansion Unit and Expansion I/O Units

CPM1A Expansion Unit and Expansion I/O Units can be used with CP1H or CP1L CPU Units under the same conditions as for the CP1W.

## CP1H Only

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

Up to two CJ-series Special I/O Units or CPU Bus Units can be connected by using a CJ Unit Adaptor. Refer to page 27 for the Units that can be used. For details on CJ-series Units, refer to the *CJ1 Catalog* (Cat. No. P052).

#### ■ CJ Unit Adaptor



CP1W-EXT01  
(with End Cover)

#### ■ Special I/O Units



Analog Input Units  
CJ1W-AD042  
CJ1W-AD041-V1  
CJ1W-AD081-V1  
(4 or 8 points)



Analog Output Units  
CJ1W-DA042V  
CJ1W-DA021/041  
CJ1W-DA08V/08C  
(2, 4, or 8 points)



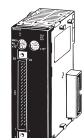
Analog I/O Unit  
CJ1W-MAD42  
(4 analog inputs,  
2 analog outputs)



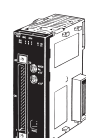
Process Input Units  
CJ1W-PH41U  
CJ1W-AD04U  
CJ1W-PTS51/52  
CJ1W-PTS15/16  
CJ1W-PDC15



Temperature Control Units  
CJ1W-TC000  
(4 or 2 loops)



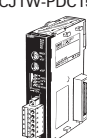
Position Control Units  
CJ1W-NC003  
(1 to 4 axes)



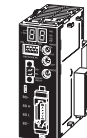
High-speed Counter Unit  
CJ1W-CT021  
(2 axes)



ID Sensor Units  
CJ1W-V680C1  
CJ1W-V600C1  
(1 or 2 Heads)



CompoBus/S Master Unit  
CJ1W-SRM21



CompoNet Master Unit  
CJ1W-CRM21

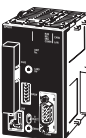
#### ■ CPU Bus Units



Position Control Unit with MECHATROLINK-II Communications  
CJ1W-NC271 (2 axes)  
CJ1W-NC471 (4 axes)  
CJ1W-NCF71 (16 axes)  
CJ1W-NCF71-MA (16 axes)



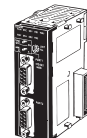
Motion Control Unit with MECHATROLINK-II Communications  
CJ1W-MCH71 (30 axes)



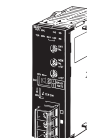
SYSMAC SPU High-speed Data Collection Unit  
CJ1W-SPU01-V2



Ethernet Unit  
CJ1W-ETN21  
(100Base-TX)



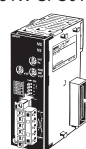
Serial Communications Units  
CJ1W-SCU42/SCU41-V1  
(RS-232C and RS-422/485 ports)  
CJ1W-SCU22/SCU21-V1  
(Two RS-232C ports)  
CJ1W-SCU32/SCU31-V1  
(Two RS-422/485 ports)



Controller Link Unit  
CJ1W-CLK23



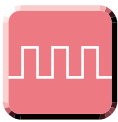
FL-Net Unit  
CJ1W-FLN22  
(100Base-TX)



DeviceNet Unit  
CJ1W-DRM21



EtherNet/IP Unit  
CJ1W-EIP21



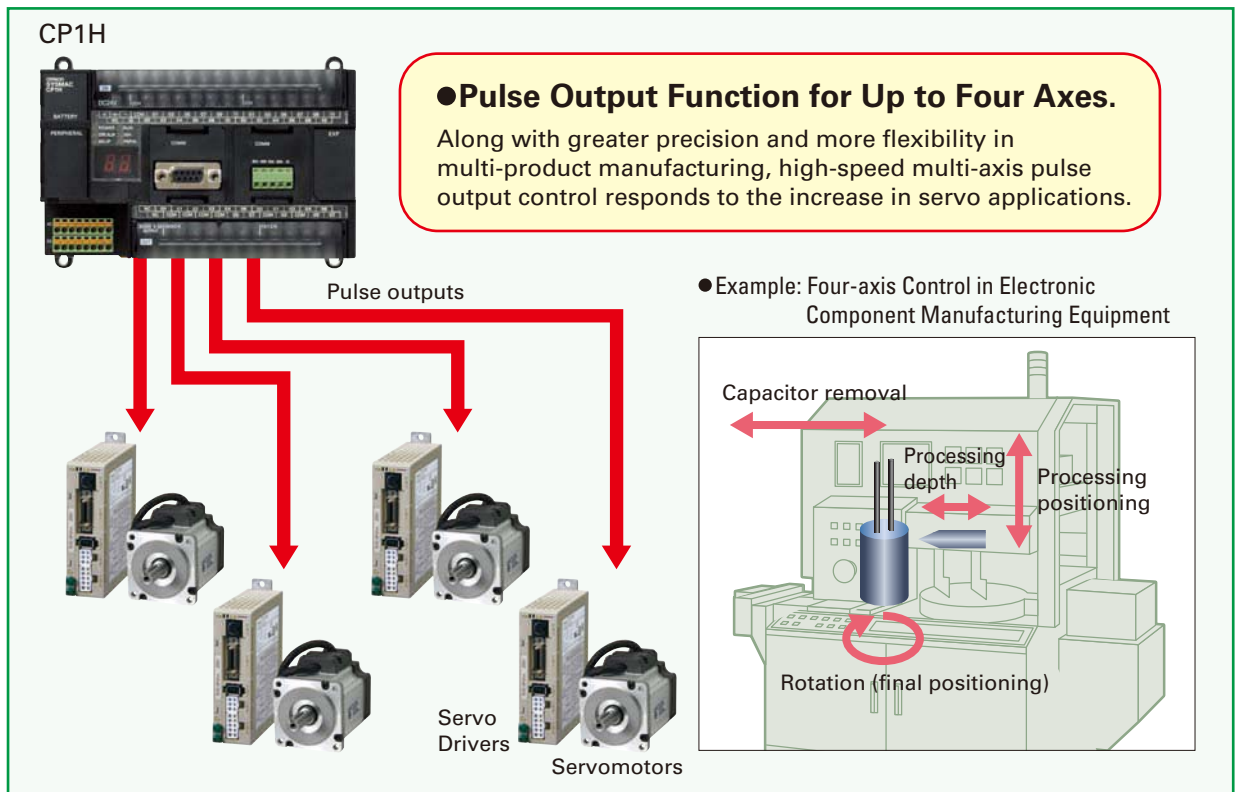
## Pulse Outputs

Up to Four Axes Are Standard.

Advanced Power for High-precision Positioning Control.

Positioning for Electronic Component Manufacturing Equipment

Sheet Feeding for Vertical Pillow Packer



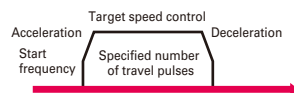
## A Full Range of Functions

### ■Origin Search Function (ORG Instruction)

Origin searches are possible with a single ORG instruction.

### ■Positioning with Trapezoidal Acceleration and Deceleration (PLS2 Instruction)

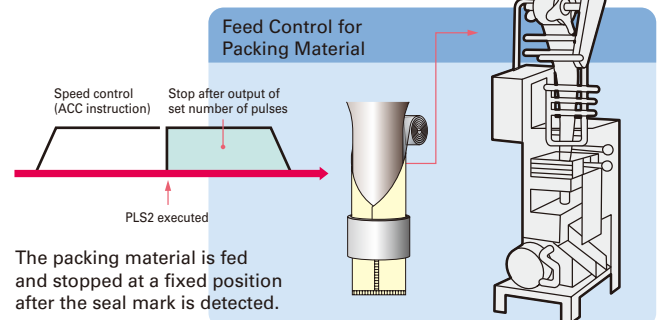
Easily achieved with special positioning instruction (PLS2).



S-curve acceleration/ deceleration can be used to reduce vibration in high-speed positioning.



### ■Interrupt Feeding (ACC and PLS2 Instructions)



## Applicable CPU Units and Functions

### CP1H-Y CPU Unit



1 MHz for 2 axes and 100 kHz for 2 axes, for a total of 4 axes

### CP1H-X□ CPU Unit



100 kHz for 4 axes

### CP1L CPU Unit



100 kHz for 2 axes

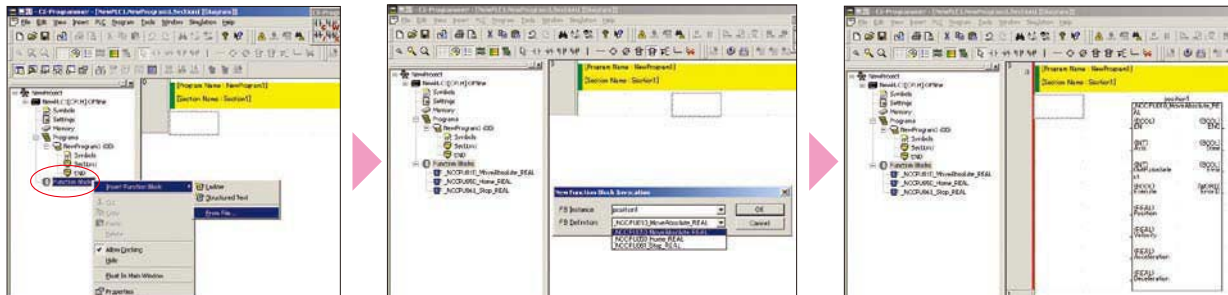




## Programming Is Made Easy Using OMRON Function Blocks

Note: For a list of function blocks in the OMRON Function Block Library, refer to page 62.

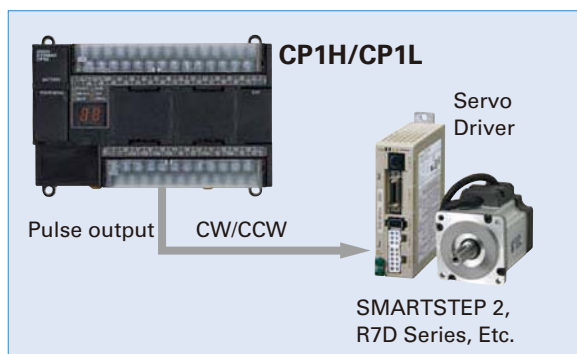
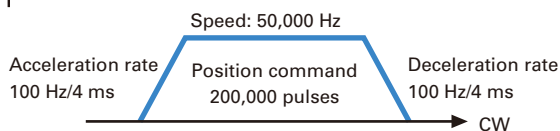
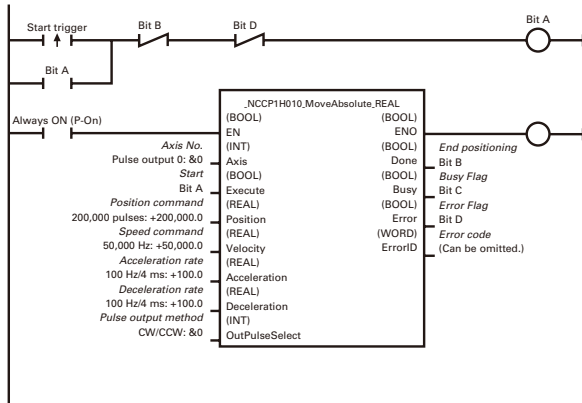
### Just use the CX-Programmer to paste function blocks into the ladder program.



- 1 Start the CX-Programmer and right-click "Function Block" in the tree to select the required library file.
- 2 Use a function block call to select the desired OMRON Function Block.
- 3 An instance of the function block will be created in the ladder program.

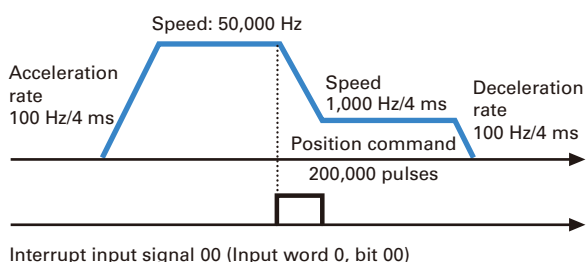
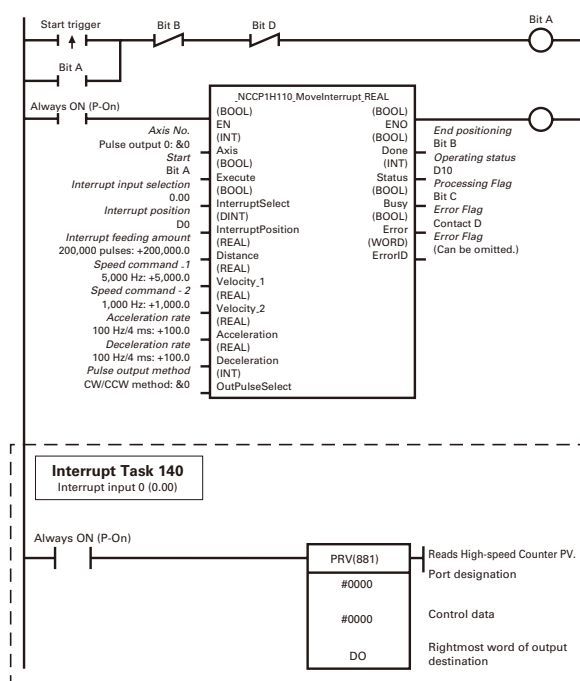
### Just insert set values into the OMRON Function Block.

#### Example: Using Positioning OMRON Function Block



A positioning OMRON Function Block for the CP1H is used in the above application example. The positioning OMRON Function Blocks for the CP1L are the same as the positioning OMRON Function Blocks for the CJ1M-CPU21/22/23.

#### Using Interrupt Feeding OMRON Function Block





## High-speed Counters

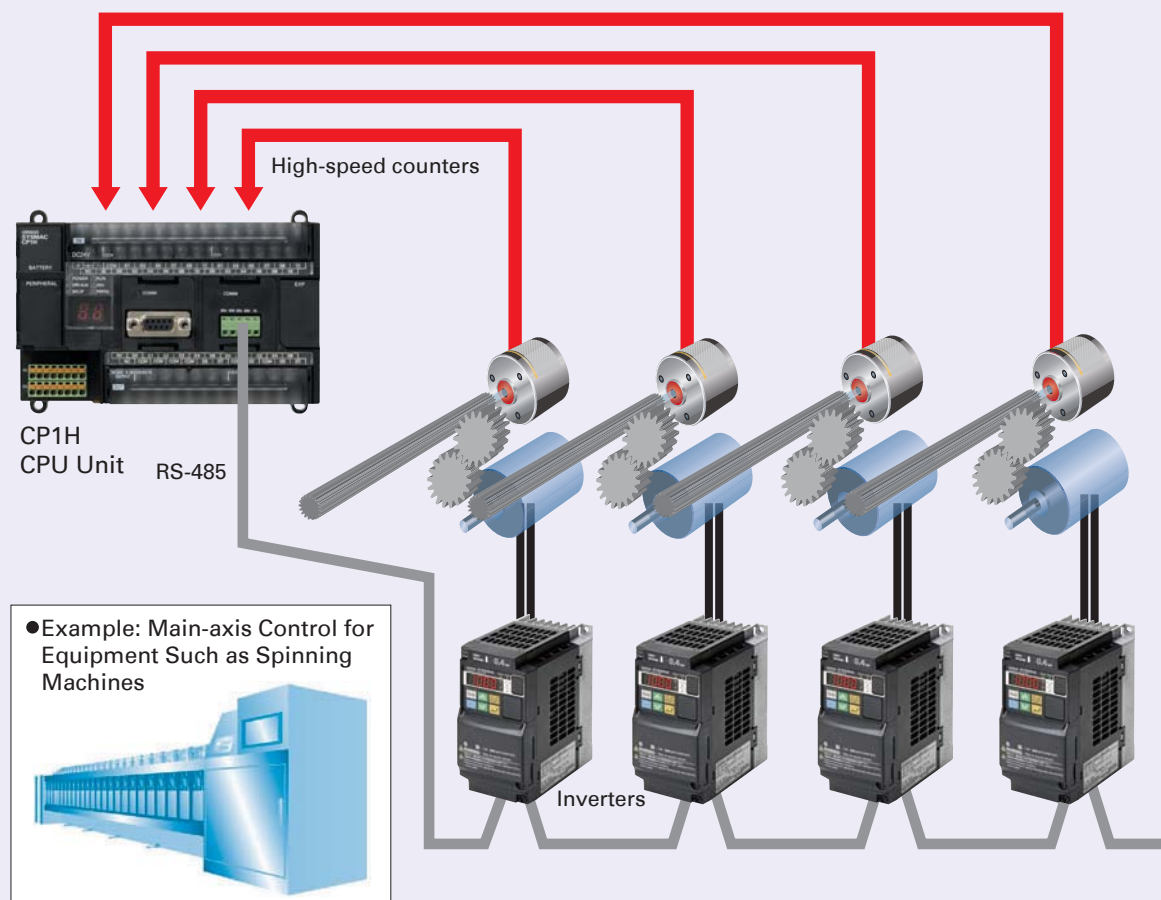
**Differential Phases for Up to Four Axes Are Standard.  
Easily Handles Multi-axis Control with a Single Unit.**

Main-axis Control for Equipment Such as  
Textile Machinery or Spinning Machinery

Positioning Conveyance for Equipment Such as Building  
Material Manufacturing Machinery and Stone-cutting Machinery

### ●Four-axis Counter Function (Single-phase or Differential Phases)

Multi-axis counter inputs enable calculations for inverter positioning, spindle speed control in textile manufacturing, and much more.



## Applicable CPU Units and Functions

### CP1H-Y CPU Unit



1 MHz (single-phase), 500 kHz (differential phases) for two axes, 100 kHz (single-phase), 50 kHz (differential phases) for two axes (four axes total)

### CP1H-X□ CPU Unit



100 kHz (single-phase), 50 kHz (differential phases) for four axes

### CP1L CPU Unit



100 kHz (single-phase) for four axes, or 50 kHz (differential phases) for two axes

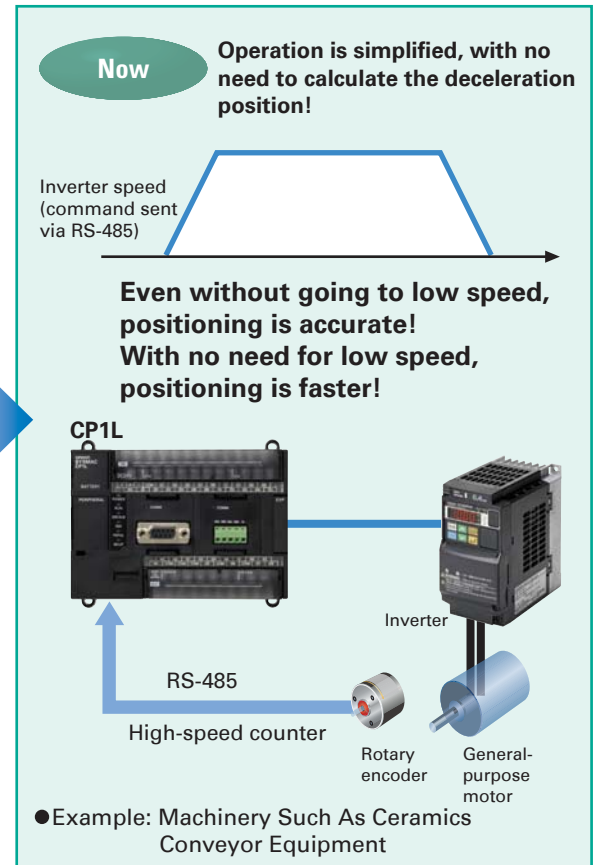
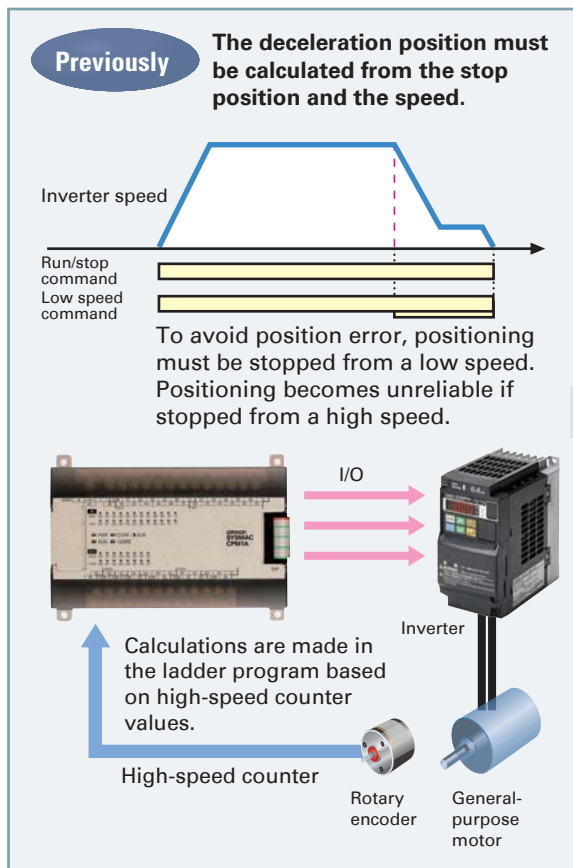


# Inverter Positioning High-speed Positioning Operations Using Inverters Is Made Easy.

High-speed Counters

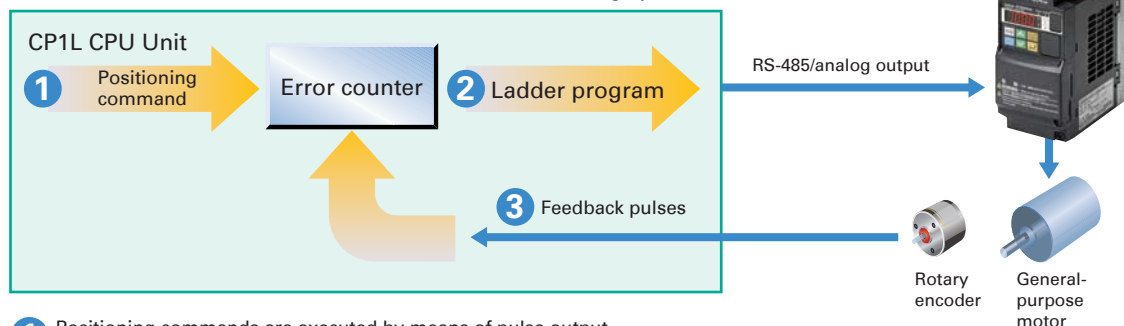
Inverter Positioning

Machinery Such As Ceramics Conveyor Equipment



## Overview of Inverter Positioning

The CP1L's built-in error counter function enables the following operation.



- 1 Positioning commands are executed by means of pulse output instructions. Pulse output instructions normally output pulses from the PLC, but pulses can be output to the error counter according to the operand setting in the instruction (such as PLS2).
- 2 The amount of pulses input to the error counter is converted to a speed command and output to the inverter. A command to the inverter is created in the ladder program using this speed command (proportional to the pulses remaining in the error counter). When RS-485 communications are executed, ladder programming for communicating with the inverter is created. When analog outputs are executed, ladder programming for analog outputs is created.
- 3 When a run/stop command is executed for the inverter, the motor is rotated and feedback pulses (for the amount of movement) are output from the encoder to the CP1L. The error counter value is decremented by these feedback pulses. The CP1L continues sending commands to the inverter until positioning is completed. This enables accurate positioning to the position output by the first position command.

## Applicable CPU Units and Functions

### CP1L CPU Unit



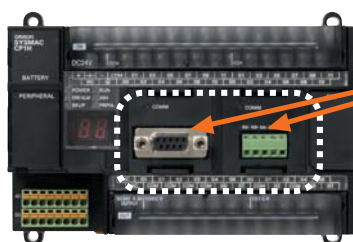
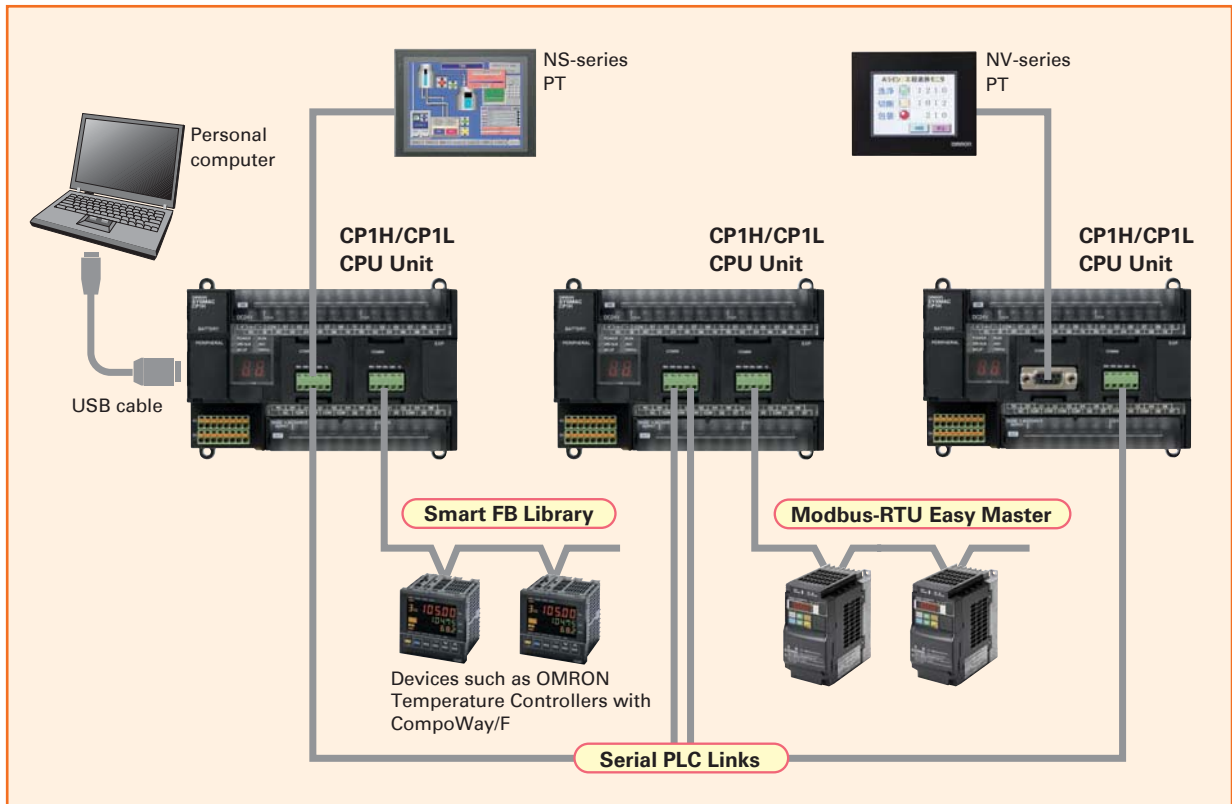
Inverter positioning function for two axes



## Serial Communications

# A Standard USB Port and Two Serial Ports Enable Connecti Communications with a Wide Range of Components.

Up to two Option Boards can be mounted for RS-232C or RS-422A/485 communications. A peripheral USB port has been added to connect to a personal computer for a total of three communications ports, making it easy to simultaneously connect to a PT, various components (such as Inverters, Temperature Controllers, and Smart Sensors), Serial PLC Link for linking to other PLCs, and a personal computer.



CP1H/CP1L CPU Unit  
(except CP1L-L10)

Two option board slots can be used for either an RS-232C or RS-422A/485 interface.



RS-232C Option Board  
CP1W-CIF01



RS-422A/485 Option Board  
CP1W-CIF11  
(Maximum transmission distance 50m)



RS-422A/485(Isolated-type)  
Option Board  
CP1W-CIF12  
(Maximum transmission distance 500m)

## Applicable CPU Units and Functions

### CP1H CPU Unit



Serial Option Board for up to two ports.

### CP1L CPU Unit (60, 40 or 30 Points)



Serial Option Board for up to two ports.

