# OMRON

**Programmable Controllers** 

# CP1H/CP1L







**Ethernet Option Board** 

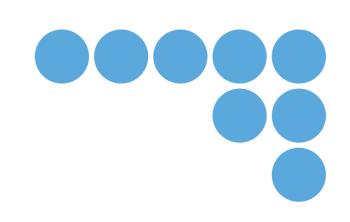
Wide Lineup of CPU Units with USB Port on All Models.
Multi-functionality Condensed into One-package PLCs

thone



CP1L-L





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** 



#### 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.

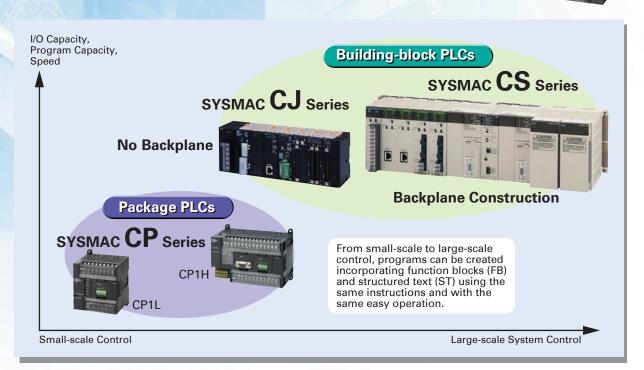


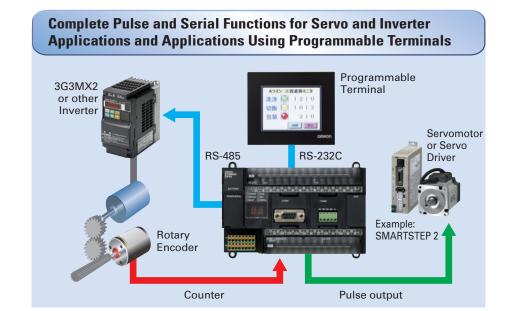
#### A Standard Package-type PLC

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.

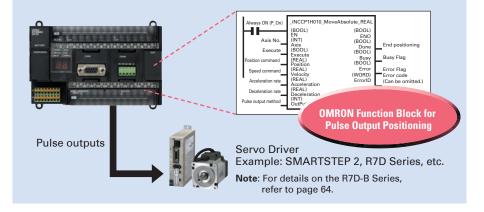








For positioning or communications, simply enter the set values for the instructions. Even complicated functions can be easily programmed using the OMRON Function Block (FB) Library.



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

Attach an LCD Option Board to the errecentererrecent 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 CP1H/CP1L

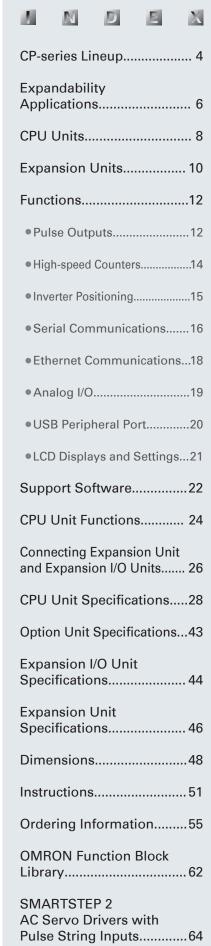
#### **USB Port Standard on all Models**