### CP1L CPU Unit (20 or 14 Points)



Serial Option Board for only one port.



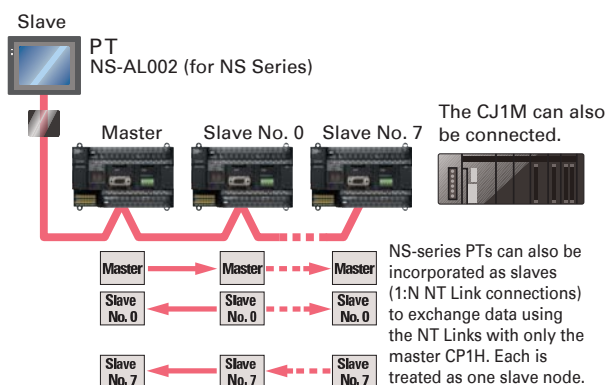
## Serial PLC Links



Setting/monitoring operation  
Set temperature/present  
temperature  
Errors

When multiple boilers are being controlled, up to 10 words/Unit of data for settings and monitoring can be exchanged using data links between up to nine CP1H, CP1L, and CJ1M CPU Units. Serial PLC Links can be used with either serial port 1 or serial port 2.

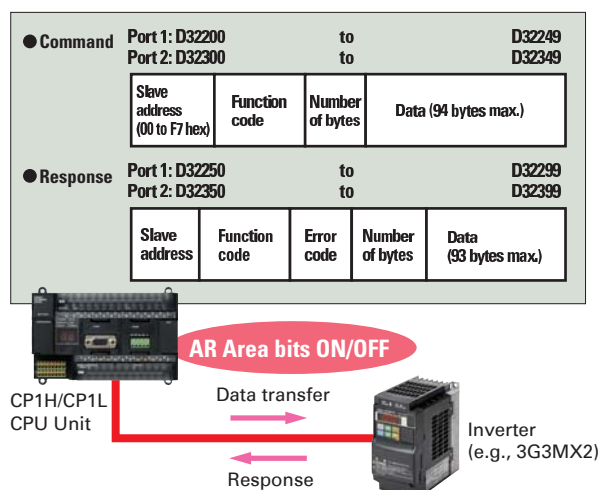
**Note:** Cannot be used for the CP1L-L10.



## Modbus-RTU Easy Master

Connecting inverter speed control is made simple using the Modbus-RTU Easy Master.

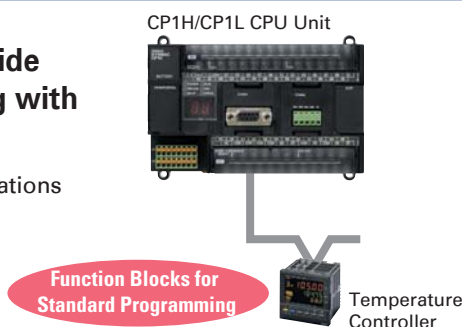
When the address, function, and data for a slave device are preset in a fixed memory area (DM Area), a message can be sent or received simply by turning ON an AR Area bit (A640.00 for port 1 or A641.00 for port 2) in the PLC.



## Easy Communications Programming Using OMRON Function Blocks

■ The OMRON Function Blocks provide function blocks for communicating with Temperature Controllers.

OMRON Function Blocks are provided for operations such as for setting SPs and reading PVs for Temperature Controllers by communications.

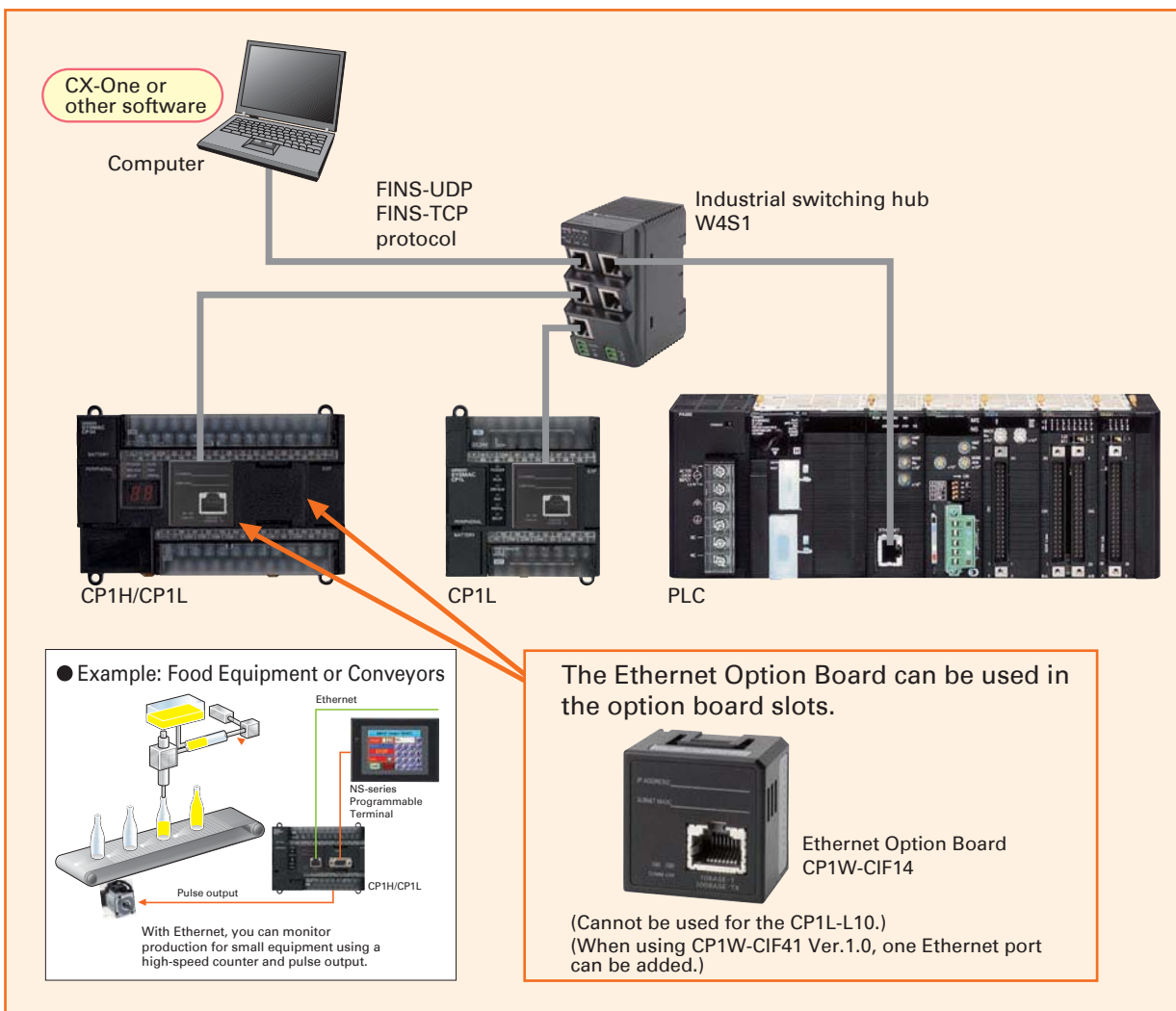




## Ethernet Communications

**Two ports can be used as an Ethernet port to perform Ethernet communications between the CP1H/CP1L and a host computer.**

Connect to a general-purpose LAN simply by mounting a CP1W-CIF41 Ethernet Option Board to an option board slot on any of the CPU Units in the CP1H/CP1L except a CP1L-L10. Perform monitoring and programming with the CX-Programmer, or communicate between a host computer and the CP1H/CP1L using Ethernet by connecting with the FINS/TCP or FINS/UDP protocols, which are supported by all OMRON PLCs.



### Applicable CPU Units and Functions

#### CP1H CPU Unit



The Ethernet Option Board provides two ports.

#### CP1L CPU Unit

(60, 40, or 30 Points)



The Ethernet Option Board provides two ports.

#### CP1L CPU Unit

(20 or 14 Points)

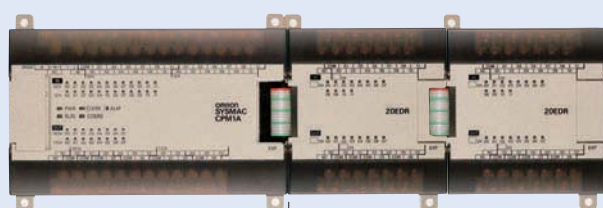


The Ethernet Option Board provides only one port.

### ●Analog Control without Using Expansion Units

Four analog inputs and two analog outputs are built in.  
CP1H-XA CPU Units handle a wide range of applications with a  
single PLC.

Previously



CPM2A CPU Unit

Two CPM1A-MAD11 Analog I/O Units  
(2 Analog Inputs and 1 Analog Output)

CP1H



CP1H-XA

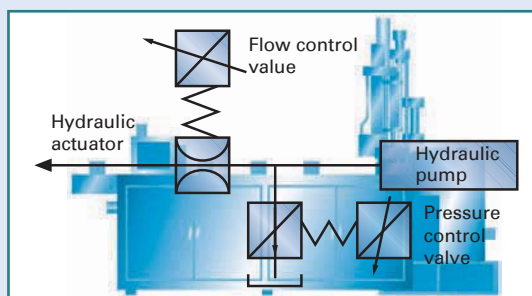
Up to 4 input words and  
2 output words.  
No Expansion Units  
required.

### ●Oil Pressure Control

Oil pressure control can also be handled by  
this CPU Unit.



Pressure Position Control valves  
Analog I/O

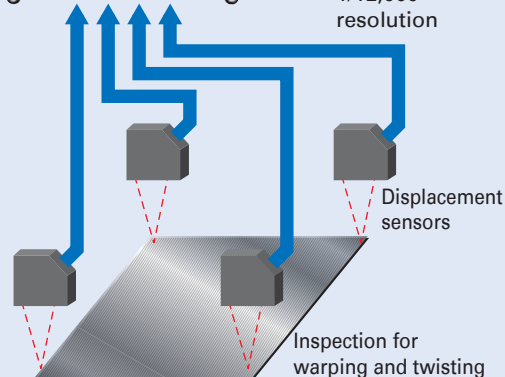


### ●Inspection Devices

Inspection devices are required more and  
more to enhance quality.



1/6,000 or  
1/12,000  
resolution



### Applicable CPU Units and Functions

#### CP1H-XA CPU Unit



Four analog input words Two analog output words

### ●Complete with CP1W/CPM1A Analog Units.

- Unit with 4 Analog Inputs
- Units with 4 Analog Outputs
- Unit with 2 Analog Outputs
- Units with 2 Analog Inputs and 1 Analog Output





## USB Peripheral Port

All CP-series CPU Units Provide a USB Port as a Standard Feature.

FA Integrated Tool Package

CX-One



Commercially available USB cable

Computer running CX-One



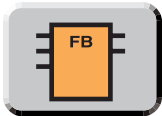
The built-in USB port lets you connect to a personal computer using a general-purpose cable.



Commercially available USB cable (A-type male connector to B-type female connector) can be used, helping to keep costs down.

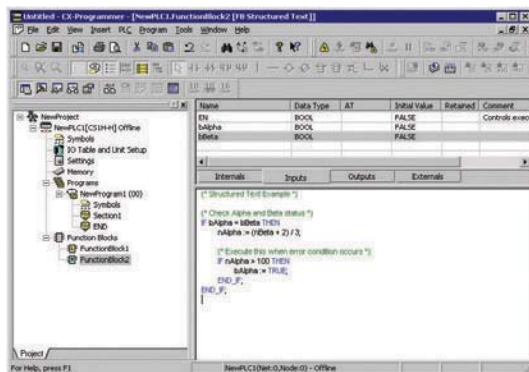
(The CP1H/CP1L USB port is used only for connecting to a Programming Device.)

**Note:** Programming Consoles (C200H-PRO027, etc.) cannot be used with CP1H and CP1L CPU Units.



## The Structured Text (ST) Language Makes Math Operations Even Easier.

In addition to ladder programming, function block logic can be written in ST language, which conforms to IEC 61131-3. Arithmetic processing is also possible with ST, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing that is difficult to write in ladder programming becomes easy using structured text.



### ● Structured Text Commands (Keywords)

TRUE, FALSE.  
IF, THEN, ELSE, ELSEIF, END\_IF  
DO, WHILE, END\_WHILE.  
REPEAT, UNTIL, END\_REPEAT.  
FOR, TO, BY, DO, END\_FOR.  
CASE, OF, END\_CASE.  
EXIT, RETURN.  
● Operators  
Addition (+), Subtraction (-), Multiplication (\*), Division (/)  
Parenthesis (brackets), Array Indexing (square brackets [ ])  
Assignment Operator (:=), Less Than Comparison Operator (<),  
Less Than or Equal To Comparison Operator (<=),  
Greater Than Comparison Operator (>),  
Greater Than or Equal To Comparison Operator (>=),  
Equals Comparison Operator (=),  
Is Not Equal To Comparison Operator (<>),  
Bitwise AND (AND or &), Bitwise OR (OR), Exclusive OR (XOR),  
NOT (NOT), Exponentiation (\*\*)

### ● Numerical Functions

ABS, SQRT, SQR, LN, LOG, EXP, SIN, COS, TAN, ASIN, ACOS, ATAN, EXPT

### ● Arithmetic Functions

Exponentiation (EXPT)

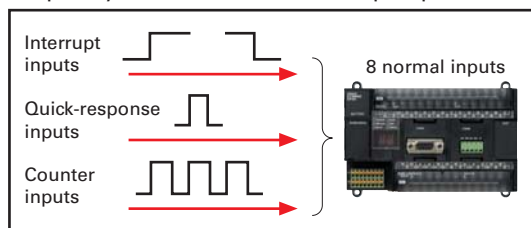
**Note:** The CP1H/CP1L CPU Units support the same function blocks and ST language as CS/CJ-series CPU Units with unit version 3.0.



## High-speed Processing

Up to Eight Interrupt Inputs Can Be Used.

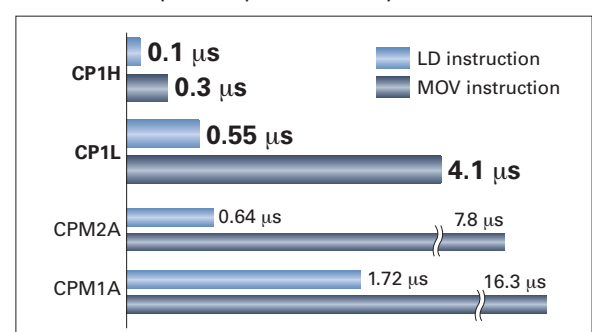
Eight interrupt inputs are built in. Quick-response inputs for pulse widths of 50  $\mu$ s. The interrupt inputs can also be used as counters. (Response frequency: 5 kHz total for 8 interrupt inputs)



The normal inputs can be set in the PLC Setup as interrupt, quick-response, or counter inputs. (There are 8 normal inputs for the CP1H-X/XA, 6 for the CP1H-Y, 6 for the CP1L with 20, 30, or 40 points, and 4 for the CP1L with 14 points.)

Compared with the CPM2A, Basic Instructions Are at Least Six Times Faster and MOV Instructions Are 26 Times Faster.

Processing speed has been increased not only for basic instructions but also for special instructions as well. Faster processing of approximately 500 instructions speeds up the entire system.







## LCD Displays and Settings

● USB Peripheral Port

● LCD Displays and Settings

### Compact Display and Setting Device

### Available to Mount on CPU Unit for Easy Maintenance and Startup Adjustments

Data values in the PLC can be easily monitored or changed by adding the new LCD Option Board. This enables visually checking the operation status, such as error occurrence and error details. Register in advance functions that you use often to quickly perform settings and confirm operation. Functionality can also be expanded to items not included in the CPU Unit, such as calendars and timers.



CP1H/CP1L  
(except CP1L-L10)

An LCD Option Board interface can be used in option board slot 1.



CP1W-DAM01  
LCD Option Board

#### Monitoring and Changing Data Values

##### ● I/O Monitoring

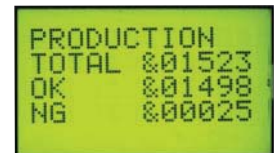
All memory area values can be monitored and changed. Switch between decimal and hexadecimal or monitor 2-word hexadecimal data, such as high-speed counter values, in decimal.



#### Simply press the up and down keys to quickly display up to 16 registered monitor screens.

##### ● User Monitor Settings and Messages

Up to seven fixed characters and the present value of word data can be displayed. Simply press the up and down keys from the initial screen to perform monitoring. Of course, you can also change the settings. Plus, up to 48 characters can be set in advance and then displayed when a specified bit turns ON. This makes onsite setting and confirming faster.



#### Visual Checking of Status with Display of PLC Error Details

##### ● I/O Monitoring

The backlight on the LCD screen will turn red when an error occurs to notify you of the error status. You can monitor the displayed error details and the error log.



#### Expanded Functionality with Calendar Timers, and Other Items Not Included in the CPU Units

##### ● Variety of Additional Functions

You can use calendar timers, weekly timers, and daily timers. Sixteen of each timer type can be set.



#### Applicable CPU Units and Functions

##### CP1H



Can be mounted to option board slot 1.

##### CP1L

CPU Units with 30, 40, or 60 I/O points



Can be mounted to option board slot 1.

##### CP1L

CPU Units with 14 points or 20 I/O points



Can be mounted to option board slot 1.

# Shortened System Design and Startup. Increased Program Reusability.

Support Software

## Integrated OMRON PLCs and Component Support Software

### FA Integrated Tool Package



The CX-One is an FA Integrated Tool Package for connecting, setting, and programming OMRON components, including PLCs. CP1H/CP1L programming and settings can be done with just the CX-Programmer, but the CX-One provides Support Software for setting and programming PTs, Temperature Controllers, and many other components. Using the CX-One makes programming and setup easy, shortening the total lead time required for starting up machines and equipment.

### CX-One Configuration

|                                                                                   |                                                                                       |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 Network Software                                                                | CX-Integrator CX-FLnet CX-Protocol CX-ConfiguratorFDT Network Configurator            |
| 2 PLC Software                                                                    | CX-Programmer CX-Simulator SwitchBox Utility                                          |
| 3 HMI Software                                                                    | CX-Designer Ladder Monitor software included. (See note 1.) NV-Designer (See note 2.) |
| 4 Motion Controller Software                                                      | CX-Drive CX-Motion-NCF CX-Motion-MCH CX-Position CX-Motion                            |
| 5 PLC Software                                                                    | CX-Process Tool NS-series Face Plate Auto-Builder                                     |
| 6 Component Software<br>(for Temperature Controllers/for Temperature Controllers) | CX-Thermo                                                                             |

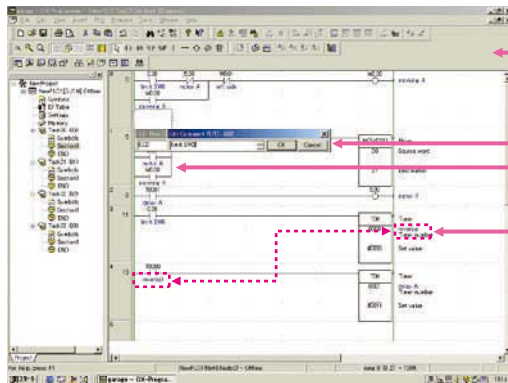
Note: 1. The Ladder Monitor is required to monitor ladder programs running on CS/CJ-series PLCs from an NS-series PT.  
2. Include with CX-One Lite version 4.0 and in CX-One version 3.2 or later.

### Easy-to-use Programming Software.

### Programming with Function Blocks (Ladder Diagrams/ST Language) Is Also Standard.

## CX-Programmer

#### ● Easy Operation Simplifies Programming and Debugging.



Shortcut keys can be easily checked using the ladder key guide. Programming is simplified by key inputs, such as the **C** Key for an NC input (contact), the **O** Key for an OUT instruction, and the **I** Key for special instructions.

**C** Key, address, **↶** Key, comment, **↷** Key. The CX-Programmer automatically goes into character input mode when it is time to enter a comment. Special instructions can be input as follows:

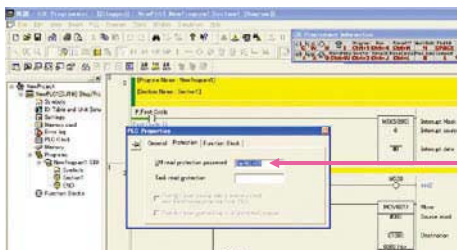


Simple key inputs are also available to connect lines.



Comments can be added for timer and counter instructions through timer and counter input bits.

#### ● The Password Function Enables Protecting Important Programs.



#### Eight-character Password Protection

Important programs can be protected by setting a password from the CX-Programmer (with the PLC online).

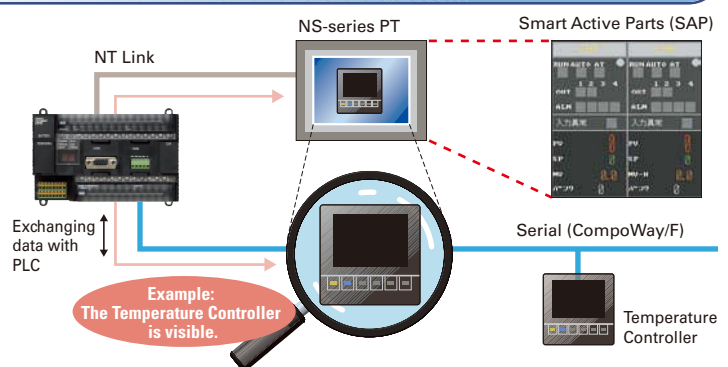
Password setting: Up to 8 alphanumeric characters (A-Z, a-z, 0-9)

## Improved Functional Connectivity with HMI Design Software and Integration of Component Software

### Configured with an NS-series PT

### CX-Designer

The CX-Designer can be started from the CX-Integrator's NT Link Window. It can be used to design HMI screens. In addition, the Smart Active Parts (SAP) Library is provided with the CX-Designer to enable easily creating setting screens for devices such as Temperature Controllers.



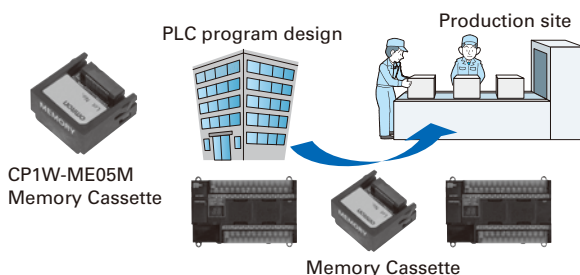


## CPU Unit Overview and Built-in Functions



## Memory Cassette

- Data, such as programs and initial memory values, can be stored on a Memory Cassette (optional) and copied to other systems.
- The Memory Cassette can also be used when installing new versions of application programs.



## Clock Function

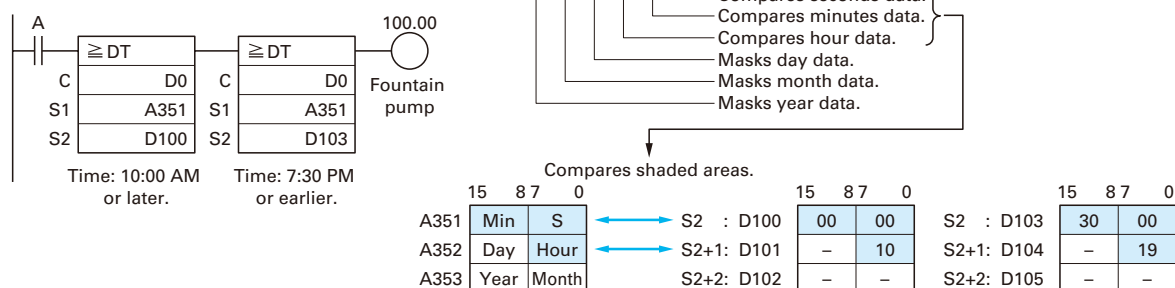
- All CP1H/CP1L CPU Units have a built-in clock.

- Shopping Mall Fountain Control

### Controlling a Fountain for a Period of Time

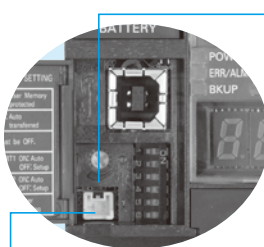
### ■ Program Example A

If bit A is ON, the fountain pump turns ON from 10:00 AM to 7:30 PM.



## ■ Analog Inputs Are Made Simple.

An analog adjustment and an external analog setting input connector are provided.



- **Analog Adjustment**

The analog adjustment has a resolution of 256. Values are entered in A642 and can be used in the ladder program. When the value is changed, it is displayed (0 to FF) for three seconds on the 7-segment display.



(Only CP1H CPU Unit)



(Only CP1H CPU Units provide a 7-segment display.)

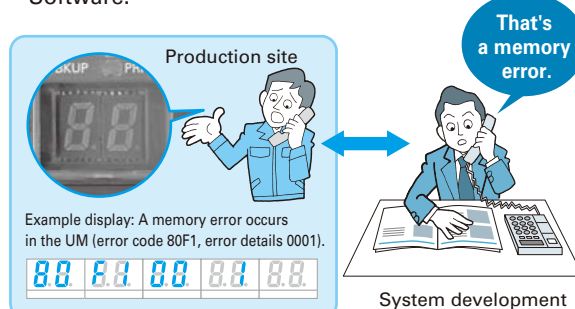
- **External Analog Setting Input Connector**

This connector is used for an 0 to 10-V analog input with a 256 resolution. Each CP1H/CP1L CPU Unit has one of these connectors built in. A device, such as a potentiometer, can be connected to enable direct manual operation and control from a control panel. The maximum cable length is 3 meters. A connecting cable (1 m) is included with the CPU Unit.



### Status Displayed on 7-segment Display (CP1H only)

- The 7-segment display provides two display digits.
- In addition to displaying error codes for errors detected by the PLC, codes can be displayed on the display from the ladder program.
- The 7-segment display is useful for maintenance as well, allowing problems that arise during system operation to be grasped without using any Support Software.



## ■ Battery-free Operation

- The values in the DM Area (32K words) are saved in the CPU Unit's built-in flash memory as initial values, and can be read at startup.
- Battery-free operation can be used to enable saving production data and machine parameters in the DM Area, turning OFF the power, and then using then same data again for the next production run. (This is ideal for machinery that is only used seasonally.)

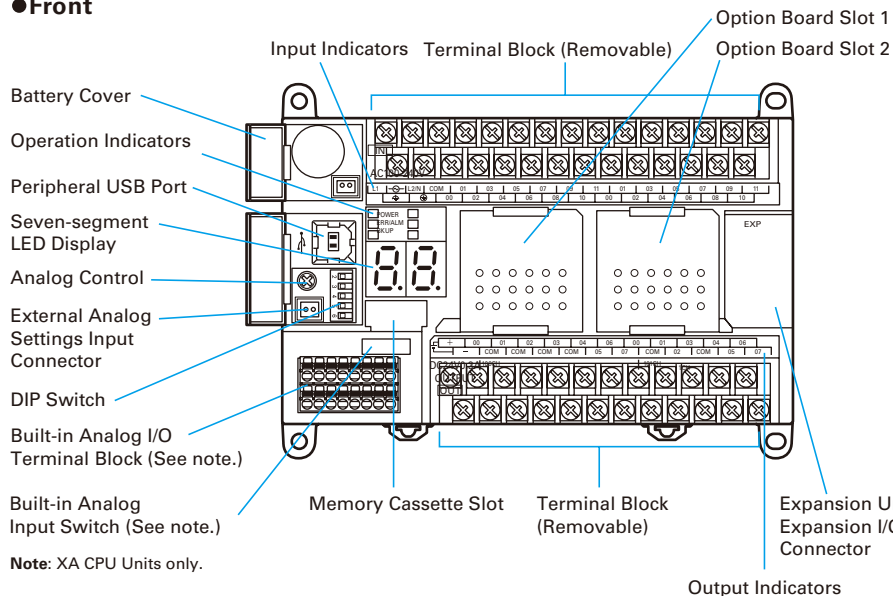
**Note:**

- A battery is required for the clock function and to retain the status of HR Area bits and counter values.
- A battery is provided as a standard feature with the CPU Unit.
- The user program (ladder program) is stored in built-in flash memory, so no battery is required to back it up.

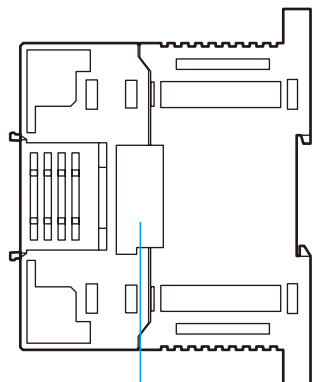


## CP1H CPU Unit Nomenclature

### ●Front



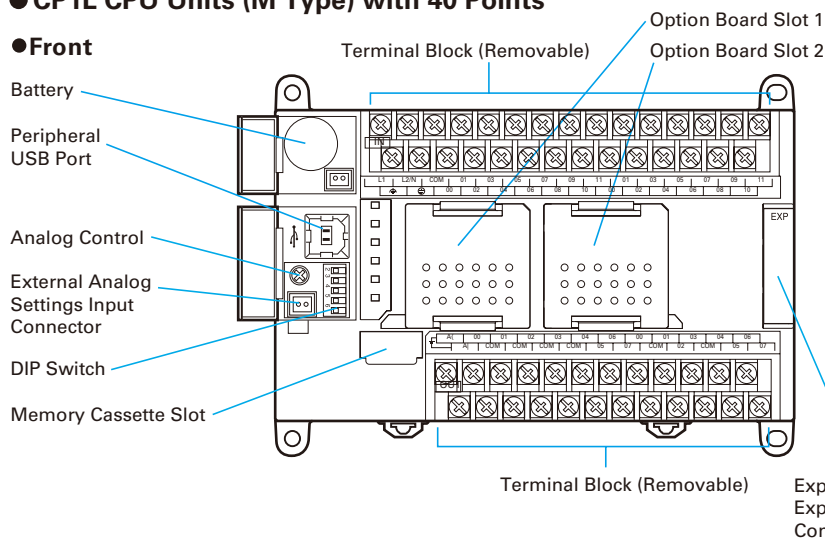
### ●Back



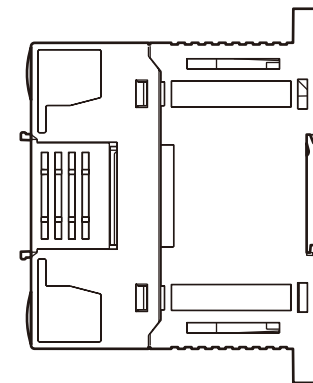
## CP1L CPU Unit Nomenclature

### ●CP1L CPU Units (M Type) with 40 Points

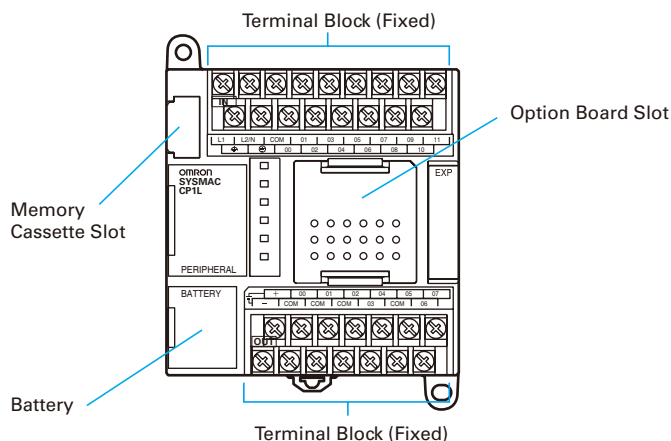
#### ●Front



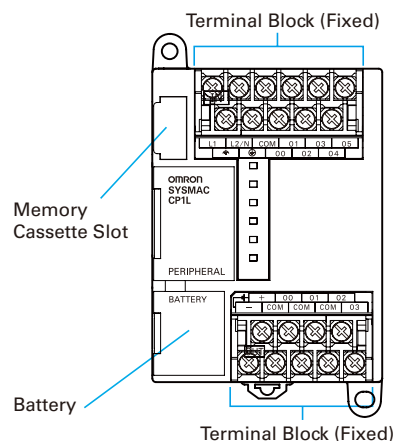
#### ●Back



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



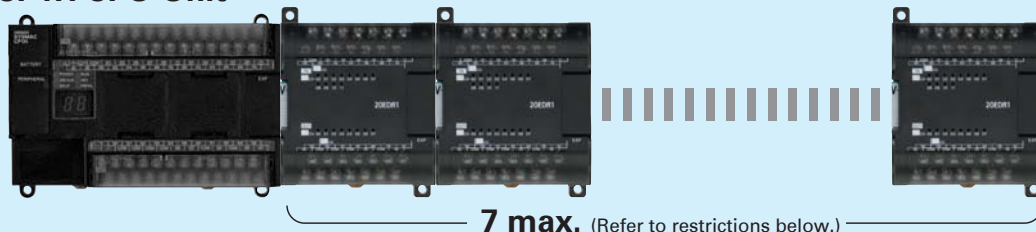
### ●CP1L CPU Units (L Type) with 10 Points



# Connecting Expansion Unit and Expansion I/O Units

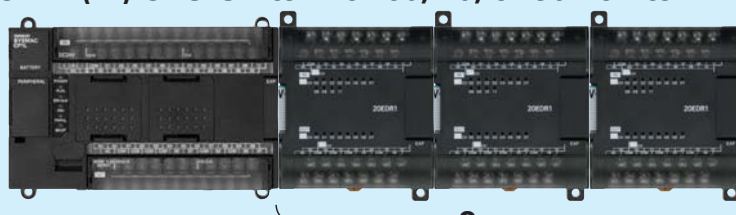
## Maximum Number of CP1W/CPM1A Expansion Unit and Expansion I/O Units

### ● CP1H CPU Unit



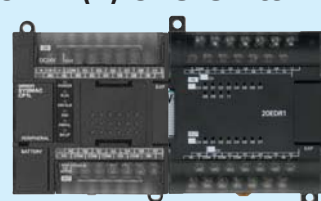
**7 max.** (Refer to restrictions below.)

### ● CP1L (M) CPU Units with 60, 40, or 30 Points



**3 max.**

### ● 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.

## Restrictions on the Number of CP1H Expansion Unit and I/O Unit Connections

Up to seven Expansion Units and Expansion I/O Units can be connected when a CP1H CPU Unit is used, but the following restrictions apply. Observe these restrictions when using the models in the shaded areas in the following tables. A maximum total of 15 input words is allocated for Expansion Units and a maximum total of 15 output words is allocated for Expansion Units and Expansion I/O Units.

### ■ Words Allocated to CP1W Expansion Units and Expansion I/O Units

| Unit type                |                                          | Model       | No. of words |        |
|--------------------------|------------------------------------------|-------------|--------------|--------|
|                          |                                          |             | Input        | Output |
| Expansion I/O Units      | 40 I/O points                            | CP1W-40EDR  | 2            | 2      |
|                          |                                          | CP1W-40EDT  |              |        |
|                          |                                          | CP1W-40EDT1 |              |        |
|                          | 32 outputs                               | CP1W-32ER   | —            | 4      |
|                          |                                          | CP1W-32ET   |              |        |
|                          |                                          | CP1W-32ET1  |              |        |
|                          | 20 I/O points                            | CP1W-20EDR1 | 1            | 1      |
|                          |                                          | CP1W-20EDT  |              |        |
|                          |                                          | CP1W-20EDT1 |              |        |
|                          | 16 outputs                               | CP1W-16ER   | —            | 2      |
|                          |                                          | CP1W-16ET   |              |        |
|                          |                                          | CP1W-16ET1  |              |        |
|                          | 8 inputs                                 | CP1W-8ED    | 1            | —      |
|                          | 8 outputs                                | CP1W-8ER    | —            | 1      |
|                          |                                          | CP1W-8ET    |              |        |
|                          |                                          | CP1W-8ET1   |              |        |
| Analog Units             | 2 analog inputs, 1 analog output         | CP1W-MAD11  | 2            | 1      |
|                          | 4 analog inputs                          | CP1W-AD041  | 4            | 2      |
|                          | 4 analog outputs                         | CP1W-DA041  | —            | 4      |
|                          | 2 analog outputs                         | CP1W-DA021  | —            | 2      |
| Temperature Sensor Units | 2 thermocouple inputs                    | CP1W-TS001  | 2            | —      |
|                          | 4 thermocouple inputs                    | CP1W-TS002  | 4            | —      |
|                          | 2 platinum resistance thermometer inputs | CP1W-TS101  | 2            | —      |
|                          | 4 platinum resistance thermometer inputs | CP1W-TS102  | 4            | —      |
| CompoBus/S I/O Link Unit | 8 inputs and 8 outputs                   | CP1W-SRT21  | 1            | 1      |

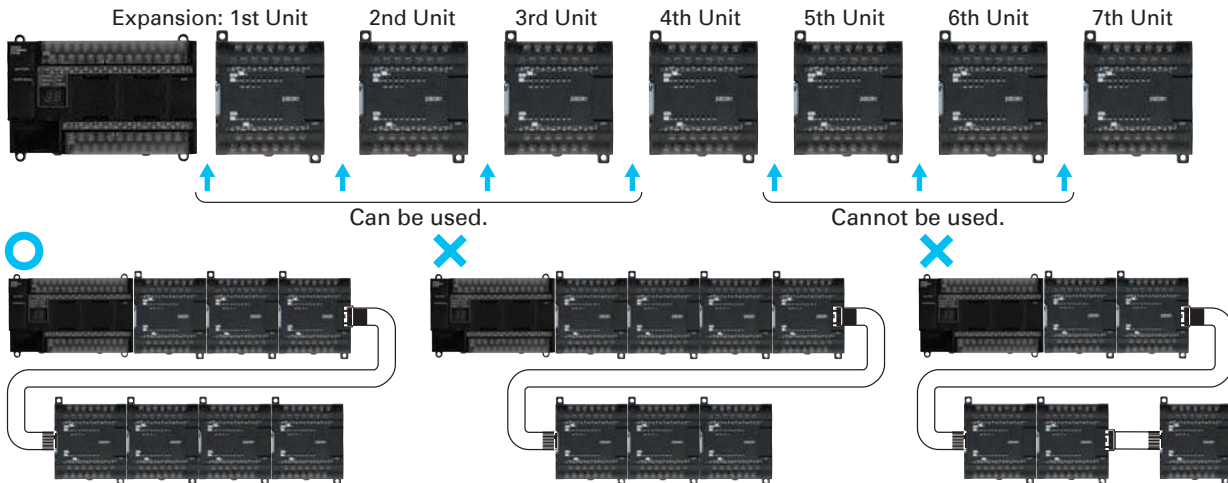
For example, the CP1W-TS002 Temperature Sensor Unit is allocated four words per Unit, so no more than three Units can be connected (4 words x 3 Units = 12 words). It would then be possible to mount a combination of other Units to use the remaining three input and 15 output words.

### Examples of Possible Combinations

| Number of Units | Input                        | Output                      |
|-----------------|------------------------------|-----------------------------|
| CP1H-X40DR-A    |                              |                             |
| CP1W-TS002 x 3  | 4 words x 3 Units = 12 words | 0 words                     |
| CP1W-TS001 x 1  | 2 words x 1 Unit = 2 words   | 0 words                     |
| CP1W-20EDR1 x 1 | 1 word x 1 Unit = 1 word     | 1 word x 1 Unit = 1 word    |
| CP1W-DA041 x 2  | 0 words                      | 4 words x 2 Units = 8 words |
| Total: 7 Units  | Total: 15 words              | Total: 9 words              |
| ≤ 7 Units       | ≤ 15 words                   | ≤ 15 words                  |

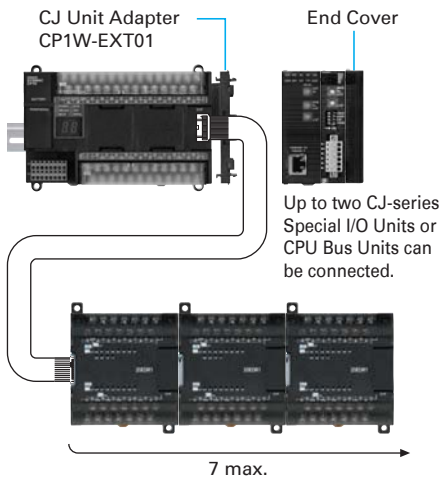
### Using CP1W-CN811 I/O Connecting Cable

- I/O Connecting Cable can be connected to any Unit from the CP1H/CP1L CPU Unit to the third Expansion Unit or Expansion I/O Unit (i.e., the fourth Unit).
- Only one I/O Connecting Cable can be used in each CP1H or CP1L PLC.
- Even when I/O Connecting Cable is used, the above restrictions on the number of connectable CP1W/CPM1A Expansion Units and Expansion I/O Units still apply.



### Using CJ-series Special I/O Units or CPU Bus Units with a CP1H CPU Unit

Up to two CJ-series Special I/O Units or CPU Bus Units can be connected by using a CP1W-EXT01 CJ Unit Adapter. The number of Units that can be used is as described below.



Use CP1W-CN811 I/O Connecting Cable when using CP1W/CPM1A Expansion Units and Expansion I/O Units at the same time as a CJ Unit Adapter. In this situation, the number of CP1W/CPM1A Expansion Unit and Expansion I/O Units that can be connected is subject to the restrictions described above. Only one I/O Connecting Cable can be used.

■ CJ-series Special I/O Units and CPU Bus Units (For details, refer to the *CJ1 Catalog* (Cat. No. P052)).

| Unit name                 | Model         | 5 V Current consumption (A) |
|---------------------------|---------------|-----------------------------|
| Analog Input Units        | CJ1W-AD042    | 0.52 A                      |
|                           | CJ1W-AD081-V1 | 0.42 A                      |
|                           | CJ1W-AD041-V1 |                             |
| Analog Output Units       | CJ1W-DA042V   | 0.40 A                      |
|                           | CJ1W-DA08V    | 0.14 A                      |
|                           | CJ1W-DA08C    |                             |
|                           | CJ1W-DA041    | 0.12 A                      |
|                           | CJ1W-DA021    |                             |
|                           |               |                             |
| Analog I/O Unit           | CJ1W-MAD42    | 0.58 A                      |
| Process Input Units       | CJ1W-PH41U    | 0.30 A                      |
|                           | CJ1W-AD04U    | 0.32 A                      |
|                           | CJ1W-PTS51    | 0.25 A                      |
|                           | CJ1W-PTS52    |                             |
|                           | CJ1W-PTS15    | 0.18 A                      |
|                           | CJ1W-PTS16    |                             |
| Temperature Control Units | CJ1W-PDC15    |                             |
|                           | CJ1W-TC001    | 0.25 A                      |
|                           | CJ1W-TC002    |                             |
|                           | CJ1W-TC003    |                             |
|                           | CJ1W-TC004    |                             |
|                           | CJ1W-TC101    |                             |
|                           | CJ1W-TC102    |                             |
|                           | CJ1W-TC103    |                             |
|                           | CJ1W-TC104    |                             |
| CompoBus/S Master Unit    | CJ1W-SRM21    | 0.15 A                      |
| CompoNet Master Unit      | CJ1W-CRM21    | 0.40 A                      |

| Unit name                             | Model         | 5 V Current consumption (A) |
|---------------------------------------|---------------|-----------------------------|
| Position Control Units                | CJ1W-NC113    | 0.25 A                      |
|                                       | CJ1W-NC213    |                             |
|                                       | CJ1W-NC413    | 0.36 A                      |
|                                       | CJ1W-NC133    | 0.25 A                      |
|                                       | CJ1W-NC233    |                             |
|                                       | CJ1W-NC433    | 0.36 A                      |
| High-speed Counter Unit               | CJ1W-CT021    | 0.25 A                      |
| ID Sensor Units                       | CJ1W-V680C11  | 0.26 A (24 VDC 0.13 A)      |
|                                       | CJ1W-V680C12  | 0.32 A (24 VDC 0.26 A)      |
|                                       | CJ1W-V600C11  | 0.26 A (24 VDC 0.12 A)      |
|                                       | CJ1W-V600C12  | 0.32 A (24 VDC 0.24 A)      |
|                                       |               |                             |
| Serial Communications Units           | CJ1W-SCU42    | 0.36 A*                     |
|                                       | CJ1W-SCU22    | 0.28 A*                     |
|                                       | CJ1W-SCU32    | 0.40 A                      |
|                                       | CJ1W-SCU41-V1 | 0.38 A*                     |
|                                       | CJ1W-SCU21-V1 | 0.28 A*                     |
|                                       | CJ1W-SCU31-V1 | 0.38 A                      |
| Ethernet Unit                         | CJ1W-ETN21    | 0.37 A                      |
| EtherNet/IP Unit                      | CJ1W-EIP21    | 0.41 A                      |
| DeviceNet Unit                        | CJ1W-DRM21    | 0.33 A                      |
| Controller Link Unit                  | CJ1W-CLK23    | 0.35 A                      |
| MECHATROLINK-II Position Control Unit | CJ1W-NC271    | 0.36 A                      |
|                                       | CJ1W-NC471    |                             |
|                                       | CJ1W-NCF71    |                             |
|                                       | CJ1W-NCF71-MA |                             |
| MECHATROLINK-II Motion Control Unit   | CJ1W-MCH71    | 0.6 A                       |
| FL-net Unit                           | CJ1W-FLN22    | 0.37 A                      |
| Storage/Processing Unit               | CJ1W-SPU01-V2 | 0.56 A                      |

●Based on the current consumption when CJ-series Special I/O Units or CPU Bus Units are used with a CP1H CPU Unit, the maximum number of Units that can be used is two CJ-series Units and seven CP1W/CPM1A Expansion Units and Expansion I/O Units. The current consumption for the CP1H must be no more than 2 A for 5 V and 1 A for 24 V, and the total current consumption must be no more than 30 W. Check the total current consumption to be sure these limits are not exceeded referring to page 29 for the CP1H CPU Unit and CP1W Expansion Unit and Expansion I/O Unit current consumptions and to the above table for CJ-series Unit current consumptions.

\* The current consumption increases by 0.15 A/Adapter when NT-AL001 Link Adapters are used.

# CPU Unit Specifications

## ■ I/O Bits and I/O Allocations

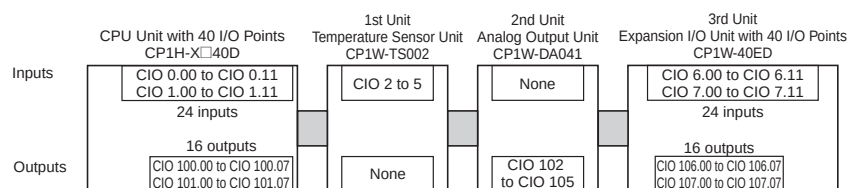
With CP1H and CP1L CPU Units, the beginning input and output words (CIO 0 and CIO 100) are allocated by the CPU Unit one or two words at a time. I/O bits are allocated in word units in order of connection to Expansion Units and Expansion I/O Units connected to a CPU Unit.

| CPU Unit                                    | Allocated words         |                               |
|---------------------------------------------|-------------------------|-------------------------------|
|                                             | Inputs                  | Outputs                       |
| CP1H CPU Unit with 40 I/O points            | CIO 0 and CIO 1         | CIO 100 and CIO 101           |
| 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 CIO 102 |

**Note:** For details on the number of words allocated to Expansion Units and Expansion I/O Units, refer to *Words Allocated to CP1W Expansion Units and Expansion I/O Units* on page 26.

## ● 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



## ■ General Specifications

| Item                          | Type                                                                                                                                                                                                                  | AC power supply models   | DC power supply models                                                                                              |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------|
|                               | Model                                                                                                                                                                                                                 | CP1H-□□□-A<br>CP1L-□□□-A | CP1H-□□□-D<br>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             | 100 VA max. (CP1H-□□□-A)<br>50 VA max. (CP1L-M60/-M40/-M30□□-A) (See next page.)<br>30 VA max. (CP1L-L20/-L14/-L10□□-A)                                                                                               |                          | 50 W max. (CP1H-□□□-D)<br>20 W max. (CP1L-M60/-M40/-M30□□-D) (See next page.)<br>13 W max. (CP1L-L20/-L14/-L10□□-D) |
| Inrush current (See note.)    | 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 (CP1H, 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 <sup>2</sup> 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 <sup>2</sup> 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.                                                                                                           |

**Note:** 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.



# CPU Unit Specifications

## ■ Current Consumption

The power consumption shown on page 28 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. (When using CJ-series Units with the CP1H, add the current consumption for the CJ-series Units shown on page 27.)

## ● CPU Units

| Model          | Current consumption |        | External power supply   |
|----------------|---------------------|--------|-------------------------|
|                | 5 VDC               | 24 VDC | 24 VDC (See note 5.)    |
| CP1H-X40DR-A   | 0.42 A              | 0.07 A | 0.3 A max. (0.9 A max.) |
| CP1H-X40DT-D   | 0.50 A              | 0.01 A | ---                     |
| CP1H-X40DT1-D  | 0.50 A              | 0.02 A | ---                     |
| CP1H-XA40DR-A  | 0.43 A              | 0.18 A | 0.3 A max. (0.8 A max.) |
| CP1H-XA40DT-D  | 0.51 A              | 0.12 A | ---                     |
| CP1H-XA40DT1-D | 0.51 A              | 0.15 A | ---                     |
| CP1H-Y20DT-D   | 0.55 A              | ---    | ---                     |
| 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   | 0.28 A              | 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   | 0.20 A              | 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              | 0.03 A | ---                     |
| 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              | 0.03 A | ---                     |
| 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.** CPU Units with DC power do not provide an external power supply.

**3.** 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.

**4.** 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.

**5.** 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) or *CP1H CPU Unit Operation Manual* (Cat. No. W450) for details.

# CPU Unit Specifications

## ● 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             | ---     |

# CPU Unit Specifications

## ■ Characteristics

### ● CP1H

| Type                                        |                           | CP1H-XA CPU Units                                                                                                                                                                                                                                              | CP1H-X CPU Units                                                                                                                 | CP1H-Y CPU Units                                                                                      |
|---------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Item                                        | Models                    | CP1H-XA□□□□-□                                                                                                                                                                                                                                                  | CP1H-X□□□□-□                                                                                                                     | CP1H-Y□□□□-□                                                                                          |
| 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<br>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: 0.10 μs min. Special instructions: 0.15 μs min.                                                                                                                                                                                            |                                                                                                                                  |                                                                                                       |
| Common processing time                      |                           | 0.7 ms                                                                                                                                                                                                                                                         |                                                                                                                                  |                                                                                                       |
| Program capacity                            |                           | 20K steps                                                                                                                                                                                                                                                      |                                                                                                                                  |                                                                                                       |
| Number of tasks                             |                           | 288 (32 cyclic tasks and 256 interrupt tasks)                                                                                                                                                                                                                  |                                                                                                                                  |                                                                                                       |
|                                             | Scheduled interrupt tasks | 1 (interrupt task No. 2, fixed)                                                                                                                                                                                                                                |                                                                                                                                  |                                                                                                       |
|                                             | Input interrupt tasks     | 8 (interrupt task No. 140 to 147, fixed)                                                                                                                                                                                                                       | 6 (interrupt task No. 140 to 145, fixed)                                                                                         |                                                                                                       |
|                                             |                           | (Interrupt tasks can also be specified and executed for high-speed counter interrupts.)                                                                                                                                                                        |                                                                                                                                  |                                                                                                       |
| Maximum subroutine number                   |                           | 256                                                                                                                                                                                                                                                            |                                                                                                                                  |                                                                                                       |
| Maximum jump number                         |                           | 256                                                                                                                                                                                                                                                            |                                                                                                                                  |                                                                                                       |
| I/O areas<br>(See note.)                    | Input bits                | 1,600 bits (100 words): CIO 0.00 to CIO 99.15 (The 24 built-in inputs are allocated in CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11.)                                                                                                                         |                                                                                                                                  |                                                                                                       |
|                                             | Output bits               | 1,600 bits (100 words): CIO 100.00 to CIO 199.15 (The 16 built-in outputs are allocated in CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07.)                                                                                                             |                                                                                                                                  |                                                                                                       |
|                                             | Built-in Analog Inputs    | CIO 200 to CIO 203                                                                                                                                                                                                                                             | ---                                                                                                                              |                                                                                                       |
|                                             | Built-in Analog Outputs   | CIO 210 to CIO 211                                                                                                                                                                                                                                             | ---                                                                                                                              |                                                                                                       |
|                                             | 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): W0.00 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                                                                                                                                                                                                                                        |                                                                                                                                  |                                                                                                       |
| 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.<br>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 two Ethernet Option Boards can be mounted. When using CP1W-CIF41 Ver.1.0, one Ethernet 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)                                                                                                                                                                                                                                     | 20 (12 inputs, 8 outputs)<br>Line-driver inputs: Two axes for phases A, B, and Z<br>Line-driver outputs: Two axes for CW and CCW |                                                                                                       |
| Number of connectable Expansion (I/O) Units |                           | CP Expansion I/O Units: 7 max.; CJ-series Special I/O Units or CPU Bus Units: 2 max.                                                                                                                                                                           |                                                                                                                                  |                                                                                                       |
| Max. number of I/O points                   |                           | 320 (40 built in + 40 per Expansion (I/O) Unit × 7 Units)                                                                                                                                                                                                      |                                                                                                                                  | 300 (20 built in + 40 per Expansion (I/O) Unit × 7 Units)                                             |
| Interrupt inputs                            |                           | 8 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)                                                                                                                                                               |                                                                                                                                  | 6 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)      |
| Interrupt input counter mode                |                           | 8 inputs (Response frequency: 5 kHz max. for all interrupt inputs),<br>16 bits<br>Up or down counters                                                                                                                                                          |                                                                                                                                  | 6 inputs (Response frequency: 5 kHz max. for all interrupt inputs),<br>16 bits<br>Up or down counters |
| Quick-response inputs                       |                           | 8 points (Min. input pulse width: 50 μs max.)                                                                                                                                                                                                                  |                                                                                                                                  | 6 points (Min. input pulse width: 50 μs max.)                                                         |
| Scheduled interrupts                        |                           | 1                                                                                                                                                                                                                                                              |                                                                                                                                  |                                                                                                       |

# CPU Unit Specifications

| Type                                                |               | CP1H-XA CPU Units                                                                                                                                                                                                           | CP1H-X CPU Units | CP1H-Y CPU Units                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item                                                | Models        | CP1H-XA□□□□-□                                                                                                                                                                                                               | CP1H-X□□□□-□     | CP1H-Y□□□□-□                                                                                                                                                                                                                                                                                          |
| High-speed counters                                 |               | 4 inputs: Differential phases (4x), 50 kHz or 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 |                  | 2 inputs: Differential phases (4x), 500 kHz or Single-phase, 1 MHz and<br>2 inputs: Differential phases (4x), 50 kHz or 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>4 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)                                                                                 |                  | Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed)<br>2 outputs, 1 Hz to 1 MHz (CCW/CW or pulse plus direction)<br>2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)                                                                                              |
|                                                     | PWM outputs   | Duty ratio: 0.0% to 100.0% (Unit: 0.1%)<br>2 outputs, 0.1 to 6553.5 Hz (Accuracy: ±5% at 1 kHz)                                                                                                                             |                  |                                                                                                                                                                                                                                                                                                       |
| Built-in analog I/O terminals                       |               | 4 analog inputs and 2 analog outputs                                                                                                                                                                                        | None             |                                                                                                                                                                                                                                                                                                       |
| Analog control                                      |               | 1 (Setting range: 0 to 255)                                                                                                                                                                                                 |                  |                                                                                                                                                                                                                                                                                                       |
| External analog input                               |               | 1 input (Resolution: 1/256, Input range: 0 to 10 V), not isolated                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                       |

**Note:** The memory areas for CJ-series Special I/O Units and CPU Bus Units are allocated at the same as for the CJ-series. For details, refer to the CJ Series catalog (Cat. No. P052).

## ● CP1L

| Type                       |                           | CP1L-M60<br>(60 points)                                                                                                                                                        | CP1L-M40<br>(40 points)                           | CP1L-M30<br>(30 points)                                   | CP1L-L20<br>(20 points)                  | CP1L-L14<br>(14 points)                  | CP1L-L10<br>(10 points)                  |
|----------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Item                       | Models                    | CP1L-M60□□□-□                                                                                                                                                                  | CP1L-M40□□□-□                                     | CP1L-M30□□□-□                                             | CP1L-L20□□□-□                            | CP1L-L14□□□-□                            | CP1L-L10□□□-□                            |
| Control method             |                           | Stored program method                                                                                                                                                          |                                                   |                                                           |                                          |                                          |                                          |
| I/O control method         |                           | Cyclic scan with immediate refreshing                                                                                                                                          |                                                   |                                                           |                                          |                                          |                                          |
| Program language           |                           | Ladder diagram                                                                                                                                                                 |                                                   |                                                           |                                          |                                          |                                          |
| Function blocks            |                           | Maximum number of function block definitions: 128<br>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. <b>Note:</b> Can be used for program backups and auto-booting.                                                          |                                                   |                                                           |                                          |                                          |                                          |



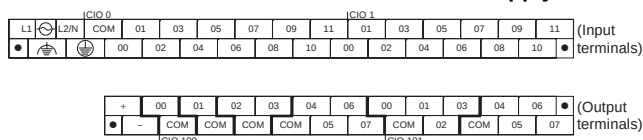
# CPU Unit Specifications

| Type                                                          |               | CP1L-M60<br>(60 points)                                                                                                                                                                                                                                        | CP1L-M40<br>(40 points)                                   | CP1L-M30<br>(30 points)                                   | CP1L-L20<br>(20 points)                                             | CP1L-L14<br>(14 points)                                                                         | CP1L-L10<br>(10 points)                                                                         |
|---------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Item                                                          | Models        | CP1L-M60□□-□                                                                                                                                                                                                                                                   | CP1L-M40□□-□                                              | CP1L-M30□□-□                                              | CP1L-L20□□-□                                                        | CP1L-L14□□-□                                                                                    | CP1L-L10□□-□                                                                                    |
| Clock function                                                |               | Supported. Accuracy (monthly deviation): −4.5 min to −0.5 min (ambient temperature: 55°C), −2.0 min to +2.0 min (ambient temperature: 25°C), −2.5 min to +1.5 min (ambient temperature: 0°C)                                                                   |                                                           |                                                           |                                                                     |                                                                                                 |                                                                                                 |
| Communications functions                                      |               | One built-in peripheral port (USB 1.1): For connecting Support Software only.                                                                                                                                                                                  |                                                           |                                                           |                                                                     |                                                                                                 |                                                                                                 |
|                                                               |               | A maximum of two Serial Communications Option Boards can be mounted.                                                                                                                                                                                           |                                                           |                                                           | A maximum of one Serial Communications Option Board can be mounted. |                                                                                                 | Not supported.                                                                                  |
|                                                               |               | A maximum of two Ethernet Option Board can be mounted. When using CP1W-CIF41 Ver.1.0, one Ethernet Option Board can be mounted.                                                                                                                                |                                                           |                                                           | A maximum of one Ethernet Option Board can be mounted.              |                                                                                                 | Not supported.                                                                                  |
| Memory backup                                                 |               | Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to flash memory as initial values.<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)                                                                |
| 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.                                                                                                                                                                                             |                                                           |                                                           |                                                                     |                                                                                                 |                                                                                                 |

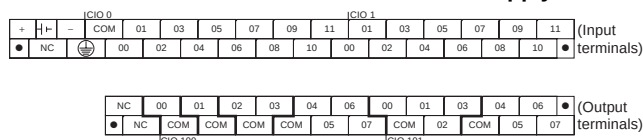
# CPU Unit Specifications

## ■ Terminal Block Arrangement

### ● CP1H-XA and X CPU Units with AC Power Supply



### ● CP1H-XA and X CPU Units with DC Power supply



## ■ Built-in Input Area

### ● CP1H-XA and X CPU Units

| PLC Setup | Input operation |                  |                       | High-speed counter operation | Pulse output origin search function set to be used.           |
|-----------|-----------------|------------------|-----------------------|------------------------------|---------------------------------------------------------------|
|           | Normal inputs   | Interrupt inputs | Quick-response inputs | High-speed counters          | Origin search                                                 |
| CIO 0     | 00              | Normal input 0   | Interrupt input 0     | Quick-response input 0       | Pulse 0: Origin input signal                                  |
|           | 01              | Normal input 1   | Interrupt input 1     | Quick-response input 1       | High-speed counter 2 (phase-Z/reset)                          |
|           | 02              | Normal input 2   | Interrupt input 2     | Quick-response input 2       | High-speed counter 1 (phase-Z/reset)                          |
|           | 03              | Normal input 3   | Interrupt input 3     | Quick-response input 3       | High-speed counter 0 (phase-Z/reset)                          |
|           | 04              | Normal input 4   |                       |                              | High-speed counter 2 (phase-A, increment, or count input)     |
|           | 05              | Normal input 5   |                       |                              | High-speed counter 2 (phase-B, decrement, or direction input) |
|           | 06              | Normal input 6   |                       |                              | High-speed counter 1 (phase-A, increment, or count input)     |
|           | 07              | Normal input 7   |                       |                              | High-speed counter 1 (phase-B, decrement, or direction input) |
|           | 08              | Normal input 8   |                       |                              | High-speed counter 0 (phase-A, increment, or count input)     |
|           | 09              | Normal input 9   |                       |                              | High-speed counter 0 (phase-B, decrement, or direction input) |
|           | 10              | Normal input 10  |                       |                              | High-speed counter 3 (phase-A, increment, or count input)     |
|           | 11              | Normal input 11  |                       |                              | High-speed counter 3 (phase-B, decrement, or direction input) |
| CIO 1     | 00              | Normal input 12  | Interrupt input 4     | Quick-response input 4       | High-speed counter 3 (phase-Z/reset)                          |
|           | 01              | Normal input 13  | Interrupt input 5     | Quick-response input 5       |                                                               |
|           | 02              | Normal input 14  | Interrupt input 6     | Quick-response input 6       |                                                               |
|           | 03              | Normal input 15  | Interrupt input 7     | Quick-response input 7       |                                                               |
|           | 04              | Normal input 16  |                       |                              |                                                               |
|           | 05              | Normal input 17  |                       |                              |                                                               |
|           | 06              | Normal input 18  |                       |                              |                                                               |
|           | 07              | Normal input 19  |                       |                              |                                                               |
|           | 08              | Normal input 20  |                       |                              |                                                               |
|           | 09              | Normal input 21  |                       |                              |                                                               |
|           | 10              | Normal input 22  |                       |                              |                                                               |
|           | 11              | Normal input 23  |                       |                              |                                                               |

## ■ Built-in Output Area

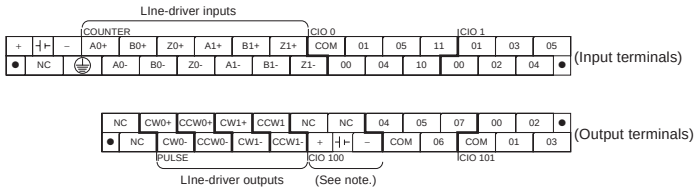
### ● CP1H-XA and CP1H-X CPU Units

| Instruct-ions | PLC Setup | 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 |
|---------------|-----------|-----------------------------------------------------|-----------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|               |           | Normal outputs                                      | Fixed duty ratio pulse outputs                                        |                            | When the origin search function is used                                                                                     | Variable duty ratio pulse output     |
| CIO 100       | 00        | Normal output 0                                     | Pulse output 0 (CW)                                                   | Pulse output 0 (pulse)     |                                                                                                                             |                                      |
|               | 01        | Normal output 1                                     | Pulse output 0 (CCW)                                                  | Pulse output 1 (pulse)     |                                                                                                                             |                                      |
|               | 02        | Normal output 2                                     | Pulse output 1 (CW)                                                   | Pulse output 0 (direction) |                                                                                                                             |                                      |
|               | 03        | Normal output 3                                     | Pulse output 1 (CCW)                                                  | Pulse output 1 (direction) |                                                                                                                             |                                      |
|               | 04        | Normal output 4                                     | Pulse output 2 (CW)                                                   | Pulse output 2 (pulse)     |                                                                                                                             |                                      |
|               | 05        | Normal output 5                                     | Pulse output 2 (CCW)                                                  | Pulse output 2 (direction) |                                                                                                                             |                                      |
|               | 06        | Normal output 6                                     | Pulse output 3 (CW)                                                   | Pulse output 3 (pulse)     |                                                                                                                             |                                      |
| CIO 101       | 07        | Normal output 7                                     | Pulse output 3 (CCW)                                                  | Pulse output 3 (direction) |                                                                                                                             |                                      |
|               | 00        | Normal output 8                                     |                                                                       |                            |                                                                                                                             | PWM output 0                         |
|               | 01        | Normal output 9                                     |                                                                       |                            |                                                                                                                             | PWM output 1                         |
|               | 02        | Normal output 10                                    |                                                                       |                            | Origin search 0 (Error counter reset output)                                                                                |                                      |
|               | 03        | Normal output 11                                    |                                                                       |                            | Origin search 1 (Error counter reset output)                                                                                |                                      |
| CIO 101       | 04        | Normal output 12                                    |                                                                       |                            | Origin search 2 (Error counter reset output)                                                                                |                                      |
|               | 05        | Normal output 13                                    |                                                                       |                            | Origin search 3 (Error counter reset output)                                                                                |                                      |
|               | 06        | Normal output 14                                    |                                                                       |                            |                                                                                                                             |                                      |
|               | 07        | Normal output 15                                    |                                                                       |                            |                                                                                                                             |                                      |

# CPU Unit Specifications

## ■ Terminal Block Arrangement

### ● CP1H-Y CPU Units



**Note:** Supply 24 VDC to the bottom 24 VDC input terminals when using bits 04 to 07 of output word CIO 100.

## ■ Built-in Input Area

### ● CP1H-Y CPU Units

| PLC Setup | Input operation setting |                  |                       | High-speed counter operation setting                                | Pulse output origin search function set to be used.           |
|-----------|-------------------------|------------------|-----------------------|---------------------------------------------------------------------|---------------------------------------------------------------|
|           | Normal inputs           | Interrupt inputs | Quick-response inputs | High-speed counters                                                 | Origin search                                                 |
| A0        |                         |                  |                       | High-speed counter 0 (phase-A, increment, or count input) fixed     |                                                               |
| B0        |                         |                  |                       | High-speed counter 0 (phase-B, decrement, or direction input) fixed |                                                               |
| Z0        |                         |                  |                       | High-speed counter 0 (phase-Z/reset) fixed                          | Pulse 0: Origin input signal (line driver)                    |
| A1        |                         |                  |                       | High-speed counter 1 (phase-A, increment, or count input) fixed     |                                                               |
| B1        |                         |                  |                       | High-speed counter 1 (phase-B, decrement, or direction input) fixed |                                                               |
| Z1        |                         |                  |                       | High-speed counter 1 (phase-Z/reset) fixed                          | Pulse 1: Origin input signal (line driver)                    |
| CIO 0     | Bit 00                  | Normal input 0   | Interrupt 0           | Quick-response input 0                                              | Pulse 2: Origin proximity input signal                        |
|           | Bit 01                  | Normal input 1   | Interrupt 1           | Quick-response input 1                                              | High-speed counter 2 (phase-Z/reset)                          |
|           | Bit 04                  | Normal input 2   |                       |                                                                     | High-speed counter 2 (phase-A, increment, or count input)     |
|           | Bit 05                  | Normal input 3   |                       |                                                                     | High-speed counter 2 (phase-B, decrement, or direction input) |
|           | Bit 10                  | Normal input 4   |                       |                                                                     | High-speed counter 3 (phase-A, increment, or count input)     |
|           | Bit 11                  | Normal input 5   |                       |                                                                     | High-speed counter 2 (phase-B, decrement, or direction input) |
| CIO 1     | Bit 00                  | Normal input 6   | Interrupt 2           | Quick-response input 2                                              | High-speed counter 2 (phase-Z/reset)                          |
|           | Bit 01                  | Normal input 7   | Interrupt 3           | Quick-response input 3                                              | Pulse 3: Origin input signal                                  |
|           | Bit 02                  | Normal input 8   | Interrupt 4           | Quick-response input 4                                              | Pulse 2: Origin input signal                                  |
|           | Bit 03                  | Normal input 9   | Interrupt 5           | Quick-response input 5                                              | Pulse 1: Origin input signal (open collector)                 |
|           | Bit 04                  | Normal input 10  |                       |                                                                     | Pulse 0: Origin input signal (open collector)                 |
|           | Bit 05                  | Normal input 11  |                       |                                                                     | Pulse 1: Origin proximity input signal                        |

These areas are for line-driver inputs, so they can be used only for high-speed counters (1 MHz) and not for other purposes, such as normal inputs.

## ■ Built-in Output Area

### ● CP1H-Y CPU Units

| Instructions | PLC Setup | 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 |
|--------------|-----------|-----------------------------------------------------|-----------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|              |           | Normal output                                       | Fixed duty ratio pulse output                                         |                                  |                                                                                                                             | Variable duty ratio pulse output     |
|              |           |                                                     | CW/CCW                                                                | Pulse plus direction             | When the origin search function is used                                                                                     | PWM output                           |
|              | CW0       | Not supported.                                      | Pulse output 0 (CW) fixed                                             | Pulse output 0 (pulse) fixed     |                                                                                                                             |                                      |
|              | CCW0      | Not supported.                                      | Pulse output 0 (CCW) fixed                                            | Pulse output 1 (pulse) fixed     |                                                                                                                             |                                      |
|              | CW1       | Not supported.                                      | Pulse output 1 (CW) fixed                                             | Pulse output 0 (direction) fixed |                                                                                                                             |                                      |
|              | CCW1      | Not supported.                                      | Pulse output 1 (CCW) fixed                                            | Pulse output 1 (direction) fixed |                                                                                                                             |                                      |
| CIO 100      | Bit 04    | 100.04                                              | Pulse output 2 (CW)                                                   | Pulse output 2 (pulse)           |                                                                                                                             |                                      |
|              | Bit 05    | 100.05                                              | Pulse output 2 (CCW)                                                  | Pulse output 2 (direction)       |                                                                                                                             |                                      |
|              | Bit 06    | 100.06                                              | Pulse output 3 (CW)                                                   | Pulse output 3 (pulse)           |                                                                                                                             |                                      |
|              | Bit 07    | 100.07                                              | Pulse output 3 (CCW)                                                  | Pulse output 3 (direction)       |                                                                                                                             |                                      |
| CIO 101      | Bit 00    | 101.00                                              |                                                                       |                                  | Origin search 2 (Error counter reset output)                                                                                | PWM output 0                         |
|              | Bit 01    | 101.01                                              |                                                                       |                                  | Origin search 3 (Error counter reset output)                                                                                | PWM output 1                         |
|              | Bit 02    | 101.02                                              |                                                                       |                                  | Origin search 0 (Error counter reset output)                                                                                |                                      |
|              | Bit 03    | 101.03                                              |                                                                       |                                  | Origin search 1 (Error counter reset output)                                                                                |                                      |

These areas are for line-driver inputs, so they can be used only for high-speed counters (1 MHz) and not for other purposes, such as normal inputs.

# CPU Unit Specifications

## ■ Input Terminal Block Arrangement (Top Block)

### ● CP1L (60 Inputs)

· AC Power Supply Models

|                |      |     |    |    |    |                |    |    |    |    |    |                |    |    |    |    |    |    |    |    |  |  |  |
|----------------|------|-----|----|----|----|----------------|----|----|----|----|----|----------------|----|----|----|----|----|----|----|----|--|--|--|
| L1             | L2/N | COM | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 | 07 | 09 | 11 |  |  |  |
|                |      |     | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | 06 | 08 | 10 |  |  |  |
| Inputs (CIO 0) |      |     |    |    |    | Inputs (CIO 1) |    |    |    |    |    | Inputs (CIO 2) |    |    |    |    |    |    |    |    |  |  |  |

· DC Power Supply Models

|                |   |     |    |    |    |                |    |    |    |    |    |                |    |    |    |    |    |    |    |    |  |  |  |
|----------------|---|-----|----|----|----|----------------|----|----|----|----|----|----------------|----|----|----|----|----|----|----|----|--|--|--|
| +              | - | COM | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 | 07 | 09 | 11 |  |  |  |
| NC             |   |     | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | 06 | 08 | 10 |  |  |  |
| Inputs (CIO 0) |   |     |    |    |    | Inputs (CIO 1) |    |    |    |    |    | Inputs (CIO 2) |    |    |    |    |    |    |    |    |  |  |  |

### ● CP1L (40 Inputs)

· AC Power Supply Models

|                |      |     |    |    |    |                |    |    |    |    |    |    |    |    |  |  |  |
|----------------|------|-----|----|----|----|----------------|----|----|----|----|----|----|----|----|--|--|--|
| L1             | L2/N | COM | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 | 07 | 09 | 11 |  |  |  |
|                |      |     | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | 06 | 08 | 10 |  |  |  |
| Inputs (CIO 0) |      |     |    |    |    | Inputs (CIO 1) |    |    |    |    |    |    |    |    |  |  |  |

· DC Power Supply Models

|                |   |     |    |    |    |                |    |    |    |    |    |    |    |    |  |  |  |
|----------------|---|-----|----|----|----|----------------|----|----|----|----|----|----|----|----|--|--|--|
| +              | - | COM | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 | 07 | 09 | 11 |  |  |  |
| NC             |   |     | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | 06 | 08 | 10 |  |  |  |
| Inputs (CIO 0) |   |     |    |    |    | Inputs (CIO 1) |    |    |    |    |    |    |    |    |  |  |  |

### ● CP1L (30 inputs)

AC Power Supply Models

|                |      |     |    |    |    |                |    |    |    |    |    |    |
|----------------|------|-----|----|----|----|----------------|----|----|----|----|----|----|
| L1             | L2/N | COM | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 |    |
|                |      |     | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | NC |
| Inputs (CIO 0) |      |     |    |    |    | Inputs (CIO 1) |    |    |    |    |    |    |

DC Power Supply Models

|                |   |     |    |    |    |                |    |    |    |    |    |    |
|----------------|---|-----|----|----|----|----------------|----|----|----|----|----|----|
| +              | - | COM | 01 | 03 | 05 | 07             | 09 | 11 | 01 | 03 | 05 |    |
| NC             |   |     | 00 | 02 | 04 | 06             | 08 | 10 | 00 | 02 | 04 | NC |
| Inputs (CIO 0) |   |     |    |    |    | Inputs (CIO 1) |    |    |    |    |    |    |

### ● CP1L (20 Inputs)

· AC Power Supply Models

|                |      |     |    |    |    |    |    |    |
|----------------|------|-----|----|----|----|----|----|----|
| L1             | L2/N | COM | 01 | 03 | 05 | 07 | 09 | 11 |
|                |      |     | 00 | 02 | 04 | 06 | 08 | 10 |
| Inputs (CIO 0) |      |     |    |    |    |    |    |    |

· DC Power Supply Models

|                |   |     |    |    |    |    |    |    |
|----------------|---|-----|----|----|----|----|----|----|
| +              | - | COM | 01 | 03 | 05 | 07 | 09 | 11 |
| NC             |   |     | 00 | 02 | 04 | 06 | 08 | 10 |
| Inputs (CIO 0) |   |     |    |    |    |    |    |    |

### ● CP1L (14 Inputs)

· AC Power Supply Models

|                |      |     |    |    |    |    |    |    |
|----------------|------|-----|----|----|----|----|----|----|
| L1             | L2/N | COM | 01 | 03 | 05 | 07 | NC | NC |
|                |      |     | 00 | 02 | 04 | 06 | NC | NC |
| Inputs (CIO 0) |      |     |    |    |    |    |    |    |

· DC Power Supply Models

|                |   |     |    |    |    |    |    |    |
|----------------|---|-----|----|----|----|----|----|----|
| +              | - | COM | 01 | 03 | 05 | 07 | NC | NC |
| NC             |   |     | 00 | 02 | 04 | 06 | NC | NC |
| Inputs (CIO 0) |   |     |    |    |    |    |    |    |

### ● CP1L (10 Inputs)

· AC Power Supply Models

|                |      |     |    |    |    |
|----------------|------|-----|----|----|----|
| L1             | L2/N | COM | 01 | 03 | 05 |
|                |      |     | 00 | 02 | 04 |
| Inputs (CIO 0) |      |     |    |    |    |

· DC Power Supply Models

|                |  |     |    |    |    |
|----------------|--|-----|----|----|----|
| {              |  | COM | 01 | 03 | 05 |
| NC             |  |     | 00 | 02 | 04 |
| Inputs (CIO 0) |  |     |    |    |    |

# CPU Unit Specifications

## ■ Built-in Input Area

### ● CP1L

| Number of inputs | Input terminal block |     | Input operation |                   |                        | High-speed counter operation                                                  |                                                                     | Origin search                                     |                                               |                                               |
|------------------|----------------------|-----|-----------------|-------------------|------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------|-----------------------------------------------|
|                  | Word                 | Bit | Normal inputs   | Interrupt inputs  | Quick-response inputs  | Operation settings<br>• High-speed counters enabled<br>• Phase-Z signal reset |                                                                     | Origin searches enabled for pulse outputs 0 and 1 |                                               |                                               |
|                  |                      |     |                 |                   |                        | 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-          |
|                  |                      | 06  | Normal input 6  | Interrupt input 2 | Quick-response input 2 | Counter 2, phase-Z/reset input                                                |                                                                     | Pulse output 0: Origin input signal               |                                               | ---                                           |
|                  |                      | 07  | Normal input 7  | Interrupt input 3 | Quick-response input 3 | Counter 3, phase-Z/reset input                                                |                                                                     | Pulse output 1: Origin input signal               |                                               | ---                                           |
|                  |                      | 08  | Normal input 8  | Interrupt input 4 | Quick-response input 4 | ---                                                                           |                                                                     | ---                                               | ---                                           | ---                                           |
|                  |                      | 09  | Normal input 9  | Interrupt input 5 | Quick-response input 5 | ---                                                                           |                                                                     | ---                                               | ---                                           | ---                                           |
|                  |                      | 10  | Normal input 10 | ---               | ---                    | ---                                                                           |                                                                     | Pulse output 0: Origin proximity input signal     | ---                                           | ---                                           |
| 14               | CIO 0                | 11  | Normal input 11 | ---               | ---                    | ---                                                                           |                                                                     | Pulse output 1: Origin proximity input signal     | ---                                           | ---                                           |
|                  | CIO 1                | 00  | Normal input 12 | ---               | ---                    | ---                                                                           |                                                                     | ---                                               | ---                                           | ---                                           |
|                  |                      | to  | to              | to                | to                     | to                                                                            | to                                                                  | to                                                | to                                            | to                                            |
|                  |                      | 05  | Normal input 17 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  |                      | 06  | Normal input 18 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  |                      | to  | to              | to                | to                     | to                                                                            | to                                                                  | to                                                | to                                            | to                                            |
| 20               | CIO 2                | 11  | Normal input 23 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  | CIO 2                | 00  | Normal input 24 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  |                      | to  | to              | to                | to                     | to                                                                            | to                                                                  | to                                                | to                                            | to                                            |
| 30               | CIO 2                | 11  | Normal input 35 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  | CIO 2                | 00  | Normal input 24 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  |                      | to  | to              | to                | to                     | to                                                                            | to                                                                  | to                                                | to                                            | to                                            |
| 40               | CIO 2                | 11  | Normal input 35 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  | CIO 2                | 00  | Normal input 24 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  |                      | to  | to              | to                | to                     | to                                                                            | to                                                                  | to                                                | to                                            | to                                            |
| 60               | CIO 2                | 11  | Normal input 35 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  | CIO 2                | 00  | Normal input 24 | ---               | ---                    | ---                                                                           | ---                                                                 | ---                                               | ---                                           | ---                                           |
|                  |                      | to  | to              | to                | to                     | to                                                                            | to                                                                  | to                                                | to                                            | to                                            |



# CPU Unit Specifications

## Output Terminal Block Arrangement (Bottom Block)

### CP1L (60 Outputs)

· AC Power Supply Models

|         |     |     |     |    |     |         |     |    |    |     |    |         |    |    |     |    |
|---------|-----|-----|-----|----|-----|---------|-----|----|----|-----|----|---------|----|----|-----|----|
| +       | 00  | 01  | 02  | 04 | 05  | 07      | 00  | 02 | 04 | 05  | 07 | 00      | 02 | 04 | 05  | 07 |
| -       | COM | COM | COM | 03 | COM | 06      | COM | 01 | 03 | COM | 06 | COM     | 01 | 03 | COM | 06 |
| CIO 100 |     |     |     |    |     | CIO 101 |     |    |    |     |    | CIO 102 |    |    |     |    |

· DC Power Supply Models

|         |     |     |     |    |     |         |     |    |    |     |    |         |    |    |     |    |
|---------|-----|-----|-----|----|-----|---------|-----|----|----|-----|----|---------|----|----|-----|----|
| NC      | 00  | 01  | 02  | 04 | 05  | 07      | 00  | 02 | 04 | 05  | 07 | 00      | 02 | 04 | 05  | 07 |
| NC      | COM | COM | COM | 03 | COM | 06      | COM | 01 | 03 | COM | 06 | COM     | 01 | 03 | COM | 06 |
| CIO 100 |     |     |     |    |     | CIO 101 |     |    |    |     |    | CIO 102 |    |    |     |    |

### CP1L (40 Outputs)

· AC Power Supply Models

|         |     |     |     |         |    |    |     |    |     |    |    |
|---------|-----|-----|-----|---------|----|----|-----|----|-----|----|----|
| +       | 00  | 01  | 02  | 03      | 04 | 06 | 00  | 01 | 03  | 04 | 05 |
| -       | COM | COM | COM | COM     | 05 | 07 | COM | 02 | COM | 05 | 07 |
| CIO 100 |     |     |     | CIO 101 |    |    |     |    |     |    |    |

· DC Power Supply Models

|         |     |     |     |         |    |    |     |    |     |    |    |
|---------|-----|-----|-----|---------|----|----|-----|----|-----|----|----|
| NC      | 00  | 01  | 02  | 03      | 04 | 06 | 00  | 01 | 03  | 04 | 05 |
| NC      | COM | COM | COM | COM     | 05 | 07 | COM | 02 | COM | 05 | 07 |
| CIO 100 |     |     |     | CIO 101 |    |    |     |    |     |    |    |

### CP1L (30 Outputs)

· AC Power Supply Models

|         |     |     |     |         |     |    |     |    |    |
|---------|-----|-----|-----|---------|-----|----|-----|----|----|
| +       | 00  | 01  | 02  | 04      | 05  | 07 | 00  | 02 |    |
| -       | COM | COM | COM | 03      | COM | 06 | COM | 01 | 03 |
| CIO 100 |     |     |     | CIO 101 |     |    |     |    |    |

· DC Power Supply Models

|         |     |     |     |         |     |    |     |    |    |
|---------|-----|-----|-----|---------|-----|----|-----|----|----|
| NC      | 00  | 01  | 02  | 04      | 05  | 07 | 00  | 02 |    |
| NC      | COM | COM | COM | 03      | COM | 06 | COM | 01 | 03 |
| CIO 100 |     |     |     | CIO 101 |     |    |     |    |    |

### CP1L (20 Outputs)

· AC Power Supply Models

|         |     |     |     |    |     |    |
|---------|-----|-----|-----|----|-----|----|
| +       | 00  | 01  | 02  | 04 | 05  | 07 |
| -       | COM | COM | COM | 03 | COM | 06 |
| CIO 100 |     |     |     |    |     |    |

· DC Power Supply Models

|         |     |     |     |    |     |    |
|---------|-----|-----|-----|----|-----|----|
| NC      | 00  | 01  | 02  | 04 | 05  | 07 |
| NC      | COM | COM | COM | 03 | COM | 06 |
| CIO 100 |     |     |     |    |     |    |

### CP1L (14 Outputs)

· AC Power Supply Models

|         |     |     |     |    |     |    |
|---------|-----|-----|-----|----|-----|----|
| +       | 00  | 01  | 02  | 04 | 05  | NC |
| -       | COM | COM | COM | 03 | COM | NC |
| CIO 100 |     |     |     |    |     |    |

· DC Power Supply Models

|         |     |     |     |    |     |    |
|---------|-----|-----|-----|----|-----|----|
| NC      | 00  | 01  | 02  | 04 | 05  | NC |
| NC      | COM | COM | COM | 03 | COM | NC |
| CIO 100 |     |     |     |    |     |    |

### CP1L (10 Outputs)

· AC Power Supply Models

|         |     |     |     |    |
|---------|-----|-----|-----|----|
| {       | 00  | 01  | 02  |    |
|         | COM | COM | COM | 03 |
| CIO 100 |     |     |     |    |

· DC Power Supply Models

|         |     |     |     |    |
|---------|-----|-----|-----|----|
| NC      | 00  | 01  | 02  |    |
| NC      | COM | COM | COM | 03 |
| CIO 100 |     |     |     |    |

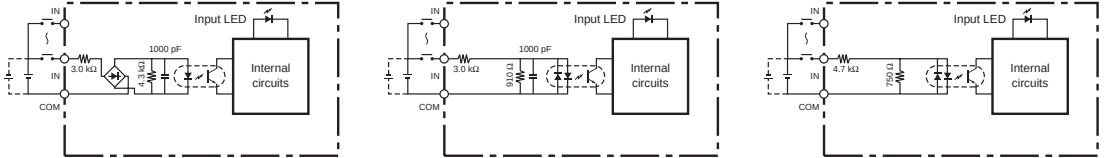
## Built-in Output Area

### CP1L

| Number of outputs |         |    |                  | Output Terminal Block |                            | When the instructions to the right are not executed | When a pulse output instruction (SPED, ACC, PLS2, or ORG) is executed |                      | When the origin search function is set to be used in the PLC Setup, and an origin search is executed by the ORG instruction | When the PWM instruction is executed |            |                                  |
|-------------------|---------|----|------------------|-----------------------|----------------------------|-----------------------------------------------------|-----------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|----------------------------------|
|                   |         |    |                  | Word                  | Bit                        | Normal output                                       | Fixed duty ratio pulse output                                         |                      |                                                                                                                             |                                      |            | Variable duty ratio pulse 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         |                                                                                                                             |                                      |            |                                  |
|                   |         | 04 | Normal output 4  | ---                   | ---                        | Origin search 0 (Error counter reset output)        | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   |         | 05 | Normal output 5  | ---                   | ---                        | Origin search 1 (Error counter reset output)        | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   |         | 06 | Normal output 6  | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   |         | 07 | Normal output 7  | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   | CIO 101 | 00 | Normal output 8  | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   |         | to | to               | to                    | to                         | to                                                  | to                                                                    | to                   |                                                                                                                             |                                      |            |                                  |
|                   |         | 03 | Normal output 11 | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   |         | 04 | Normal output 12 | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   | CIO 102 | 01 | Normal output 16 | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |
|                   |         | to | to               | to                    | to                         | to                                                  | to                                                                    | to                   |                                                                                                                             |                                      |            |                                  |
|                   |         | 07 | Normal output 23 | ---                   | ---                        | ---                                                 | ---                                                                   | ---                  |                                                                                                                             |                                      |            |                                  |

# CPU Unit Specifications

## Input Specifications

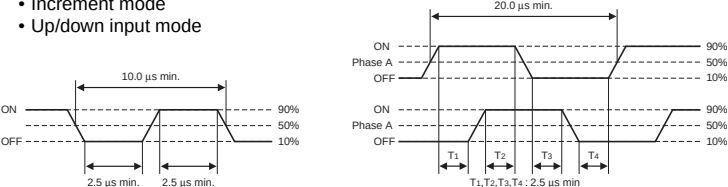
| ITEM                   | Specifications                                                                     |                                                  |                                                                      |
|------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------|
|                        | High-speed counter inputs<br>(phases A and B)                                      | Interrupt inputs and<br>quick-response inputs    | Normal inputs                                                        |
| CP1L                   | CIO 0.00 to CIO 0.03                                                               | CIO 0.04 to CIO 0.09                             | CIO 0.10, CIO 0.11,<br>CIO 1.00 to CIO 1.11, and<br>CIO 2.00 to 2.11 |
| CP1H-XA/X CPU<br>Units | CIO 0.04 to CIO 0.11                                                               | CIO 0.00 to CIO 0.03 and<br>CIO 1.00 to CIO 1.03 | CIO 1.04 to CIO 1.11                                                 |
| CP1H-Y CPU Units       | CIO 0.04, CIO 0.05, CIO 0.10, CIO 0.11                                             | CIO 0.00, CIO 0.01 and<br>CIO 1.00 to CIO 1.03   | CIO 1.04, CIO 1.05                                                   |
| 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

CP1L CPU Units (Input bits: CIO 0.00 to CIO 0.03)

CP1H-XA/X CPU Units (Input bits: CIO 0.04 to CIO 0.11)

CP1H-Y CPU Units (Input bits: CIO 0.04, CIO 0.05, CIO 0.10, CIO 0.11)

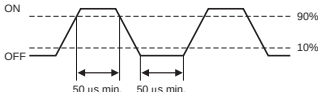
| Item         | Specifications                                                                                                                                                                                                                                                    |
|--------------|-----------------------------------------------------------------------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

## Interrupt Input Counter Mode

CP1L CPU Units (Input bits: CIO 0.04 to CIO 0.09)

CP1H-XA/X CPU Units (Input bits: CIO 0.00 to CIO 0.03, CIO 1.00 to CIO 1.03)

CP1H-Y CPU Units (Input bits: CIO 0.00, CIO 0.11, CIO 1.00 to CIO 1.03)

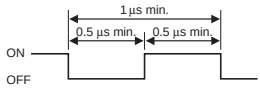
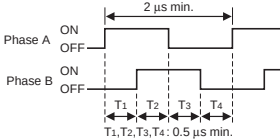
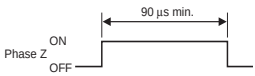
| Item         | Specifications                                                                      |
|--------------|-------------------------------------------------------------------------------------|
| ON/OFF delay |  |

## High-speed Counter Inputs (Line-driver Inputs)

CP1H-Y CPU Units

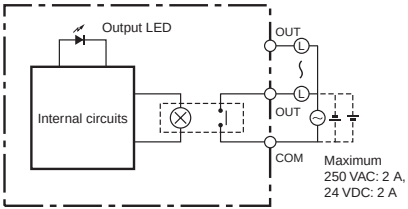
| Item                      | Specifications                                                                                                       |               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|---------------|
| High-speed counter inputs | Phases A and B                                                                                                       | Phase Z       |
| Input voltage             | RS-422A line-driver, AM26LS31 or equivalent<br>Note: The power supply voltage on the line-driver must be 5 V±5% max. |               |
| Input type                | Line-driver input                                                                                                    |               |
| Input current             | 10 mA typical                                                                                                        | 13 mA typical |
| Circuit configuration     |                                  |               |

# CPU Unit Specifications

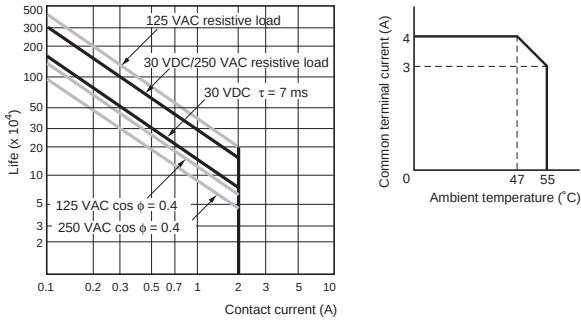
| Item         | Specifications                                                                                                                          |                                                                                                                                                  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

■ Output Specifications

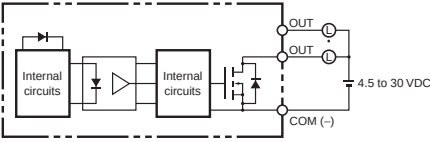
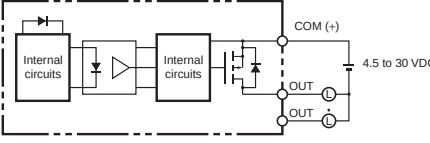
● CPU Units with Relay Outputs

| 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   | Resistive load<br>100,000 operations (24 VDC)                                      |
|                         | Inductive load<br>48,000 operations (250 VAC, cosφ = 0.4)                          |
|                         | Mechanical<br>20,000,000 operations                                                |
| ON delay                | 15 ms max.                                                                         |
| OFF delay               | 15 ms max.                                                                         |
| Circuit configuration   |  |

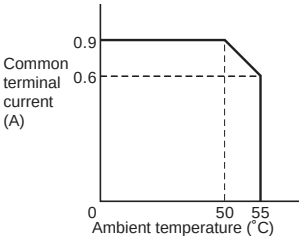
**Note:** Under the worst conditions, the service life of output contacts is as shown on the left.  
The service life of relays is as shown in the following diagram as a guideline.



● CPU Units with Transistor Outputs (Sinking/Sourcing)

| Item                    | Specifications                                                                                                 |                        |                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------|
| CP1L CPU Units          | CIO 100.00 to CIO 100.03                                                                                       | ---                    | CIO 100.04 to CIO 101.07<br>CIO 102.00 to CIO 102.11 |
| CP1H-XA/X CPU Units     | CIO 100.00 to CIO 100.07                                                                                       | CIO 101.00, CIO 101.01 | CIO 101.02 to CIO 101.07                             |
| CP1H-Y CPU Units        | CIO 100.04 to CIO 100.07                                                                                       | CIO 101.00, CIO 101.01 | CIO 101.02, CIO 101.03                               |
| 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   | <b>Sinking Outputs</b><br>  |                        |                                                      |
|                         | <b>Sourcing Outputs</b><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.



# CPU Unit Specifications

## ● Pulse outputs

CP1L CPU Units: Output bits CIO 100.00 to CIO 100.03

CP1H-XA/X CPU Units: Output bits CIO 100.00 to CIO 100.07

CP1H-Y CPU Units: Output bits CIO100.04 to CIO 100.07

| 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 (Line-driver Outputs)

CP1H-Y CPU Units

| Item                  | Specifications                              |
|-----------------------|---------------------------------------------|
| Pulse outputs         | Line-driver outputs, Am26LS31 or equivalent |
| Max. output current   | 20 mA                                       |
| Max. output frequency | 1 MHz                                       |
| Circuit configuration |                                             |

**Note:** Connect a load of 20 mA or less to the output. The Unit may be damaged if a current of more than 20 mA is output.

## ● Pulse outputs

CP1L CPU Units: Output bits CIO100.01, CIO 100.03

CP1H-XA/X/Y CPU Units: Output bits CIO101.00, CIO 101.01

| Item                    | Specifications                                |
|-------------------------|-----------------------------------------------|
| Max. switching capacity | 30 mA at 4.75 to 26.4 VDC                     |
| Max. output frequency   | CP1H: 1 kHz, 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".

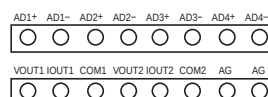
## ■ Analog I/O Specifications (CP1H-XA CPU Units Only)

| Item                  |                                           | Voltage I/O                                                                                                         | Current I/O                                        |
|-----------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Analog Input Section  | Number of analog inputs                   | 4                                                                                                                   |                                                    |
|                       | Input signal range                        | 0 to 5 V, 1 to 5 V, 0 to 10 V, or -10 to 10 V                                                                       | 0 to 20 mA or 4 to 20 mA                           |
|                       | Max. rated input                          | ±15 V                                                                                                               | ±30 mA                                             |
|                       | External input impedance                  | 1 MΩ min.                                                                                                           | Approx. 250 Ω                                      |
|                       | Resolution                                | 1/6,000 or 1/12,000 (full scale)                                                                                    |                                                    |
|                       | Overall accuracy                          | 25°C: ±0.3% full scale/0 to 55°C: ±0.6% full scale                                                                  | 25°C: ±0.4% full scale/0 to 55°C: ±0.8% full scale |
|                       | A/D conversion data                       | Full scale for -10 to 10 V: F448 (E890) to 0BB8 (1770) hex<br>Full scale for other ranges: 0000 to 1770 (2EE0) hex  |                                                    |
|                       | Averaging                                 | Supported (Set for individual inputs in the PLC Setup.)                                                             |                                                    |
| Analog Output Section | Open-circuit detection                    | Supported (Value when disconnected: 8000 Hex)                                                                       |                                                    |
|                       | Number of outputs                         | 2                                                                                                                   |                                                    |
|                       | Output signal range                       | 0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V                                                                          | 0 to 20 mA or 4 to 20 mA                           |
|                       | Allowable external output load resistance | 1 kΩ min.                                                                                                           | 600 Ω max.                                         |
|                       | External output impedance                 | 0.5 Ω max.                                                                                                          | ---                                                |
|                       | Resolution                                | 1/6000 or 1/12000 (full scale)                                                                                      |                                                    |
|                       | Overall accuracy                          | 25°C±0.4% of full scale, 0 to 55°C±0.8% of full scale                                                               |                                                    |
|                       | D/A conversion data                       | Full scale for -10 to 10 V: F448 (E890) to 0BB8 (1770) hex<br>Full scale for other ranges: 0000 to 1770 (2EE0) hex  |                                                    |
|                       | Conversion time                           | 1 ms/point                                                                                                          |                                                    |
| Isolation method      |                                           | Photocoupler isolation between analog I/O terminals and internal circuits. No isolation between analog I/O signals. |                                                    |

### Built-in Analog Input Switch (Factory Settings)



### Built-in Analog I/O Terminal Block Arrangement



# CPU Unit Specifications

## ■ Serial Communications Specifications (CP1W-CIF01/-CIF11)

| Item                                   | Applicable CPU Units |             |              |          | Function                                                                                                                                                                                                            | Interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|----------------------|-------------|--------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | CP1H                 | CP1L-M Type | CP1L-L14/L20 | CP1L-L10 |                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Peripheral USB port                    | Yes                  | Yes         | Yes          | Yes      | For connecting Peripheral Device.                                                                                                                                                                                   | Conforms to USB 1.1, B-type connector                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Serial port 1<br>(Option board slot 1) | Yes                  | Yes         | Yes          | ---      | Host Link, No-protocol, NT Link (1: N), Serial PLC Link (See note 1.), Serial Gateway (CompoWay/ F master, Modbus-RTU master), Modbus-RTU easy master function NT Link (1: 1) (See note 2.) 1: 1 Link (See note 2.) | <p>The following can be used for either port.</p> <p>CP1W-CIF01 RS-232C Option Board</p>  <p>CP1W-CIF11 RS-422A/485 Option Board (Maximum transmission distance 50m)</p>  <p>CP1W-CIF12 RS-422A/485(Isolated-type) Option Board (Maximum transmission distance 500m)</p> <p>Can be used with either port.</p> |
| Serial port 2<br>(Option board slot 2) | Yes                  | Yes         | ---          | ---      |                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Note:** 1. Serial PLC Link can be used with either serial port 1 or serial port 2.  
2. CP1L CPU Units only.

## ■ Ethernet Communications Specifications (CP1W-CIF41)

| Item                                |                     |                                       | Specifications                                                                                                                                                                |
|-------------------------------------|---------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicable PLCs                     |                     |                                       | CP1H/CP1L CPU Units<br><b>Note:</b> 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.) |
| 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.



# Option Unit Specifications

## ■ LDC Option Board (CP1W-DAM01)

### ● Specifications

| Item                         | Function                                                                                                         |
|------------------------------|------------------------------------------------------------------------------------------------------------------|
| Mounting port                | CP1H/CP1L: Option board slot 1<br><b>Note:</b> 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                                                 |

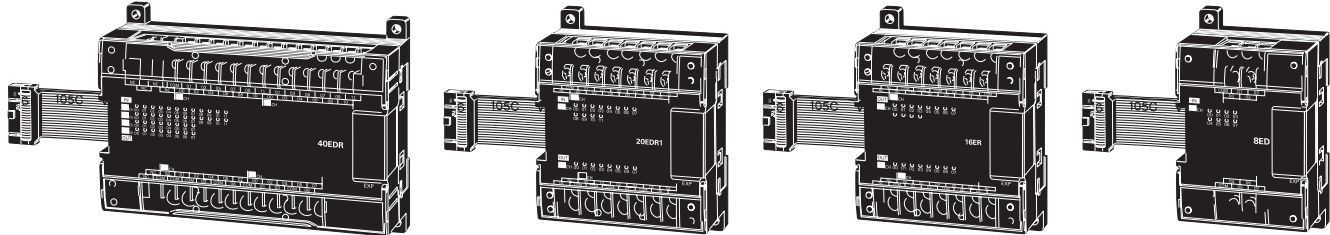
### ● LCD Functions

| 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                            | <p><b>Day timer</b></p> <p>Use this timer for ON/OFF switching at a specified times every day from the starting day of the week to the ending day of the week. Sixteen timers can be set from timer 01 to timer 16.</p> <p>Operation:</p>                                                                                                                      |
|                                   | <p><b>Weekly timer</b></p> <p>Use this timer for ON/OFF operation in intervals of one week that starts one day and ends another day. Sixteen timers can be set from timer No. 01 to timer No. 16.</p> <p>Operation:</p>                                                                                                                                        |
|                                   | <p><b>Calendar timer</b></p> <p>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.</p> <p>Operation:</p>                                                                                                                                   |
| 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                   | <ul style="list-style-type: none"> <li>Setting the time of the PLC's built-in clock</li> <li>Reading system data (e.g., unit version and lot number)</li> <li>Setting the backlight lighting time</li> <li>Adjusting LCD contrast</li> <li>Reading cycle time (e.g., average, maximum, and minimum)</li> <li>Clearing data for the LCD Option Board</li> </ul> |

# 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.

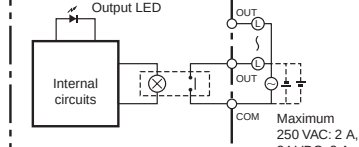


### ● DC Inputs (CP1W-40EDR/40EDT/40EDT1/20EDR1/20EDT/20EDT1/8ED)

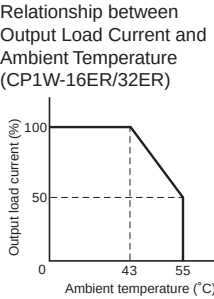
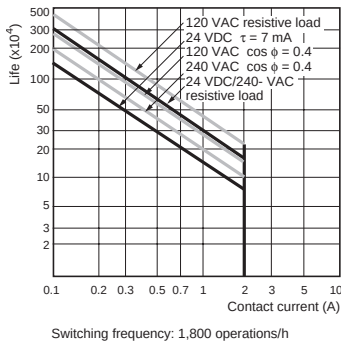
| Item                  | Specifications                                |
|-----------------------|-----------------------------------------------|
| Input voltage         | 24 VDC +10%/-15%                              |
| Input impedance       | 4.7 kΩ                                        |
| Input 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:**
- Do not apply a voltage exceeding the rated voltage to an input terminal.
  - 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   | Elec-trical | 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   |             |                | <div></div> |

**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.



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

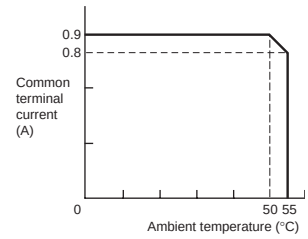
# Expansion I/O Unit Specifications

## ● 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   |                              |
|                                       | 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<br>+10%/-5%, 5 to 300 mA                                                                                                                                                        |                        |                              |                              |                              |
| Fuse (See note 2.)                    | 1/common                                                                                                                                                                                            |                        |                              |                              |                              |
| Circuit configuration                 | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Sinking Outputs</p> </div> <div style="text-align: center;"> <p>Sourcing Outputs</p> </div> </div> |                        |                              |                              |                              |
|                                       |                                                                                                                                                                                                     |                        |                              |                              |                              |

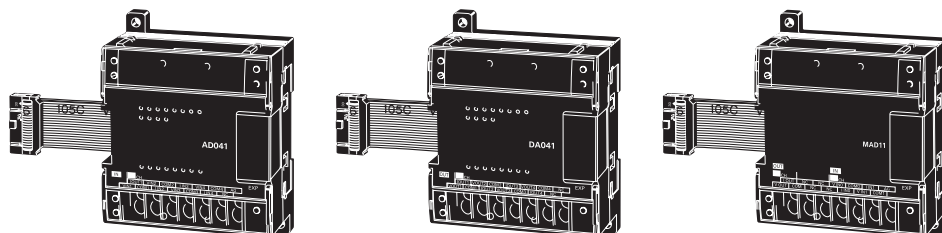
- Note:**
1. Do not apply a voltage or connect a load to an output terminal exceeding the maximum switching capacity.
  2. The fuses cannot be replaced by the user.
  3. A maximum of 0.9 A per common can be switched at an ambient temperature of 50°C.



# Expansion Unit Specifications

## ■ 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

| Model                    |           | CP1W-AD041                                                                                                                            |                          |
|--------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Item                     |           | Input voltage                                                                                                                         | Input current            |
| Number of inputs         |           | 4                                                                                                                                     |                          |
| Input signal range       |           | 0 to 5 V, 1 to 5 V,<br>0 to 10 V, -10 to 10 V                                                                                         | 0 to 20 mA<br>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

| Model                                     |           | CP1W-DA041/DA021                                                                                                                      |                          |
|-------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Item                                      |           | Input voltage                                                                                                                         | Input current            |
| Number of outputs                         |           | DA041: 4, DA021: 2                                                                                                                    |                          |
| Output signal range                       |           | 0 to 5 V, 0 to 10 V,<br>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

| Model                               |                                           | CP1W-MAD11                                                                                                              |                                                                                                                       |
|-------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Item                                |                                           | Voltage I/O                                                                                                             | Current I/O                                                                                                           |
| Analog Input Section                | Number of inputs                          | 2 inputs                                                                                                                |                                                                                                                       |
|                                     | Input signal range                        | 0 to 5 V, 1 to 5V, 0 to 10 V, or -10 to 10V                                                                             |                                                                                                                       |
|                                     | Max. rated input                          | ±15 V                                                                                                                   |                                                                                                                       |
|                                     | External input impedance                  | 1 MΩ min.                                                                                                               |                                                                                                                       |
|                                     | Resolution                                | 1/6000 (full scale)                                                                                                     |                                                                                                                       |
|                                     | Overall accuracy                          | 25°C                                                                                                                    |                                                                                                                       |
|                                     |                                           | 0 to 55°C                                                                                                               |                                                                                                                       |
| Analog Output Section (See note 1.) | 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                                                                                                             |
|                                     | Number of outputs                         |                                                                                                                         | 1 output                                                                                                              |
|                                     | Output signal range                       |                                                                                                                         | 1 to 5 V, 0 to 10 V, -10 to 10 V                                                                                      |
|                                     | External output max. current              |                                                                                                                         | 0 to 20 mA, 4 to 20 mA                                                                                                |
|                                     | Allowable external output load resistance |                                                                                                                         | 1 kΩ min.                                                                                                             |
|                                     | External input impedance                  |                                                                                                                         | 600 Ω max.                                                                                                            |
|                                     | Resolution                                |                                                                                                                         | 1/6000 (full scale)                                                                                                   |
|                                     | Overall accuracy                          |                                                                                                                         | 25°C                                                                                                                  |
|                                     |                                           |                                                                                                                         | 0 to 55°C                                                                                                             |
|                                     | 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 (See note 2.)       |                                           | 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.) |                                                                                                                       |

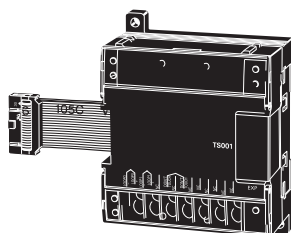
**Note: 1.** The voltage output and current output can be used at the same time for analog outputs, but the total output current must not exceed 21 mA.

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

# Expansion Unit Specifications

## ■ 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: $\pm 0.5\%$ and $\pm 2^\circ\text{C}$ (See note.)) $\pm 1$ digit max. | (The larger of the indicated value: $\pm 0.5\%$ and $\pm 1^\circ\text{C}$ ) $\pm 1$ 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  $-100^\circ\text{C}$  is  $\pm 4^\circ\text{C} \pm 1$  digit max.

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

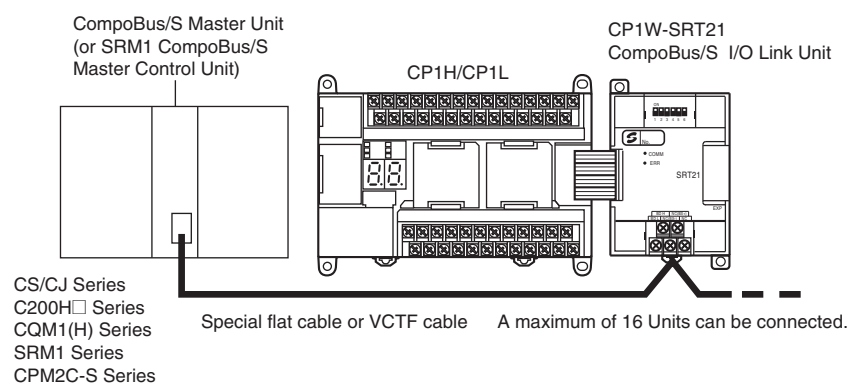
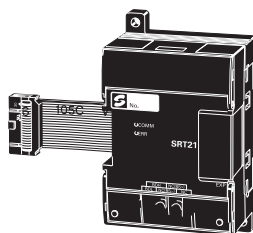
| Input type | Range ( $^\circ\text{C}$ ) | Range ( $^\circ\text{F}$ ) |
|------------|----------------------------|----------------------------|
| K          | -200 to 1300               | -300 to 2300               |
|            | 0.0 to 500.0               | 0.0 to 900.0               |
| J          | -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 ( $^\circ\text{C}$ ) | Range ( $^\circ\text{F}$ ) |
|------------|----------------------------|----------------------------|
| 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

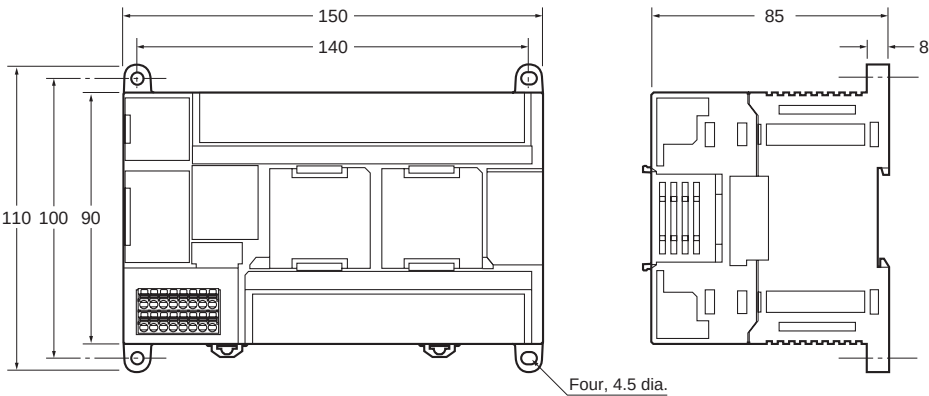
| Item                                             | Model | CP1W-SRT21                                                                           |
|--------------------------------------------------|-------|--------------------------------------------------------------------------------------|
| Master/Slave                                     |       | CompoBus/S Slave                                                                     |
| Number of I/O bits                               |       | 8 input bits, 8 output bits                                                          |
| Number of words occupied in CP1H/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.)                         |

# Dimensions

## Dimensions

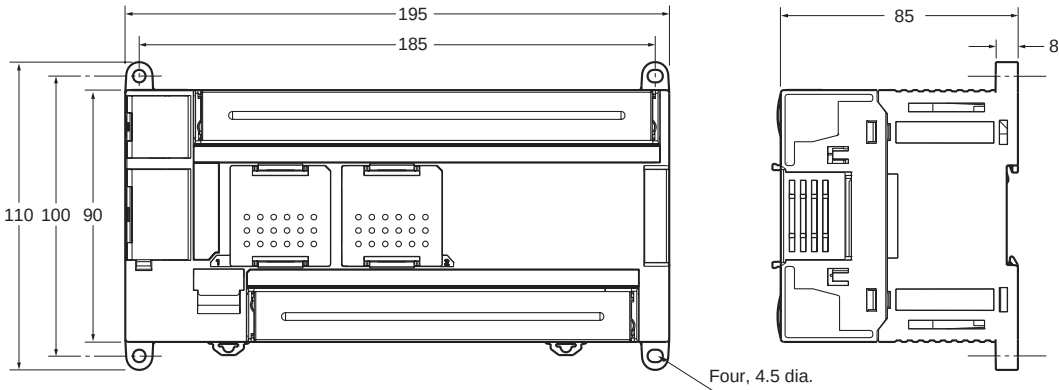
(Unit: mm)

### ■ CPU Units CP1H CPU Units (X/XA/Y Types)



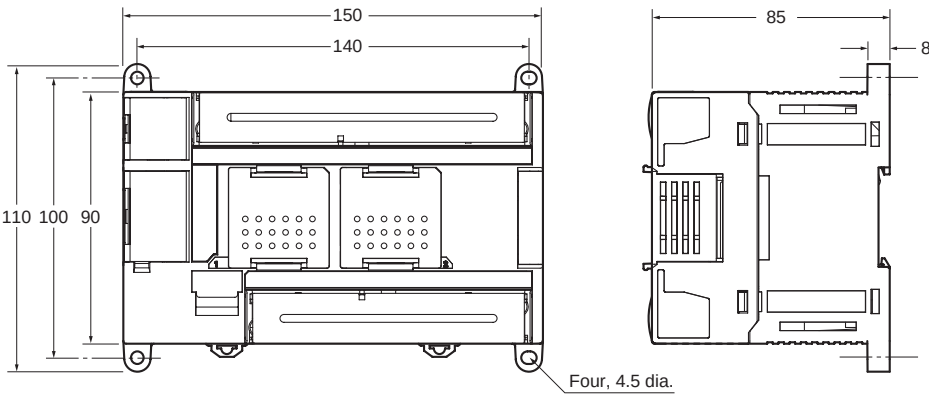
Weight:  
CP1H-□□□-A (AC power supply):  
740 g max.  
CP1H-□□□-D DC power supply):  
590 g max.

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



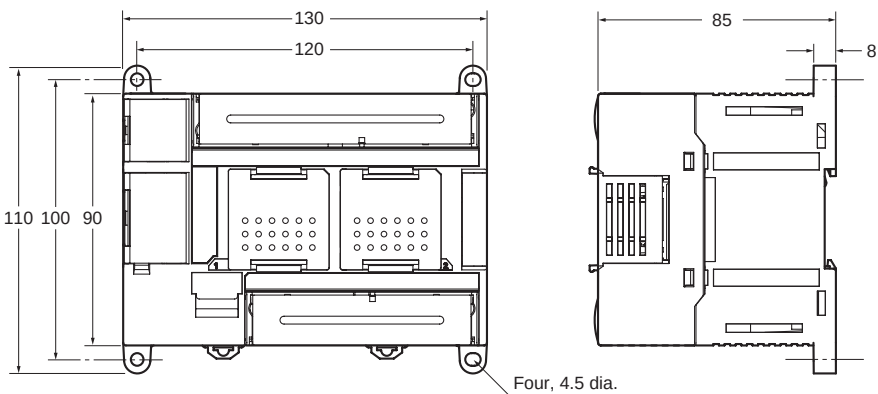
Weight:  
820 g max.

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



Weight:  
675 g max.

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

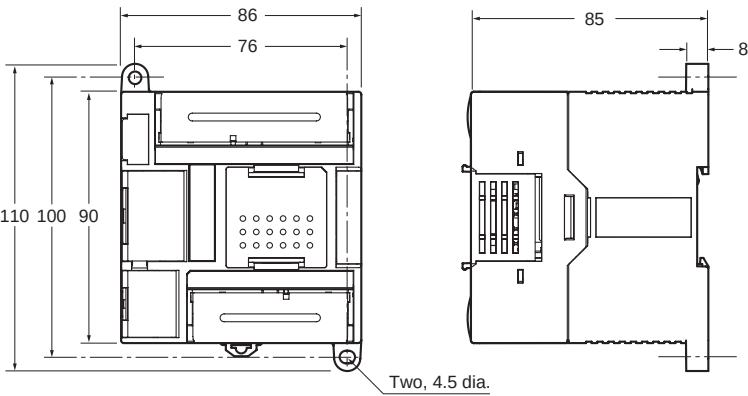


Weight:  
610 g max.

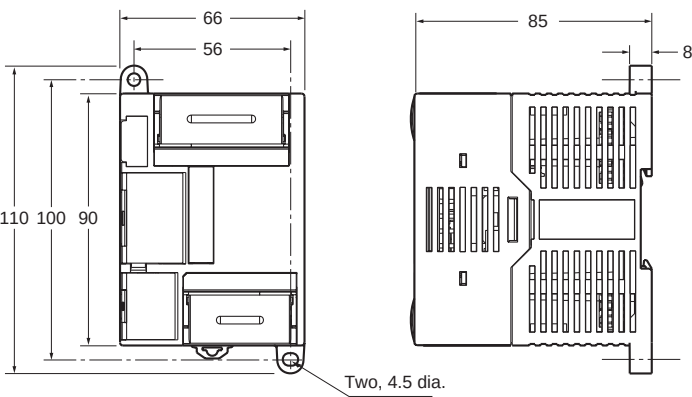


# Dimensions

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



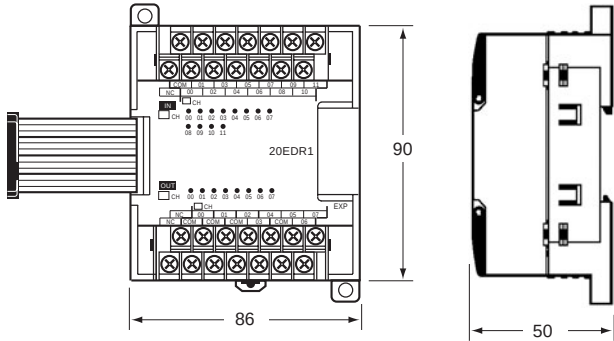
## CP1L CPU Units with 10 I/O Points



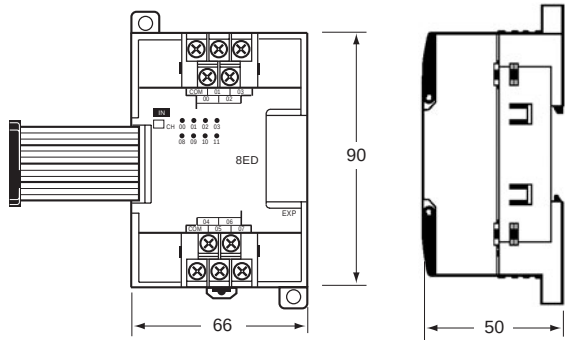
Dimensions

Expansion Units and Expansion I/O Units

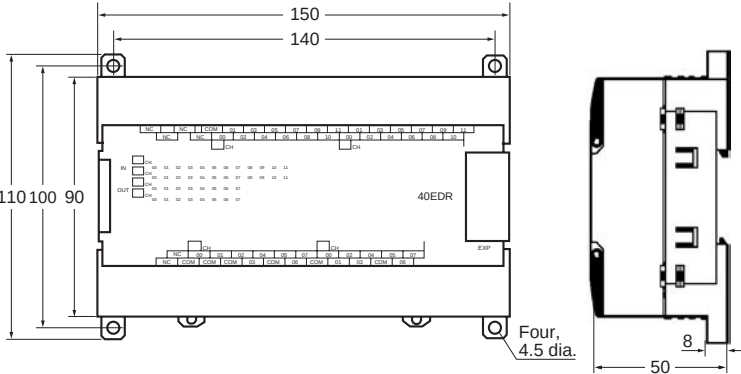
- CP1W-20ED
- CP1W-16E
- CP1W-AD041/CP1W-DA041/CP1W-DA021
- CP1W-MAD11/CP1W-TS



- CP1W-8E
- CP1W-SRT21

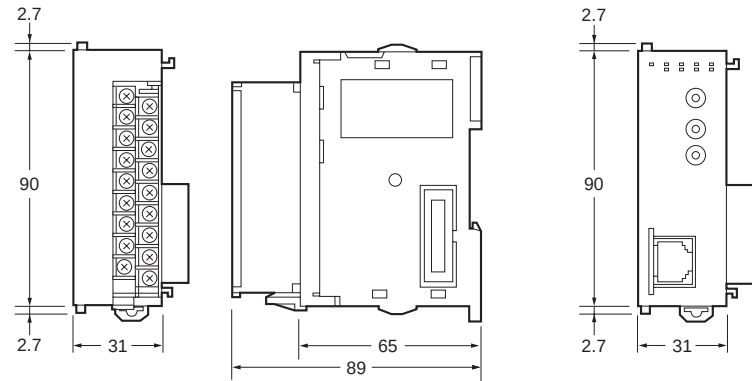


- CP1W-40ED
- CP1W-32E

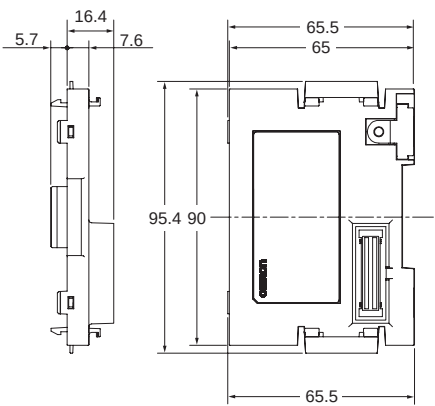


| Unit name                | Model number                    | Weight |
|--------------------------|---------------------------------|--------|
| Expansion I/O Units      | CP1W-40ER                       | 380 g  |
|                          | CP1W-40EDT/-40EDT1              | 320 g  |
|           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

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

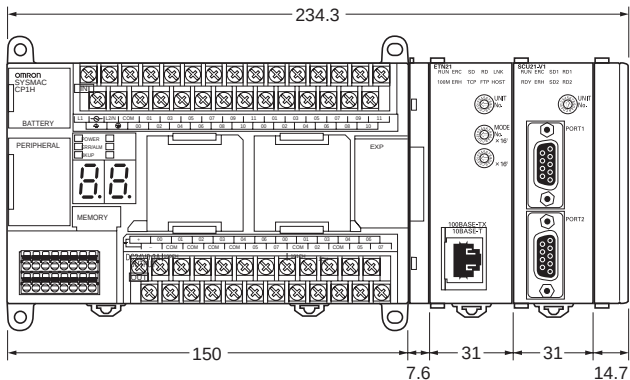


CJ Unit Adaptor  
CP1W-EXT01



CP1H

Example: Two CJ-series Units (31-mm widths) Connected Using a CJ Unit Adaptor



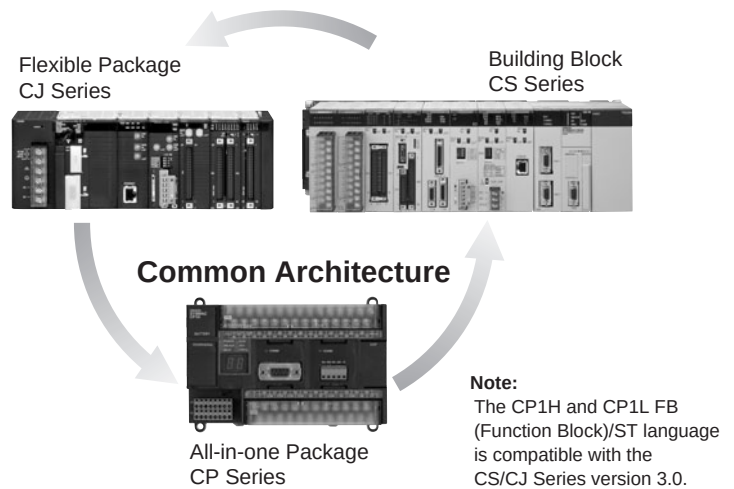
## A Wealth of Instructions

### Floating-point Decimal Instructions, Trigonometric Instruction, and More

Just like the CS/CJ-series PLCs, the CP1H and CP1L have approximately 500 instructions for ladder programming.

### Example: PID Instructions with Autotuning

Autotuning of PID constants is enabled using the PID CONTROL instruction. The limit cycle method is used for tuning, so tuning is completed in a short time.



### ● Sequence Input Instructions

| Instruction       | Mnemonic | Function code |
|-------------------|----------|---------------|
| LOAD              | LD       | ---           |
| LOAD NOT          | LD NOT   | ---           |
| AND               | AND      | ---           |
| AND NOT           | AND NOT  | ---           |
| OR                | OR       | ---           |
| OR NOT            | OR NOT   | ---           |
| AND LOAD          | AND LD   | ---           |
| OR LOAD           | OR LD    | ---           |
| NOT               | NOT      | 520           |
| CONDITION ON      | UP       | 521           |
| CONDITION OFF     | DOWN     | 522           |
| LOAD BIT TEST     | LD TST   | 350           |
| LOAD BIT TEST NOT | LD TSTN  | 351           |
| AND BIT TEST      | AND TST  | 350           |
| AND BIT TEST NOT  | AND TSTN | 351           |
| OR BIT TEST       | OR TST   | 350           |
| OR BIT TEST NOT   | OR TSTN  | 351           |

### ● Sequence Output Instructions

| Instruction        | Mnemonic | Function code |
|--------------------|----------|---------------|
| OUTPUT             | OUT      | ---           |
| OUTPUT NOT         | OUT NOT  | ---           |
| KEEP               | KEEP     | 011           |
| DIFFERENTIATE UP   | DIFU     | 013           |
| DIFFERENTIATE DOWN | DIFD     | 014           |
| SET                | SET      | ---           |
| RESET              | RSET     | ---           |
| MULTIPLE BIT SET   | SETA     | 530           |
| MULTIPLE BIT RESET | RSTA     | 531           |
| SINGLE BIT SET     | SETB     | 532           |
| SINGLE BIT RESET   | RSTB     | 533           |
| SINGLE BIT OUTPUT  | OUTB     | 534           |

### ● Sequence Control Instructions

| Instruction                             | Mnemonic | Function code |
|-----------------------------------------|----------|---------------|
| END                                     | END      | 001           |
| NO OPERATION                            | NOP      | 000           |
| INTERLOCK                               | IL       | 002           |
| INTERLOCK CLEAR                         | ILC      | 003           |
| MULTI-INTERLOCK DIFFERENTIATION HOLD    | MILH     | 517           |
| MULTI-INTERLOCK DIFFERENTIATION RELEASE | MILR     | 518           |
| MULTI-INTERLOCK CLEAR                   | MILC     | 519           |
| JUMP                                    | JMP      | 004           |
| JUMP END                                | JME      | 005           |
| CONDITIONAL JUMP                        | CJP      | 510           |
| CONDITIONAL JUMP NOT                    | CJPN     | 511           |
| MULTIPLE JUMP                           | JMP0     | 515           |
| MULTIPLE JUMP END                       | JME0     | 516           |
| FOR LOOP                                | FOR      | 512           |
| BREAK LOOP                              | BREAK    | 514           |
| NEXT LOOPS                              | NEXT     | 513           |

### ● Timer and Counter Instructions

| Instruction         | Mnemonic | Function code |
|---------------------|----------|---------------|
| TIMER               | BCD      | TIM           |
|                     | BIN      | TIMX          |
| COUNTER             | BCD      | CNT           |
|                     | BIN      | CNTX          |
| HIGH-SPEED TIMER    | BCD      | TIMH          |
|                     | BIN      | TIMHX         |
| ONE-MS TIMER        | BCD      | TMHH          |
|                     | BIN      | TMHHX         |
| ACCUMULATIVE TIMER  | BCD      | TTIM          |
|                     | BIN      | TTIMX         |
| LONG TIMER          | BCD      | TIML          |
|                     | BIN      | TIMLX         |
| MULTI-OUTPUT TIMER  | BCD      | MTIM          |
|                     | BIN      | MTIMX         |
| REVERSIBLE COUNTER  | BCD      | CNTR          |
|                     | BIN      | CNTRX         |
| RESET TIMER/COUNTER | BCD      | CNR           |
|                     | BIN      | CNRX          |

### ● Data Comparison Instructions

| Instruction                               | Mnemonic                                            | Function code |
|-------------------------------------------|-----------------------------------------------------|---------------|
| Symbol Comparison (Unsigned)              | LD,AND, OR +=, < >, <, <=, >, >=                    | 300 (=)       |
|                                           |                                                     | 305 (< >)     |
|                                           |                                                     | 310 (<)       |
|                                           |                                                     | 315 (<=)      |
|                                           |                                                     | 320 (>)       |
| Symbol Comparison (Double-word, unsigned) | LD, AND, OR +=, < >, <, <=, >, >= + L               | 301 (=)       |
|                                           |                                                     | 306 (< >)     |
|                                           |                                                     | 311 (<)       |
|                                           |                                                     | 316 (<=)      |
|                                           |                                                     | 321 (>)       |
| Symbol Comparison (Signed)                | LD, AND, OR +=, < >, <, <=, >, >= + S               | 302 (=)       |
|                                           |                                                     | 307 (< >)     |
|                                           |                                                     | 312 (<)       |
|                                           |                                                     | 317 (<=)      |
|                                           |                                                     | 322 (>)       |
| Symbol Comparison (Double-word, signed)   | LD, AND, OR +=, < >, <, <=, >, >= + SL              | 303 (=)       |
|                                           |                                                     | 308 (< >)     |
|                                           |                                                     | 313 (<)       |
|                                           |                                                     | 318 (<=)      |
|                                           |                                                     | 323 (>)       |
| Time Comparison                           | LD, AND, OR += DT, < > DT, < DT, <= DT, > DT, >= DT | 341 (= DT)    |
|                                           |                                                     | 342 (< > DT)  |
|                                           |                                                     | 343 (< DT)    |
|                                           |                                                     | 344 (<= DT)   |
|                                           |                                                     | 345 (> DT)    |
| COMPARE                                   | CMP                                                 | 020           |
|                                           |                                                     | 060           |
|                                           |                                                     | 114           |
|                                           |                                                     | 115           |
|                                           |                                                     | 085           |
| DOUBLE COMPARE                            | CMPL                                                | 060           |
|                                           |                                                     | 114           |
|                                           |                                                     | 115           |
|                                           |                                                     | 085           |
|                                           |                                                     | 019           |
| SIGNED BINARY COMPARE                     | CPS                                                 | 114           |
|                                           |                                                     | 115           |
|                                           |                                                     | 085           |
|                                           |                                                     | 019           |
|                                           |                                                     | 068           |
| DOUBLE SIGNED BINARY COMPARE              | CPSL                                                | 115           |
|                                           |                                                     | 085           |
|                                           |                                                     | 019           |
|                                           |                                                     | 068           |
|                                           |                                                     | 502           |
| TABLE COMPARE                             | TCMP                                                | 085           |
|                                           |                                                     | 019           |
|                                           |                                                     | 068           |
|                                           |                                                     | 502           |
|                                           |                                                     | 088           |
| MULTIPLE COMPARE                          | MCMP                                                | 019           |
|                                           |                                                     | 068           |
|                                           |                                                     | 502           |
|                                           |                                                     | 088           |
|                                           |                                                     | 116           |
| UNSIGNED BLOCK COMPARE                    | BCMP                                                | 068           |
|                                           |                                                     | 502           |
|                                           |                                                     | 088           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
| EXPANDED BLOCK COMPARE                    | BCMP2                                               | 502           |
|                                           |                                                     | 088           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
| AREA RANGE COMPARE                        | ZCP                                                 | 088           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
| DOUBLE AREA RANGE COMPARE                 | ZCPL                                                | 116           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |
|                                           |                                                     | 116           |

# Instructions

## ● Data Movement Instructions

| Instruction                       | Mnemonic | Function code |
|-----------------------------------|----------|---------------|
| MOVE                              | MOV      | 021           |
| DOUBLE MOVE                       | MOVL     | 498           |
| MOVE NOT                          | MVN      | 022           |
| DOUBLE MOVE NOT                   | MVNL     | 499           |
| MOVE BIT                          | MOVB     | 082           |
| MOVE DIGIT                        | MOVD     | 083           |
| MULTIPLE BIT TRANSFER             | XFRB     | 062           |
| BLOCK TRANSFER                    | XFER     | 070           |
| BLOCK SET                         | BSET     | 071           |
| DATA EXCHANGE                     | XCHG     | 073           |
| DOUBLE DATA EXCHANGE              | XCGL     | 562           |
| SINGLE WORD DISTRIBUTE            | DIST     | 080           |
| DATA COLLECT                      | COLL     | 081           |
| MOVE TO REGISTER                  | MOVR     | 560           |
| MOVE TIMER/COUNTER PV TO REGISTER | MOVRW    | 561           |

## ● Data Shift Instructions

| Instruction                       | Mnemonic | Function code |
|-----------------------------------|----------|---------------|
| SHIFT REGISTER                    | SFT      | 010           |
| REVERSIBLE SHIFT REGISTER         | SFTR     | 084           |
| ASYNCHRONOUS SHIFT REGISTER       | ASFT     | 017           |
| WORD SHIFT                        | WSFT     | 016           |
| ARITHMETIC SHIFT LEFT             | ASL      | 025           |
| DOUBLE SHIFT LEFT                 | ASLL     | 570           |
| ARITHMETIC SHIFT RIGHT            | ASR      | 026           |
| DOUBLE SHIFT RIGHT                | ASRL     | 571           |
| ROTATE LEFT                       | ROL      | 027           |
| DOUBLE ROTATE LEFT                | ROLL     | 572           |
| ROTATE LEFT WITHOUT CARRY         | RLNC     | 574           |
| DOUBLE ROTATE LEFT WITHOUT CARRY  | RLNL     | 576           |
| ROTATE RIGHT                      | ROR      | 028           |
| DOUBLE ROTATE RIGHT               | RORL     | 573           |
| ROTATE RIGHT WITHOUT CARRY        | RRNC     | 575           |
| DOUBLE ROTATE RIGHT WITHOUT CARRY | RRNL     | 577           |
| ONE DIGIT SHIFT LEFT              | SLD      | 074           |
| ONE DIGIT SHIFT RIGHT             | SRD      | 075           |
| SHIFT N-BIT DATA LEFT             | NSFL     | 578           |
| SHIFT N-BIT DATA RIGHT            | NSFR     | 579           |
| SHIFT N-BITS LEFT                 | NASL     | 580           |
| DOUBLE SHIFT N-BITS LEFT          | NSLL     | 582           |
| SHIFT N-BITS RIGHT                | NASR     | 581           |
| DOUBLE SHIFT N-BITS RIGHT         | NSRL     | 583           |

## ● Increment/Decrement Instructions

| Instruction             | Mnemonic | Function code |
|-------------------------|----------|---------------|
| INCREMENT BINARY        | ++       | 590           |
| DOUBLE INCREMENT BINARY | ++L      | 591           |
| DECREMENT BINARY        | --       | 592           |
| DOUBLE DECREMENT BINARY | --L      | 593           |
| INCREMENT BCD           | ++B      | 594           |
| DOUBLE INCREMENT BCD    | ++BL     | 595           |
| DECREMENT BCD           | --B      | 596           |
| DOUBLE DECREMENT BCD    | --BL     | 597           |

## ● Symbol Math Instructions

| Instruction                                 | Mnemonic | Function code |
|---------------------------------------------|----------|---------------|
| SIGNED BINARY ADD WITHOUT CARRY             | +        | 400           |
| DOUBLE SIGNED BINARY ADD WITHOUT CARRY      | +L       | 401           |
| SIGNED BINARY ADD WITH CARRY                | +C       | 402           |
| DOUBLE SIGNED BINARY ADD WITH CARRY         | +CL      | 403           |
| BCD ADD WITHOUT CARRY                       | +B       | 404           |
| DOUBLE BCD ADD WITHOUT CARRY                | +BL      | 405           |
| BCD ADD WITH CARRY                          | +BC      | 406           |
| DOUBLE BCD ADD WITH CARRY                   | +BCL     | 407           |
| SIGNED BINARY SUBTRACT WITHOUT CARRY        | -        | 410           |
| DOUBLE SIGNED BINARY SUBTRACT WITHOUT CARRY | -L       | 411           |
| SIGNED BINARY SUBTRACT WITH CARRY           | -C       | 412           |
| DOUBLE SIGNED BINARY SUBTRACT WITH CARRY    | -CL      | 413           |
| BCD SUBTRACT WITHOUT CARRY                  | -B       | 414           |
| DOUBLE BCD SUBTRACT WITHOUT CARRY           | -BL      | 415           |
| BCD SUBTRACT WITH CARRY                     | -BC      | 416           |
| DOUBLE BCD SUBTRACT WITH CARRY              | -BCL     | 417           |
| SIGNED BINARY MULTIPLY                      | *        | 420           |
| DOUBLE SIGNED BINARY MULTIPLY               | *L       | 421           |
| UNSIGNED BINARY MULTIPLY                    | *U       | 422           |
| DOUBLE UNSIGNED BINARY MULTIPLY             | *UL      | 423           |
| BCD MULTIPLY                                | *B       | 424           |
| DOUBLE BCD MULTIPLY                         | *BL      | 425           |
| SIGNED BINARY DIVIDE                        | /        | 430           |

| Instruction                   | Mnemonic | Function code |
|-------------------------------|----------|---------------|
| DOUBLE SIGNED BINARY DIVIDE   | /L       | 431           |
| UNSIGNED BINARY DIVIDE        | /U       | 432           |
| DOUBLE UNSIGNED BINARY DIVIDE | /UL      | 433           |
| BCD DIVIDE                    | /B       | 434           |
| DOUBLE BCD DIVIDE             | /BL      | 435           |

## ● Data Conversion Instructions

| Instruction                    | Mnemonic | Function code |
|--------------------------------|----------|---------------|
| BCD-TO-BINARY                  | BIN      | 023           |
| DOUBLE BCD-TO-DOUBLE BINARY    | BINL     | 058           |
| BINARY-TO-BCD                  | BCD      | 024           |
| DOUBLE BINARY-TO-DOUBLE BCD    | BCDL     | 059           |
| 2'S COMPLEMENT                 | NEG      | 160           |
| DOUBLE 2'S COMPLEMENT          | NEGL     | 161           |
| 16-BIT TO 32-BIT SIGNED BINARY | SIGN     | 600           |
| DATA DECODER                   | MLPX     | 076           |
| DATA ENCODER                   | DMPX     | 077           |
| ASCII CONVERT                  | ASC      | 086           |
| ASCII TO HEX                   | HEX      | 162           |
| COLUMN TO LINE                 | LINE     | 063           |
| LINE TO COLUMN                 | COLM     | 064           |
| SIGNED BCD-TO-BINARY           | BINS     | 470           |
| DOUBLE SIGNED BCD-TO-BINARY    | BISL     | 472           |
| SIGNED BINARY-TO-BCD           | BCDS     | 471           |
| DOUBLE SIGNED BINARY-TO-BCD    | BDSL     | 473           |
| GRAY CODE CONVERSION           | GRY      | 474           |

## ● Special Math Instructions

| Instruction           | Mnemonic | Function code |
|-----------------------|----------|---------------|
| BINARY ROOT           | ROTB     | 620           |
| BCD SQUARE ROOT       | ROOT     | 072           |
| ARITHMETIC PROCESS    | APR      | 069           |
| FLOATING POINT DIVIDE | FDIV     | 079           |
| BIT COUNTER           | BCNT     | 067           |

## ● Logic Instructions

| Instruction          | Mnemonic | Function code |
|----------------------|----------|---------------|
| LOGICAL AND          | ANDW     | 034           |
| DOUBLE LOGICAL AND   | ANDL     | 610           |
| LOGICAL OR           | ORW      | 035           |
| DOUBLE LOGICAL OR    | ORWL     | 611           |
| EXCLUSIVE OR         | XORW     | 036           |
| DOUBLE EXCLUSIVE OR  | XORL     | 612           |
| EXCLUSIVE NOR        | XNRW     | 037           |
| DOUBLE EXCLUSIVE NOR | XNRL     | 613           |
| COMPLEMENT           | COM      | 029           |
| DOUBLE COMPLEMENT    | COML     | 614           |

# Instructions

## ● Floating-point Math Instructions

| Instruction                | Mnemonic                                            | Function code                                                                    |
|----------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------|
| FLOATING TO 16-BIT         | FIX                                                 | 450                                                                              |
| FLOATING TO 32-BIT         | FIXL                                                | 451                                                                              |
| 16-BIT TO FLOATING         | FLT                                                 | 452                                                                              |
| 32-BIT TO FLOATING         | FTL                                                 | 453                                                                              |
| FLOATING-POINT ADD         | +F                                                  | 454                                                                              |
| FLOATING-POINT SUBTRACT    | -F                                                  | 455                                                                              |
| FLOATING- POINT MULTIPLY   | *F                                                  | 456                                                                              |
| FLOATING- POINT DIVIDE     | /F                                                  | 457                                                                              |
| DEGREES TO RADIANS         | RAD                                                 | 458                                                                              |
| RADIANS TO DEGREES         | DEG                                                 | 459                                                                              |
| SINE                       | SIN                                                 | 460                                                                              |
| COSINE                     | COS                                                 | 461                                                                              |
| TANGENT                    | TAN                                                 | 462                                                                              |
| ARC SINE                   | ASIN                                                | 463                                                                              |
| ARC COSINE                 | ACOS                                                | 464                                                                              |
| ARC TANGENT                | ATAN                                                | 465                                                                              |
| SQUARE ROOT                | SQRT                                                | 466                                                                              |
| EXPONENT                   | EXP                                                 | 467                                                                              |
| LOGARITHM                  | LOG                                                 | 468                                                                              |
| EXPONENTIAL POWER          | PWR                                                 | 840                                                                              |
| Floating Symbol Comparison | LD, AND, OR +<br>= F, < > F, < F, < = F, > F, > = F | 329 (= F)<br>330 (< > F)<br>331 (< F)<br>332 (< = F)<br>333 (> F)<br>334 (> = F) |
| FLOATING- POINT TO ASCII   | FSTR                                                | 448                                                                              |
| ASCII TO FLOATING-POINT    | FVAL                                                | 449                                                                              |

## ● Double-precision Floating-point Instructions

| Instruction                      | Mnemonic | Function code |
|----------------------------------|----------|---------------|
| DOUBLE FLOATING TO 16-BIT BINARY | FIXD     | 841           |
| DOUBLE FLOATING TO 32-BIT BINARY | FIXLD    | 842           |
| 16-BIT BINARY TO DOUBLE FLOATING | DBL      | 843           |
| 32-BIT BINARY TO DOUBLE FLOATING | DBLL     | 844           |
| DOUBLE FLOATINGPOINT ADD         | +D       | 845           |
| DOUBLE FLOATING-POINT SUBTRACT   | -D       | 846           |
| DOUBLE FLOATING-POINT MULTIPLY   | *D       | 847           |
| DOUBLE FLOATING-POINT DIVIDE     | /D       | 848           |
| DOUBLE DEGREES TO RADIANS        | RADD     | 849           |
| DOUBLE RADIANS TO DEGREES        | DEGD     | 850           |
| DOUBLE SINE                      | SIND     | 851           |
| DOUBLE COSINE                    | COSD     | 852           |
| DOUBLE TANGENT                   | TAND     | 853           |
| DOUBLE ARC SINE                  | ASIND    | 854           |
| DOUBLE ARC COSINE                | ACOSD    | 855           |

| Instruction              | Mnemonic                                            | Function code                                                                    |
|--------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------|
| DOUBLE ARC TANGENT       | ATAND                                               | 856                                                                              |
| DOUBLE SQUARE ROOT       | SQRTD                                               | 857                                                                              |
| DOUBLE EXPONENT          | EXPD                                                | 858                                                                              |
| DOUBLE LOGARITHM         | LOGD                                                | 859                                                                              |
| DOUBLE EXPONENTIAL POWER | PWRD                                                | 860                                                                              |
| DOUBLE SYMBOL COMPARISON | LD, AND, OR +<br>= D, < > D, < D, < = D, > D, > = D | 335 (= D)<br>336 (< > D)<br>337 (< D)<br>338 (< = D)<br>339 (> D)<br>340 (> = D) |

## ● Table Data Processing Instructions

| Instruction            | Mnemonic | Function code |
|------------------------|----------|---------------|
| SET STACK              | SSET     | 630           |
| PUSH ONTO STACK        | PUSH     | 632           |
| FIRST IN FIRST OUT     | FIFO     | 633           |
| LAST IN FIRST OUT      | LIFO     | 634           |
| DIMENSION RECORD TABLE | DIM      | 631           |
| SET RECORD LOCATION    | SETR     | 635           |
| GET RECORD NUMBER      | GETR     | 636           |
| DATA SEARCH            | SRCH     | 181           |
| SWAP BYTES             | SWAP     | 637           |
| FIND MAXIMUM           | MAX      | 182           |
| FIND MINIMUM           | MIN      | 183           |
| SUM                    | SUM      | 184           |
| FRAME CHECKSUM         | FCS      | 180           |
| STACK SIZE READ        | SNUM     | 638           |
| STACK DATA READ        | SREAD    | 639           |
| STACK DATA OVERWRITE   | SWRIT    | 640           |
| STACK DATA INSERT      | SINS     | 641           |
| STACK DATA DELETE      | SDEL     | 642           |

## ● Data Control Instructions

| Instruction                  | Mnemonic | Function code |
|------------------------------|----------|---------------|
| PID CONTROL                  | PID      | 190           |
| PID CONTROL WITH AUTO TUNING | PIDAT    | 191           |
| LIMIT CONTROL                | LMT      | 680           |
| DEAD BAND CONTROL            | BAND     | 681           |
| DEAD ZONE CONTROL            | ZONE     | 682           |
| TIME-PROPORTIONAL OUTPUT     | TPO      | 685           |
| SCALING                      | SCL      | 194           |
| SCALING 2                    | SCL2     | 486           |
| SCALING 3                    | SCL3     | 487           |
| AVERAGE                      | AVG      | 195           |

## ● Subroutine Instructions

| Instruction       | Mnemonic | Function code |
|-------------------|----------|---------------|
| SUBROUTINE CALL   | SBS      | 091           |
| SUBROUTINE ENTRY  | SBN      | 092           |
| SUBROUTINE RETURN | RET      | 093           |
| MACRO             | MCRO     | 099           |

| Instruction              | Mnemonic | Function code |
|--------------------------|----------|---------------|
| GLOBAL SUBROUTINE CALL   | GSBN     | 751           |
| GLOBAL SUBROUTINE ENTRY  | GRET     | 752           |
| GLOBAL SUBROUTINE RETURN | GSBS     | 750           |

## ● Interrupt Control Instructions

| Instruction         | Mnemonic | Function code |
|---------------------|----------|---------------|
| SET INTERRUPT MASK  | MSKS     | 690           |
| READ INTERRUPT MASK | MSKR     | 692           |
| CLEAR INTERRUPT     | CLI      | 691           |
| DISABLE INTERRUPTS  | DI       | 693           |
| ENABLE INTERRUPTS   | EI       | 694           |

## ● High-speed Counter and Pulse Output Instructions

| Instruction                     | Mnemonic | Function code |
|---------------------------------|----------|---------------|
| MODE CONTROL                    | INI      | 880           |
| HIGH-SPEED COUNTER PV READ      | PRV      | 881           |
| COUNTER FREQUENCY CONVERT       | PRV2     | 883           |
| COMPARISON TABLE LOAD           | CTBL     | 882           |
| SPEED OUTPUT                    | SPED     | 885           |
| SET PULSES                      | PULS     | 886           |
| PULSE OUTPUT                    | PLS2     | 887           |
| ACCELERATION CONTROL            | ACC      | 888           |
| ORIGIN SEARCH                   | ORG      | 889           |
| PULSE WITH VARIABLE DUTY FACTOR | PWM      | 891           |

## ● Step Instructions

| Instruction | Mnemonic | Function code |
|-------------|----------|---------------|
| STEP DEFINE | STEP     | 008           |
| STEP START  | SNXT     | 009           |

## ● Basic I/O Unit Instructions

| Instruction              | Mnemonic | Function code |
|--------------------------|----------|---------------|
| I/O REFRESH              | IORF     | 097           |
| 7-SEGMENT DECODER        | SDEC     | 078           |
| DIGITAL SWITCH INPUT     | DSW      | 210           |
| TEN KEY INPUT            | TKY      | 211           |
| HEXADECIMAL KEY INPUT    | HKY      | 212           |
| MATRIX INPUT             | MTR      | 213           |
| 7-SEGMENT DISPLAY OUTPUT | 7SEG     | 214           |
| INTELLIGENT I/O READ     | IORD     | 222           |
| INTELLIGENT I/O WRITE    | IOWR     | 223           |
| CPU BUS I/O REFRESH      | DLNK     | 226           |

# Instructions

## ● Serial Communications Instructions

| Instruction                             | Mnemonic | Function code |
|-----------------------------------------|----------|---------------|
| PROTOCOL MACRO                          | PMCR     | 260           |
| TRANSMIT                                | TXD      | 236           |
| RECEIVE                                 | RXD      | 235           |
| TRANSMIT VIA SERIAL COMMUNICATIONS UNIT | TXDU     | 256           |
| RECEIVE VIA SERIAL COMMUNICATIONS UNIT  | RXDU     | 255           |
| CHANGE SERIAL PORT SETUP                | STUP     | 237           |

## ● Network Instructions

| Instruction            | Mnemonic | Function code |
|------------------------|----------|---------------|
| NETWORK SEND           | SEND     | 090           |
| NETWORK RECEIVE        | RECV     | 098           |
| DELIVER COMMAND        | CMND     | 490           |
| EXPLICIT MESSAGE SEND  | EXPLT    | 720           |
| EXPLICIT GET ATTRIBUTE | EGATR    | 721           |
| EXPLICIT SET ATTRIBUTE | ESATR    | 722           |
| EXPLICIT WORD READ     | ECHRD    | 723           |
| EXPLICIT WORD WRITE    | ECHWR    | 724           |

## ● Display Instructions

| Instruction                     | Mnemonic | Function code |
|---------------------------------|----------|---------------|
| DISPLAY MESSAGE                 | MSG      | 046           |
| 7-SEGMENT LED WORD DATA DISPLAY | SCH      | 047           |
| 7-SEGMENT LED CONTROL           | SCTRL    | 048           |

## ● Clock Instructions

| Instruction       | Mnemonic | Function code |
|-------------------|----------|---------------|
| CALENDAR ADD      | CADD     | 730           |
| CALENDAR SUBTRACT | CSUB     | 731           |
| HOURS TO SECONDS  | SEC      | 065           |
| SECONDS TO HOURS  | HMS      | 066           |
| CLOCK ADJUSTMENT  | DATE     | 735           |

## ● Debugging Instructions

| Instruction           | Mnemonic | Function code |
|-----------------------|----------|---------------|
| TRACE MEMORY SAMPLING | TRSM     | 045           |

## ● Failure Diagnosis Instructions

| Instruction             | Mnemonic | Function code |
|-------------------------|----------|---------------|
| FAILURE ALARM           | FAL      | 006           |
| SEVERE FAILURE ALARM    | FALS     | 007           |
| FAILURE POINT DETECTION | FPD      | 269           |

## ● Other Instructions

| Instruction               | Mnemonic | Function code |
|---------------------------|----------|---------------|
| SET CARRY                 | STC      | 040           |
| CLEAR CARRY               | CLC      | 041           |
| EXTEND MAXIMUM CYCLE TIME | WDT      | 094           |
| SAVE CONDITION FLAGS      | CCS      | 282           |
| LOAD CONDITION FLAGS      | CCL      | 283           |
| CONVERT ADDRESS FROM CS   | FRMCV    | 284           |
| CONVERT ADDRESS TO CV     | TOCV     | 285           |

## ● Block Programming Instructions

| Instruction                        | Mnemonic             | Function code |
|------------------------------------|----------------------|---------------|
| BLOCK PROGRAM BEGIN                | BPRG                 | 096           |
| BLOCK PROGRAM END                  | BEND                 | 801           |
| BLOCK PROGRAM PAUSE                | BPPS                 | 811           |
| BLOCK PROGRAM RESTART              | BPRS                 | 812           |
| CONDITIONAL BLOCK EXIT             | CCS                  | 282           |
| CONDITIONAL BLOCK EXIT             | CONDITI ON EXIT      | 806           |
| CONDITIONAL BLOCK EXIT             | EXIT Bit operand     | 806           |
| CONDITIONAL BLOCK EXIT (NOT)       | EXIT NOT Bit operand | 806           |
| CONDITIONAL BLOCK BRANCHING        | CONDITI ON IF        | 802           |
| CONDITIONAL BLOCK BRANCHING        | IF Bit operand       | 802           |
| CONDITIONAL BLOCK BRANCHING (NOT)  | IF NOT Bit operand   | 802           |
| CONDITIONAL BLOCK BRANCHING (ELSE) | ELSE                 | 803           |
| CONDITIONAL BLOCK BRANCHING END    | IEND                 | 804           |
| ONE CYCLE AND WAIT                 | CONDITI ON WAIT      | 805           |
| ONE CYCLE AND WAIT                 | WAIT Bit operand     | 805           |
| ONE CYCLE AND WAIT (NOT)           | WAIT NOT Bit operand | 805           |
| TIMER WAIT                         | BCD TIMW             | 813           |
|                                    | BIN TIMWX            | 816           |
| COUNTER WAIT                       | BCD CNTW             | 814           |
|                                    | BIN CNTWX            | 817           |
| HIGH-SPEED TIMER WAIT              | BCD TMHW             | 815           |
|                                    | BIN TMH WX           | 818           |
| LOOP                               | LOOP                 | 809           |

## ● Block Programming Instructions

| Instruction | Mnemonic             | Function code |
|-------------|----------------------|---------------|
| LEND        | CONDITI ON LEND      | 810           |
| LEND        | LEND Bit operand     | 810           |
| LEND NOT    | LEND NOT Bit operand | 810           |

## ● Text String Processing Instructions

| Instruction        | Mnemonic                                                                              | Function code                                                                          |
|--------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| MOV STRING         | MOV\$                                                                                 | 664                                                                                    |
| CONCATENATE STRING | +\$                                                                                   | 656                                                                                    |
| GET STRING LEFT    | LEFT\$                                                                                | 652                                                                                    |
| GET STRING RIGHT   | RGHT\$                                                                                | 653                                                                                    |
| GET STRING MIDDLE  | MID\$                                                                                 | 654                                                                                    |
| FIND IN STRING     | FIND\$                                                                                | 660                                                                                    |
| STRING LENGTH      | LEN\$                                                                                 | 650                                                                                    |
| REPLACE IN STRING  | RPLC\$                                                                                | 661                                                                                    |
| DELETE STRING      | DEL\$                                                                                 | 658                                                                                    |
| EXCHANGE STRING    | XCHG\$                                                                                | 665                                                                                    |
| CLEAR STRING       | CLR\$                                                                                 | 666                                                                                    |
| INSERT INTO STRING | INS\$                                                                                 | 657                                                                                    |
| String Comparison  | LD, AND, OR +<br>= \$,<br>< > \$,<br>< > \$,<br>< = \$,<br>< = \$,<br>> \$,<br>> = \$ | 670 (= \$)<br>671 (< > \$)<br>672 (< \$)<br>673 (< = \$)<br>674 (> \$)<br>675 (> = \$) |

## ● Task Control Instructions

| Instruction | Mnemonic | Function code |
|-------------|----------|---------------|
| TASK ON     | TKON     | 820           |
| TASK OFF    | TKOF     | 821           |

## ● Model Conversion Instructions

| Instruction            | Mnemonic | Function code |
|------------------------|----------|---------------|
| BLOCK TRANSFER         | XFERC    | 565           |
| SINGLE WORD DISTRIBUTE | DISTC    | 566           |
| DATA COLLECT           | COLLC    | 567           |
| MOVE BIT               | MOVBC    | 568           |
| BIT COUNTER            | BCNTC    | 621           |

## ● Special Instructions for Function Blocks

| Instruction     | Mnemonic | Function code |
|-----------------|----------|---------------|
| GET VARIABLE ID | GETID    | 286           |



---

# Ordering Information

---

|                                                                           |    |
|---------------------------------------------------------------------------|----|
| ■ CPU Units .....                                                         | 56 |
| ■ Options for CPU Units .....                                             | 57 |
| ■ Programming Devices .....                                               | 58 |
| ■ Expansion Units .....                                                   | 59 |
| ■ I/O Connecting Cable .....                                              | 59 |
| ■ Optional Products, Maintenance Products and DIN Track Accessories ..... | 59 |
| ■ CJ-series Special I/O Units and CPU Bus Units .....                     | 60 |

---

## Standards and Directives

---

### ● International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class 1 Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class 1 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.

### ● EC Directives

The EC Directives applicable to PLCs include the EMC Directives and the Low Voltage Directive. OMRON complies with these directives as described below.

#### ● EMC Directives

##### Applicable Standards

EMI: EN61000-6-4

EMS: EN61131-2 and EN61000-6-2 (See note.)

PLCs are electrical devices that are incorporated in machines and manufacturing installations. OMRON PLCs conform to the related EMC standards so that the devices and machines into which they are built can more easily conform to EMC standards. The actual PLCs have been checked to ensure conformity to EMC standards. Whether these standards are satisfied for the actual system, however, must be checked by the customer.

EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PLC is installed. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

**Note:** The applicable EMS standards depend on the product.

### ● Low Voltage Directive

#### Applicable Standard: EN61131-2

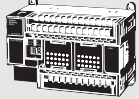
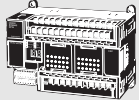
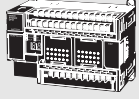
Devices that operate at voltages from 50 to 1,000 VAC or 75 to 150 VDC must satisfy the appropriate safety requirements. With PLCs, this applies to Power Supply Units and I/O Units that operate in these voltage ranges.

These Units have been designed to conform to EN61131-2, which is the applicable standard for PLCs.

# Ordering Information

## ■ CPU Units

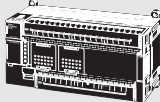
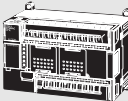
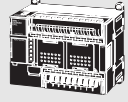
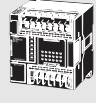
### ● CP1H CPU Units

| CPU Unit                                                                                                      | Specifications                                                                                                                                                                                                               |                 |                              |                                |                                | Model          | Standards     |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|--------------------------------|--------------------------------|----------------|---------------|
|                                                                                                               | CPU type                                                                                                                                                                                                                     | Power supply    | Output method                | Inputs                         | Outputs                        |                |               |
| <b>CP1H-X CPU Units</b><br>  | <b>Memory capacity: 20K steps</b><br><b>High-speed counters:</b><br>100 kHz, 4 axes<br><b>Pulse outputs: 100 kHz, 4 axes</b><br>(Models with transistor outputs only)                                                        | AC power supply | Relay output                 | 24                             | 16                             | CP1H-X40DR-A   | UC1, N, L, CE |
|                                                                                                               |                                                                                                                                                                                                                              | DC power supply | Transistor output (sinking)  |                                |                                | CP1H-X40DT-D   |               |
|                                                                                                               |                                                                                                                                                                                                                              |                 | Transistor output (sourcing) |                                |                                | CP1H-X40DT1-D  |               |
| <b>CP1H-XA CPU Units</b><br> | <b>Memory capacity: 20K steps</b><br><b>High-speed counters:</b><br>100 kHz, 4 axes<br><b>Pulse outputs: 100 kHz, 4 axes</b><br>(Models with transistor outputs only)<br><b>Analog inputs: 4</b><br><b>Analog outputs: 2</b> | AC power supply | Relay output                 | 24                             | 16                             | CP1H-XA40DR-A  |               |
|                                                                                                               |                                                                                                                                                                                                                              | DC power supply | Transistor output (sinking)  |                                |                                | CP1H-XA40DT-D  |               |
|                                                                                                               |                                                                                                                                                                                                                              |                 | Transistor output (sourcing) |                                |                                | CP1H-XA40DT1-D |               |
| <b>CP1H-Y CPU Units</b><br>  | <b>Memory capacity: 20K steps</b><br><b>High-speed counters:</b><br>1 MHz, 2 axes<br>100 kHz, 2 axes<br><b>Pulse outputs: 1 MHz, 2 axes</b><br>100 kHz, 2 axes                                                               | DC power supply | Transistor output (sinking)  | 12 + line-driver input, 2 axes | 8 + line-driver output, 2 axes | CP1H-Y20DT-D   |               |

**Note:** 1. CP1H PLCs are supported by CX-Programmer version 6.2 or higher.

2. Purchase a separately sold Option Unit if you will use RS-232C, RS-422A/485, Ethernet, or LCD.

### ● CP1L CPU Units

| CPU Unit                                                                                                                      | Specifications                                                                                                                                                        |                 |                              |        |         | Model         | Standards     |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|--------|---------|---------------|---------------|
|                                                                                                                               | CPU type                                                                                                                                                              | Power supply    | Output method                | Inputs | Outputs |               |               |
| <b>CP1L-M CPU Units with 60 Points</b><br> | <b>Memory capacity: 10K steps</b><br><b>High-speed counters:</b><br>100 kHz, 4 axes<br><b>Pulse outputs: 100 kHz, 2 axes</b><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 |               |
| <b>CP1L-M CPU Units with 40 Points</b><br> | <b>Memory capacity: 10K steps</b><br><b>High-speed counters:</b><br>100 kHz, 4 axes<br><b>Pulse outputs: 100 kHz, 2 axes</b><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 |               |
| <b>CP1L-M CPU Units with 30 Points</b><br> | <b>Memory capacity: 10K steps</b><br><b>High-speed counters:</b><br>100 kHz, 4 axes<br><b>Pulse outputs: 100 kHz, 2 axes</b><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 |               |
| <b>CP1L-L CPU Units with 20 Points</b><br> | <b>Memory capacity: 5K steps</b><br><b>High-speed counters:</b><br>100 kHz, 4 axes<br><b>Pulse outputs: 100 kHz, 2 axes</b><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 |               |

# Ordering Information

| CPU Unit                                                                                                                    | Specifications                                                                                                                                                           |                 |                              |        |         | Model         | Standards     |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|--------|---------|---------------|---------------|
|                                                                                                                             | CPU type                                                                                                                                                                 | Power supply    | Output method                | Inputs | Outputs |               |               |
| <b>CP1L-L CPU Units with 14 Points</b><br> | <b>Memory capacity: 5K steps</b><br><b>High-speed counters: 100 kHz, 4 axes</b><br><b>Pulse outputs: 100 kHz, 2 axes</b><br><b>(Models with transistor outputs only)</b> | 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 |               |
|                                                                                                                             |                                                                                                                                                                          |                 | Relay output                 |        |         | CP1L-L10DR-A  |               |
| <b>CP1L-L CPU Units with 10 Point</b><br>  | <b>Memory capacity: 5K steps</b><br><b>High-speed counters: 100 kHz, 4 axes</b><br><b>Pulse outputs: 100 kHz, 2 axes</b><br><b>(Models with transistor outputs only)</b> | AC power supply | Transistor output (sinking)  | 6      | 4       | CP1L-L10DT-A  | UC1, N, L, CE |
|                                                                                                                             |                                                                                                                                                                          |                 | Relay output                 |        |         | CP1L-L10DR-D  |               |
|                                                                                                                             |                                                                                                                                                                          | DC power supply | Transistor output (sinking)  |        |         | CP1L-L10DT-D  |               |
|                                                                                                                             |                                                                                                                                                                          |                 | Transistor output (sourcing) |        |         | CP1L-L10DT1-D |               |
|                                                                                                                             |                                                                                                                                                                          |                 | Relay output                 |        |         | CP1L-L10DR-A  |               |
|                                                                                                                             |                                                                                                                                                                          |                 | Transistor output (sinking)  |        |         | CP1L-L10DT-A  |               |

**Note: 1.** CP1L PLCs are supported by CX-Programmer version 7.2 or higher, except for 10-point and 60-point CPU Units. The 10-point and 60-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     |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| <b>RS-232C Option Board</b><br>                      | Can be mounted in either CPU Unit Option Board slot 1 or 2.<br><b>Note:</b> Cannot be used for the CP1L-L10.                                                                                | CP1W-CIF01 | UC1, N, L, CE |
| <b>RS-422A/485 Option Board</b><br>                 |                                                                                                                                                                                             | CP1W-CIF11 |               |
| <b>RS-422A/485 (Isolated-type) Option Board</b><br> |                                                                                                                                                                                             | CP1W-CIF12 | UC1, N, L, CE |
| <b>Ethernet Option Board</b><br>                    | Can be mounted in either CPU Unit Option Board slot 1 or 2.<br><b>Note: 1.</b> Cannot be used for the CP1L-L10.<br><b>2.</b> When using CP1W-CIF41 Ver.1.0, one Ethernet port can be added. | CP1W-CIF41 | UC1, N, L, CE |
| <b>LCD Option Board</b><br>                         | Can be mounted only in the CPU Unit Option Board slot 1.<br><b>Note:</b> Cannot be used for the CP1L-L10.                                                                                   | CP1W-DAM01 | UC1, L, N, CE |
| <b>Memory Cassette</b><br>                          | Can be used for backing up programs or auto-booting.                                                                                                                                        | CP1W-ME05M | UC1, N, L, CE |

# Ordering Information

## ■ Programming Devices

| Name                                                                                         | Specifications                                                                                                                                                                                                                                                                                                                                                      | Specifications             |                   | Model                 | Standards |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------|-----------------------|-----------|
|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                     | Number of licenses         | Media             |                       |           |
| <b>FA Integrated Tool Package CX-One Lite Version 4.□</b>                                    | 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><br>CX-One Lite Ver. 4.□ includes Micro PLC Edition CX-Programmer Ver. 9.□. | 1 license                  | CD                | <b>CXONE-LT01C-V4</b> | ---       |
| <b>FA Integrated Tool Package CX-One Ver. 4.□</b>                                            | 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><br>CX-One Ver. 4.□ includes CX-Programmer Ver. 9.□.                                                                            | 1 license (See note 3.)    | DVD (See note 4.) | <b>CXONE-AL01D-V4</b> | ---       |
| <b>Programming Device Connecting Cable for CP1W-CIF01 RS-232C Option Board (See note 5.)</b> | Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)                                                                                                                                                                                                                                                                                                                 | For anti-static connectors |                   | <b>XW2Z-200S-CV</b>   | ---       |
|                                                                                              | Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)                                                                                                                                                                                                                                                                                                                 |                            |                   | <b>XW2Z-500S-CV</b>   |           |
|                                                                                              | Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)                                                                                                                                                                                                                                                                                                                 |                            |                   | <b>XW2Z-200S-V</b>    |           |
|                                                                                              | Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)                                                                                                                                                                                                                                                                                                                 |                            |                   | <b>XW2Z-500S-V</b>    |           |
| <b>USB-Serial Conversion Cable (See note 5.)</b>                                             | 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                                                                      |                            |                   | <b>CS1W-CIF31</b>     | N         |

- Note:** 1. CP1H PLCs are supported by CX-Programmer version 6.2 or higher.  
CP1L PLCs are supported by CX-Programmer version 7.2 or higher, except for 10-point and 60-point CPU Units.  
The 10-point and 60-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.
3. Multi licenses are available for the CX-One (3, 10, 30 or 50 licenses).
4. The CX-One is also available on CD (CXONE-AL□□C-V4).
5. 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).

# Ordering Information

## ■ 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                          | <sup>NEW</sup> 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<br>(I/O link input bits) | 8<br>(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 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| Battery Set | For CP1H CPU Units<br>(Use batteries within two years of manufacture.)                                                             | CJ1W-BAT01 | ---       |
| DIN Track   | Length: 0.5 m; Height: 7.3 mm                                                                                                      | PFP-50N    |           |
|             | Length: 1 m; Height: 7.3 mm                                                                                                        | PFP-100N   |           |
|             | Length: 1 m; Height: 16 mm                                                                                                         | PFP-100N2  |           |
| End Plate   | 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      |           |

# Ordering Information

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

| Category              | Name                      | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Model                    | Standards       |
|-----------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|
| CP1H CPU Unit options | CJ Unit Adapter           | Adapter for connecting CJ-series Special I/O Units and CPU Bus Units (includes CJ-series End Cover)                                                                                                                                                                                                                                                                                                                                                                                        | CP1W-EXT01               | UC1, N, L, CE   |
| CJ1 Special I/O Units | Analog Input Units        | 4 inputs (1 to 5 V (1/10,000), 0 to 10 V (1/20,000), -5 to 5 V (1/20,000), -10 to 10 V (1/40,000), and 4 to 20 mA (1/10,000))<br>Conversion Period: 20 μs/1 point, 25 μs/2 points, 30 μs/3 points, 35 μs/4 points                                                                                                                                                                                                                                                                          | CJ1W-AD042               | UC1, CE         |
|                       |                           | 8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/8,000; Conversion speed: 250 μs/input max.<br>(Can be set to 1/4,000 resolution and 1 ms/input.)                                                                                                                                                                                                                                                                                                        | CJ1W-AD081-V1            | UC1, N, L, CE   |
|                       |                           | 4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/8,000; Conversion speed: 250 μs/input max.<br>(Can be set to 1/4,000 resolution and 1 ms/input.)                                                                                                                                                                                                                                                                                                        | CJ1W-AD041-V1            |                 |
|                       | Analog Output Units       | 4 outputs (1 to 5 V (1/10,000), 0 to 10 V (1/20,000), and -10 to 10 V (1/40,000))<br>Conversion Period: 20 μs/1 point, 25 μs/2 points, 30 μs/3 points, 35 μs/4 points                                                                                                                                                                                                                                                                                                                      | CJ1W-DA042V              | UC1, CE         |
|                       |                           | 8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V)<br>Resolution: 1/4,000; Conversion speed: 1 ms/output max.<br>(Can be set to 1/8000, 250 μs/output.)                                                                                                                                                                                                                                                                                                                                | CJ1W-DA08V               | UC1, N, L, CE   |
|                       |                           | 8 outputs (4 to 20 mA)<br>Resolution: 1/4,000; Conversion speed: 1 ms/output max.<br>(Can be set to 1/8,000, 250 μs/output.)                                                                                                                                                                                                                                                                                                                                                               | CJ1W-DA08C               | UC1, N, CE      |
|                       |                           | 4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/4,000; Conversion speed: 1ms/point max.                                                                                                                                                                                                                                                                                                                                                                | CJ1W-DA041               | UC1, N, L, CE   |
|                       |                           | 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/4,000; Conversion speed: 1ms/point max.                                                                                                                                                                                                                                                                                                                                                                | CJ1W-DA021               |                 |
|                       | Analog I/O Unit           | 4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/4000; Conversion speed: 1 ms/point max.<br>(Can be set to 1/8,000, 500 μs/point.)                                                                                                                                                                                                                                                                                                            | CJ1W-MAD42               |                 |
|                       | Process Input Units       | 4 fully universal inputs: Pt100 (3-wire), JPt100 (3-wire), Pt1000 (3-wire), Pt100 (4 wire), K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, ±100-mV selectable range, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V, ±10-V selectable range<br>Potentiometer resolution/conversion speed: 1/256,000 (conversion cycle: 60 ms/4 points), 1/64,000 (conversion cycle: 10 ms/4 points), 1/16,000 (conversion cycle: 5 ms/4 points) | CJ1W-PH41U (See note 1.) | UC1, CE         |
|                       |                           | 4 fully universal inputs: Pt100, JPt100, Pt1000, K, J, T, L, R, S, B, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V<br>Conversion speed: 250 ms/4 points                                                                                                                                                                                                                                                                                                                           | CJ1W-AD04U               | UC1, L, CE      |
|                       |                           | 4 inputs, B, J, K, L, R, S, T; Conversion speed: 250 ms/4 inputs                                                                                                                                                                                                                                                                                                                                                                                                                           | CJ1W-PTS51               | UC1, CE         |
|                       |                           | 4 inputs, Pt100 Ω (JIS, IEC), JPt100 Ω, Conversion speed: 250 ms/4 inputs                                                                                                                                                                                                                                                                                                                                                                                                                  | CJ1W-PTS52               |                 |
|                       |                           | 2 inputs, B, E, J, K, L, N, R, S, T, U, W, Re5-26, PL ±100 mV, Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs                                                                                                                                                                                                                                                                                                                                                                      | CJ1W-PTS15               |                 |
|                       |                           | 2 inputs, Pt100, JPt100, Pt50, Ni508.4; Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs                                                                                                                                                                                                                                                                                                                                                                                             | CJ1W-PTS16               |                 |
|                       | Temperature Control Units | 2 inputs, 0 to 1.25 V, -1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, -5 to 5 V, 0 to 10 V, -10 to 10 V, ±10-V selectable range, 0 to 20 mA, 4 to 20 mA                                                                                                                                                                                                                                                                                                                                              | CJ1W-PDC15               |                 |
|                       |                           | 4 loops, thermocouple input, NPN output                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CJ1W-TC001               | UC1, N, L, CE   |
|                       |                           | 4 loops, thermocouple input, PNP output                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CJ1W-TC002               |                 |
|                       |                           | 2 loops, thermocouple input, NPN output, heater burnout detection function                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-TC003               |                 |
|                       |                           | 2 loops, thermocouple input, PNP output, heater burnout detection function                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-TC004               |                 |
|                       |                           | 4 loops, platinum resistance thermometer input, NPN output                                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-TC101               |                 |
|                       |                           | 4 loops, platinum resistance thermometer input, PNP output                                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-TC102               |                 |
|                       |                           | 2 loops, platinum resistance thermometer input, NPN output, heater burnout detection function                                                                                                                                                                                                                                                                                                                                                                                              | CJ1W-TC103               |                 |
|                       |                           | 2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function                                                                                                                                                                                                                                                                                                                                                                                              | CJ1W-TC104               |                 |
|                       | High-speed Counter Unit   | 2 inputs, max. input frequency: 500 kpps                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CJ1W-CT021               | UC1, N, L, CE   |
|                       | Position Control Units    | Pulse train, open collector output, 1 axis                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-NC113               | UC1, CE         |
|                       |                           | Pulse train, open collector output, 2 axes                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-NC213               |                 |
|                       |                           | Pulse train, open collector output, 4 axes                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1W-NC413               |                 |
|                       |                           | Pulse train, line driver output, 1 axis                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CJ1W-NC133               |                 |
|                       |                           | Pulse train, line driver output, 2 axes                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CJ1W-NC233               |                 |
|                       |                           | Pulse train, line driver output, 4 axes                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CJ1W-NC433               |                 |
|                       | Space Unit                | ---                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CJ1W-SP001               |                 |
|                       | ID Sensor Units           | For V680 Series, 1 R/W Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CJ1W-V680C11             | UC, CE          |
|                       |                           | For V680 Series, 2 R/W Heads                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CJ1W-V680C12             |                 |
|                       |                           | For V600 Series, 1 R/W Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CJ1W-V600C11             |                 |
|                       |                           | For V600 Series, 2 R/W Heads                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CJ1W-V600C12             |                 |
|                       | CompoNet Master Unit      | Word slaves: 2,048 points, Bit slaves: 512 points                                                                                                                                                                                                                                                                                                                                                                                                                                          | CJ1W-CRM21               | U, U1, N, L, CE |
|                       | CompoBus/S Master Unit    | CompoBus/S remote I/O, 256 points max.                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CJ1W-SRM21               | UC1, N, L, CE   |

**Note:** 1. If a CJ1W-PH41U is used, do not use a CP1H CPU Unit with relay contact outputs or Expansion Units with relay contact outputs.  
2. Refer to the *CJ1 catalog* (Cat. No. P052) for information on the CJ1 Special I/O Units.



# Ordering Information

| Category          | Name                                  | Specifications                                                                                                                                                       |                                                  | Model         | Standards     |
|-------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------|---------------|
| CJ1 CPU Bus Units | Controller Link Units                 | Wired (shielded twisted-pair cable)                                                                                                                                  |                                                  | CJ1W-CLK23    | UC1, N, L, CE |
|                   | Serial Communications Units           | 1 RS-232C port and 1 RS-422A/485 port                                                                                                                                |                                                  | CJ1W-SCU42    | UC1, N, CE    |
|                   |                                       | 2 RS-232C ports                                                                                                                                                      |                                                  | CJ1W-SCU22    |               |
|                   |                                       | 2 RS-422A/485 ports                                                                                                                                                  |                                                  | CJ1W-SCU32    |               |
|                   |                                       | 1 RS-232C port and 1 RS-422A/485 port                                                                                                                                |                                                  | CJ1W-SCU41-V1 | UC1, N, L, CE |
|                   |                                       | 2 RS-232C ports                                                                                                                                                      |                                                  | CJ1W-SCU21-V1 |               |
|                   |                                       | 2 RS-422A/485 ports                                                                                                                                                  |                                                  | CJ1W-SCU31-V1 |               |
|                   | EtherNet/IP Unit                      | Shielded twisted-pair cable (STP), category 5 or 5e or higher<br>Tag data links and message communications supported                                                 |                                                  | CJ1W-EIP21    |               |
|                   | Ethernet Unit                         | 100Base-TX                                                                                                                                                           |                                                  | CJ1W-ETN21    | UC1, CE       |
|                   | DeviceNet Unit                        | Functions as master and/or slave; allows control of 32,000 points max. per master                                                                                    |                                                  | CJ1W-DRM21    |               |
|                   | MECHATROLINK-II Position Control Unit | Control commands sent using MECHATROLINK-II synchronized communications<br>16 axes max., direct operation from ladder diagram, control modes: position/ speed/torque | 2 axes                                           | CJ1W-NC271    |               |
|                   |                                       |                                                                                                                                                                      | 4 axes                                           | CJ1W-NC471    |               |
|                   |                                       |                                                                                                                                                                      | 16 axes                                          | CJ1W-NCF71    |               |
|                   |                                       |                                                                                                                                                                      | 16 axes                                          | CJ1W-NCF71-MA |               |
|                   | MECHATROLINK-II Motion Control Unit   | Position, speed, and torque commands sent via MECHATROLINK-II<br>Special motion control language                                                                     | 32 axes max.<br>(Real axes: 20, Virtual axes: 2) | CJ1W-MCH71    |               |
|                   | FI-net Unit                           | 100Base-TX                                                                                                                                                           |                                                  | CJ1W-FLN22    |               |
|                   | SYSMAC SPU                            | High-speed data collection unit                                                                                                                                      |                                                  | CJ1W-SPU01-V2 |               |

Note: Refer to the *CJ1 catalog* (Cat. No. P052) for information on the CJ1 CPU Bus Units.

## Industrial Switching Hubs

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

## OMRON Function Block Library

### ■ OMRON Function Block Library for Positioning with Position Controllers

When using the CP1H, use the CP1H OMRON Function Block for positioning.

When using the CP1L, use the CP1M-CPU21/22/23 OMRON Function Block for positioning.



| FB name (using CP1H)               | FB name (using CP1L)              | Function name                    | Description                                                       |
|------------------------------------|-----------------------------------|----------------------------------|-------------------------------------------------------------------|
| _NCCP1H011_MoveAbsolute_DINT       | _NCCPU011_MoveAbsolute_DINT       | Absolute move with DINT          | Positions using absolute movement.                                |
| _NCCP1H020_MoveRelative_REAL       | _NCCPU020_MoveRelative_REAL       | Relative move with REAL          | Positions using relative movement.                                |
| _NCCP1H021_MoveRelative_DINT       | _NCCPU021_MoveRelative_DINT       | Relative move with DINT          | Positions using relative movement.                                |
| _NCCP1H030_MoveVelocity_REAL       | _NCCPU030_MoveVelocity_REAL       | Velocity control with REAL       | Controls velocity.                                                |
| _NCCP1H031_MoveVelocity_DINT       | _NCCPU031_MoveVelocity_DINT       | Velocity control with DINT       | Controls velocity.                                                |
| _NCCP1H050_Home_REAL               | _NCCPU050_Home_REAL               | Origin search with REAL          | Executes an origin search to establish the origin.                |
| _NCCP1H051_Home_DINT               | _NCCPU051_Home_DINT               | Origin search with DINT          | Executes an origin search to establish the origin.                |
| _NCCP1H061_Stop_REAL               | _NCCPU061_Stop_REAL               | Deceleration stop with REAL      | Decelerates operating axis to a stop.                             |
| _NCCP1H062_Stop_DINT               | _NCCPU062_Stop_DINT               | Deceleration stop with DINT      | Decelerates operating axis to a stop.                             |
| _NCCP1H110_MoveInterrupt_REAL      | _NCCPU110_MoveInterrupt_REAL      | Interrupt feeding with REAL      | Performs interrupt feeding.                                       |
| _NCCP1H111_MoveInterrupt_DINT      | _NCCPU111_MoveInterrupt_DINT      | Interrupt feeding with DINT      | Performs interrupt feeding.                                       |
| _NCCP1H120_MoveSequence            | _NCCPU120_MoveSequence            | Continuous move                  | Positions continuously.                                           |
| _NCCP1H130_MoveTimeAbsolute_REAL   | _NCCPU130_MoveTimeAbsolute_REAL   | Timed absolute move with REAL    | Positions using absolute movement for a specified period of time. |
| _NCCP1H131_MoveTimeAbsolute_DINT   | _NCCPU131_MoveTimeAbsolute_DINT   | Timed absolute move with DINT    | Positions using absolute movement for a specified period of time. |
| _NCCP1H140_MoveTimeRelative_REAL   | _NCCPU140_MoveTimeRelative_REAL   | Timed relative move with REAL    | Positions using relative movement for a specified period of time. |
| _NCCP1H141_MoveTimeRelative_DINT   | _NCCPU141_MoveTimeRelative_DINT   | Timed relative move with DINT    | Positions using relative movement for a specified period of time. |
| _NCCP1H200_ReadStatus              | _NCCPU200_ReadStatus              | Read status                      | Reads the status of the axis.                                     |
| _NCCP1H204_ReadActualPosition_REAL | _NCCPU204_ReadActualPosition_REAL | Read present position with REAL  | Reads the present position of the axis.                           |
| _NCCP1H205_ReadActualPosition_DINT | _NCCPU205_ReadActualPosition_DINT | Read present position with DINT  | Reads the present position of the axis.                           |
| _NCCP1H610_SetPosition_REAL        | _NCCPU610_SetPosition_REAL        | Shift present position with REAL | Changes the present position.                                     |
| _NCCP1H611_SetPosition_DINT        | _NCCPU611_SetPosition_DINT        | Shift present position with DINT | Changes the present position.                                     |

## OMRON Function Block Library

### ■ OMRON Function Block Library for E5CN and E5CN-U-series Temperature Controller Serial Communications



| FB name               | Function name      | Description                                                                        |
|-----------------------|--------------------|------------------------------------------------------------------------------------|
| E5xx003_Stop          | Stop               | Stops operation for Temperature Controller channel.                                |
| E5xN004_ExecuteAT     | Execute AT         | Starts AT for Temperature Controller channel.                                      |
| E5xN005_CancelAT      | Cancel AT          | Cancels AT for Temperature Controller channel.                                     |
| E5xx200_ReadVariable  | Read variable      | Reads one item from specified variable area.                                       |
| E5xx201_ReadStatus    | Read status        | Reads status of specified Temperature Controller channel.                          |
| E5xx202_ReadPV        | Read PV            | Reads PV of specified Temperature Controller channel.                              |
| E5xx203_ReadSP        | Read SP            | Reads SP of specified Temperature Controller channel.                              |
| E5xx204_ReadCoolingMV | Read cooling MV    | Reads cooling MV of specified Temperature Controller channel.                      |
| E5xx205_ReadHeatingMV | Read heating MV    | Reads heating MV of specified Temperature Controller channel.                      |
| E5xx400_WriteVariable | Write variable     | Writes one data item to specified variable area.                                   |
| E5xx403_WriteSP       | Write SP           | Sets SP for specified Temperature Controller channel.                              |
| E5xx600_SetComm       | Set communications | Sets PLC serial port to default communications settings of Temperature Controller. |

**Note:** These OMRON Function Block can be used for only serial port 2 (the port on the right) for CP1H and CP1L-M30/-M40/-M60 CPU Units.  
They can be used for serial port 1 only on CP1L-L14/-L20 CPU Units (which have only one serial port).  
Cannot be used for the CP1L-L10.

### ■ OMRON Function Block Library for E5AR and E5ER-series Temperature Controller Serial Communications



| FB name                   | Function name      | Description                                                                        |
|---------------------------|--------------------|------------------------------------------------------------------------------------|
| E5xx003_Stop              | Stop               | Stops operation for Temperature Controller channels.                               |
| E5xN004_ExecuteAT         | Execute AT         | Starts AT for Temperature Controller channels.                                     |
| E5xN005_CancelAT          | Cancel AT          | Cancels AT for Temperature Controller channels.                                    |
| E5xx200_ReadVariable      | Read variable      | Reads one item in specified variable area.                                         |
| E5xx201_ReadStatus        | Read status        | Reads status of specified Temperature Controller channel.                          |
| E5xx202_ReadPV            | Read PV            | Reads PV of specified Temperature Controller channel.                              |
| E5xx203_ReadSP            | Read SP            | Reads SP of specified Temperature Controller channel.                              |
| E5xx204_ReadCoolingMV     | Read cooling MV    | Reads cooling MV of specified Temperature Controller channel.                      |
| E5xx205_ReadHeatingMV     | Read heating MV    | Reads heating MV of specified Temperature Controller channel.                      |
| E5xxR206_ReadValveOpening | Read valve opening | Reads valve opening monitor value of specified Temperature Controller channel.     |
| E5xx400_WriteVariable     | Write variable     | Writes one data item to specified variable area.                                   |
| E5xx403_WriteSP           | Write SP           | Sets SP for specified Temperature Controller channel.                              |
| E5xx600_SetComm           | Set communications | Sets PLC serial port to initial communications settings of Temperature Controller. |

**Note:** These OMRON Function Block can be used for only serial port 2 (the port on the right) for CP1H and CP1L-M30/-M40/-M60 CPU Units.  
They can be used for serial port 1 only on CP1L-L14/-L20 CPU Units (which have only one serial port).  
Cannot be used for the CP1L-L10.

### ■ OMRON Function Block Library for E5ZN-series Temperature Controller Serial Communications



| FB name               | Function name      | Description                                                                        |
|-----------------------|--------------------|------------------------------------------------------------------------------------|
| E5xx001_ExeOperation  | Execute command    | Executes specified command.                                                        |
| E5xx002_Run           | Run                | Starts operation for specified Temperature Controller channel.                     |
| E5xx003_Stop          | Stop               | Stops operation for specified Temperature Controller channel.                      |
| E5xN004_ExecuteAT     | Execute AT         | Starts AT for Temperature Controller channels.                                     |
| E5xN005_CancelAT      | Cancel AT          | Cancels AT for Temperature Controller channels.                                    |
| E5xx200_ReadVariable  | Read variable      | Reads one item in specified variable area.                                         |
| E5xx201_ReadStatus    | Read status        | Reads status of specified Temperature Controller channel.                          |
| E5xx202_ReadPV        | Read PV            | Reads PV of specified Temperature Controller channel.                              |
| E5xx203_ReadSP        | Read SP            | Reads SP of specified Temperature Controller channel.                              |
| E5xx204_ReadCoolingMV | Read cooling MV    | Reads cooling MV of specified Temperature Controller channel.                      |
| E5xx205_ReadHeatingMV | Read heating MV    | Reads heating MV of specified Temperature Controller channel.                      |
| E5xx400_WriteVariable | Write variable     | Writes one data item to specified variable area.                                   |
| E5xx403_WriteSP       | Write SP           | Sets SP for specified Temperature Controller channel.                              |
| E5xx600_SetComm       | Set communications | Sets PLC serial port to default communications settings of Temperature Controller. |

**Note:** These OMRON Function Block can be used for only serial port 2 (the port on the right) for CP1H and CP1L-M30/-M40/-M60 CPU Units.  
They can be used for serial port 1 only on CP1L-L14/-L20 CPU Units (which have only one serial port).  
Cannot be used for the CP1L-L10.

# SMARTSTEP 2 AC Servo Drivers with Pulse String Inputs

## R88M-G/R7D-BP

### Advanced Functionality and Performance Packed into a Super-compact Body

- Compact AC Servo Drives

Compared to the SMARTSTEP A Series, the SMARTSTEP 2 Series can reduce the installation space by 48% and the installation size by 39% in terms of volume.

- Suppressing Vibration of Low-rigidity Mechanisms during Acceleration/Deceleration

The damping control function can suppress vibration of low-rigidity mechanisms or devices whose ends tend to vibrate.

- Easy Adjustment

The realtime autotuning function automatically estimates the load inertia of the machine in realtime and sets the optimal gain.

The adaptive filter automatically suppresses vibration caused by resonance.

- Compatible with Command Pulse of 90° Phase Difference Inputs

In addition to conventional CW/CCW inputs (2 pulse inputs) and SIGN/PULS inputs (1 pulse input), the SMARTSTEP 2 supports 90° phase difference inputs. This makes it possible to input encoder output signals directly into the Servo Drive for simplified synchronization control.

- A Wide Range of Pulse Setting Functions

A wide range of pulse setting functions, such as the command pulse multiplying, electronic gear, and encoder dividing, enable you to perform pulse settings suitable for your device or system.

- Simplified Speed Control with Internal Speed Settings

Four internal speed settings allow the speed to be easily switched by using external signals.

- Encoder Dividing Output Function

The number of motor encoder pulses output by the Servo Drive can be freely set in the range of 1 to 2,500 pulses per rotation. A parameter can also be set to change the phase.



### Servo Drive-Servomotor Combinations

- Combinations of Cylinder-type 3,000-r/min Servomotors and Servo Drivers

| Voltage            | Servo Driver       | Servomotor   |               |                |
|--------------------|--------------------|--------------|---------------|----------------|
|                    | Pulse-string input | Rated output | Without brake | With brake     |
| Single-phase 100-V | R7D-BPA5L          | 50 W         | R88M-G05030H  | R88M-G05030H-B |
|                    | R7D-BP01L          | 100 W        | R88M-G10030L  | R88M-G10030L-B |
|                    | R7D-BP02L          | 200 W        | R88M-G20030L  | R88M-G20030L-B |
| Single-phase 200-V | R7D-BP01H          | 50 W         | R88M-G05030H  | R88M-G05030H-B |
|                    |                    | 100 W        | R88M-G10030H  | R88M-G10030H-B |
|                    | R7D-BP02HH         | 200 W        | R88M-G20030H  | R88M-G20030H-B |
|                    | R7D-BP-04H         | 400 W        | R88M-G40030H  | R88M-G40030H-B |
| Three-phase 200-V  | R7D-BP01H          | 50 W         | R88M-G05030H  | R88M-G05030H-B |
|                    |                    | 100 W        | R88M-G10030H  | R88M-G10030H-B |
|                    | R7D-BP02H          | 200 W        | R88M-G20030H  | R88M-G20030H-B |
|                    | R7D-BP04H          | 400 W        | R88M-G40030H  | R88M-G40030H-B |

- Combinations of Flat-type 3,000-r/min Servomotors and Servo Drivers

| Voltage            | Servo Driver       | Servomotor   |               |                |
|--------------------|--------------------|--------------|---------------|----------------|
|                    | Pulse-string input | Rated output | Without brake | With brake     |
| Single-phase 100-V | R7D-BP01L          | 100 W        | R88M-G10030L  | R88M-G10030L-B |
|                    | R7D-BP02L          | 200 W        | R88M-G20030L  | R88M-G20030L-B |
| Single-phase 200-V | R7D-BP01H          | 100 W        | R88M-G10030H  | R88M-G10030H-B |
|                    | R7D-BP02HH         | 200 W        | R88M-G20030H  | R88M-G20030H-B |
|                    | R7D-BP-04H         | 400 W        | R88M-G40030H  | R88M-G40030H-B |
| Three-phase 200-V  | R7D-BP01H          | 100 W        | R88M-G10030H  | R88M-G10030H-B |
|                    | R7D-BP02H          | 200 W        | R88M-G20030H  | R88M-G20030H-B |
|                    | R7D-BP04H          | 400 W        | R88M-G40030H  | R88M-G40030H-B |

**Note:** For information on SMARTSTEP 2, refer to the *SMARTSTEP 2 Catalog* (Cat. No. I813).

## Read and Understand this Catalog

Please read and understand this catalog before purchasing the product. Please consult your OMRON representative if you have any questions or comments.

## Warranty and Limitations of Liability

### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the product in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

## Disclaimers

### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

### DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

**Note: Do not use this document to operate the Unit.**

**OMRON Corporation      Industrial Automation Company**  
Tokyo, JAPAN

**Contact: [www.ia.omron.com](http://www.ia.omron.com)**

**Regional Headquarters**

**OMRON EUROPE B.V.**  
Wegalaan 67-69-2132 JD Hoofddorp  
The Netherlands  
Tel: (31)2356-81-300/Fax: (31)2356-81-388

**OMRON ASIA PACIFIC PTE. LTD.**  
No. 438A Alexandra Road # 05-05/08 (Lobby 2),  
Alexandra Technopark,  
Singapore 119967  
Tel: (65) 6835-3011/Fax: (65) 6835-2711

**OMRON ELECTRONICS LLC**  
One Commerce Drive Schaumburg,  
IL 60173-5302 U.S.A.  
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

**OMRON (CHINA) CO., LTD.**  
Room 2211, Bank of China Tower,  
200 Yin Cheng Zhong Road,  
PuDong New Area, Shanghai, 200120, China  
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

**Authorized Distributor:**

© OMRON Corporation 2009 All Rights Reserved.  
In the interest of product improvement,  
specifications are subject to change without notice.  
**CSM\_7\_1\_0312**      Printed in Japan  
**Cat. No. P057-E1-09**      0910 (0507)