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

in the option board slot 1

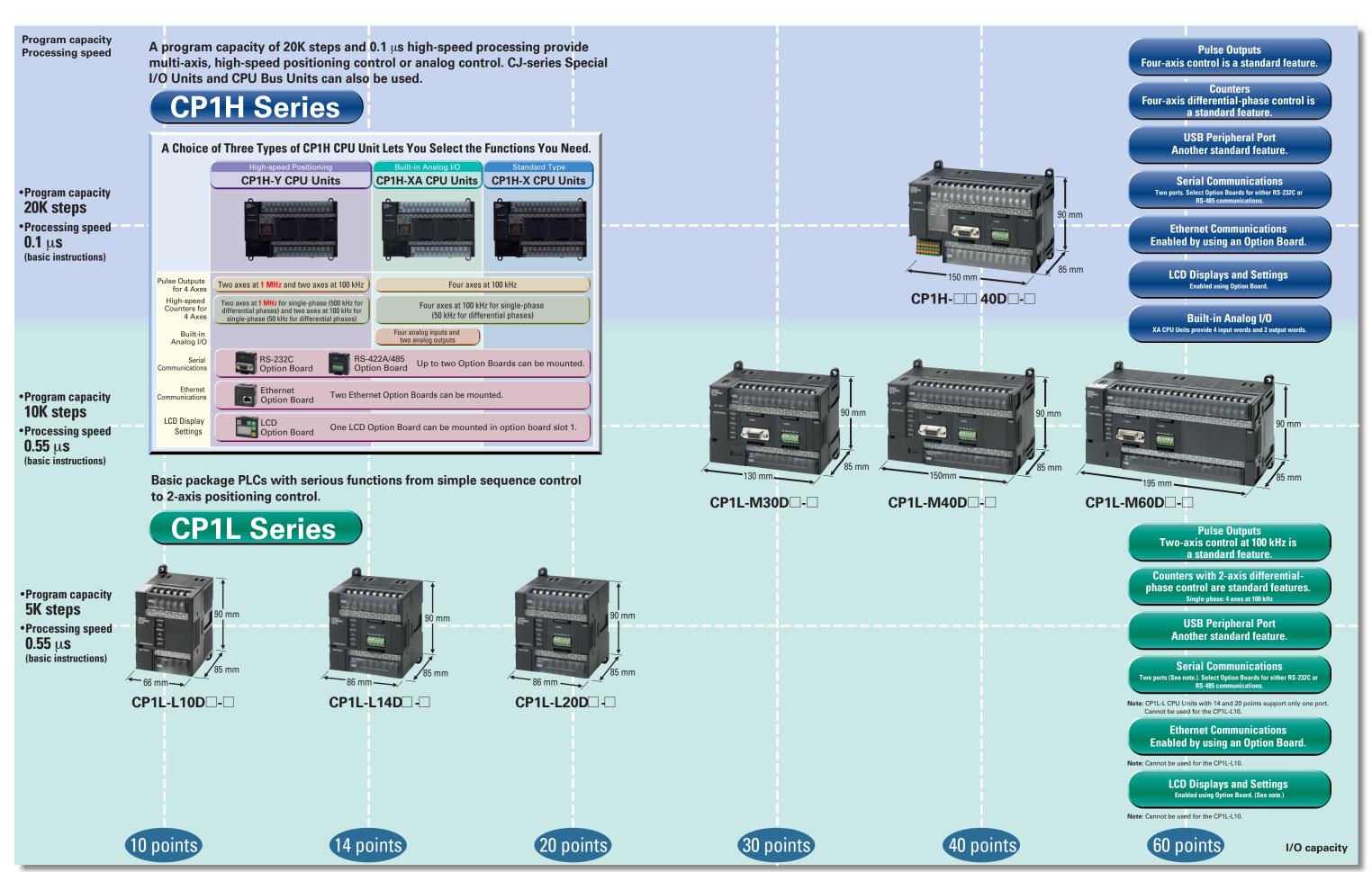


Cannot be used for the CP1L-L10.

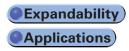


# A Wide Range of CPU Units Allows You to Select the Ideal Model.





# **Expansion Units Provide for a Wider Range of Applications.**



# SYSMAC CP1H

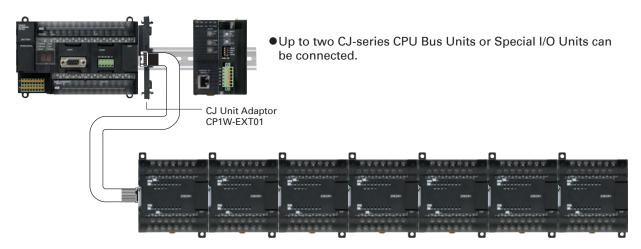
Using Only CP1W Units with the CP1H



• 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.)

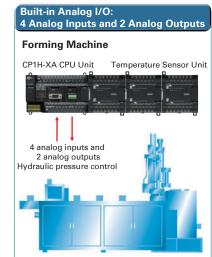
#### • Using CJ-series Special I/O Units, CJ-series CPU Bus Units, and CP1W Units with the CP1H

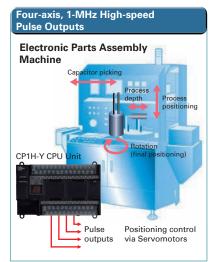


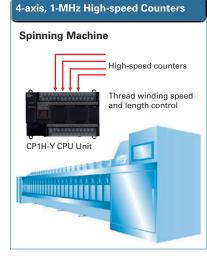
Up to 7 CP1W/CPM1A Expansion Units and Expansion I/O Units can be connected.

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**







# SYSMAC CP1L

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



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

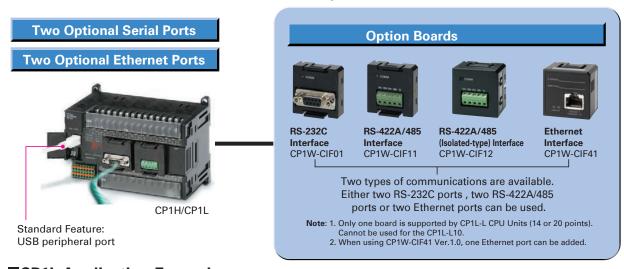
**● CP1L-L14D** □ - □ / CP1L-L20D □ - □

Note: Cannot be used for the CP1L-L10.

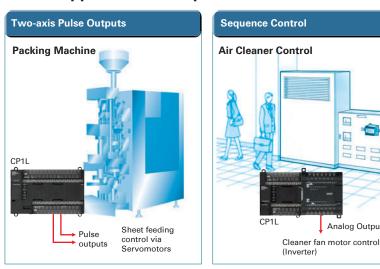


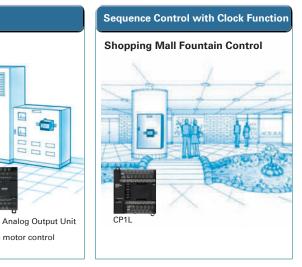
●One CP1W/CPM1A Expansion Unit or Expansion I/O Unit can be connected.

#### **■CP1H/CP1L Communications Interface Options**



#### **■**CP1L Application Examples





# Maximize Efficiency by Selecting the Optimum CPU Unit for Your Applications.



		CP1H					CP1L			
	Y CPU Units	XA CPU Units	X CPU Units	M Type 60 Points		M Type 40 Points	M Type 30 Points	L Type 20 Points	L Type 14 Points	L Type 10 Points
	PROGRAMMAN AND AND AND AND AND AND AND AND AND A	THE THE PROPERTY OF THE PROPER	TO THE STATE OF TH	RECEIVED AND ADDRESS OF THE PROPERTY OF THE PR		DE COMMUNICATION DE PROPERTIES DE LA COMMUNICATION DE LA COMMUNICA	ENGENTARIA TARAHATATANAN	TOTAL STATE OF THE PARTY OF THE	THE STATE OF THE S	DESCRIPTION OF THE PROPERTY OF
	CP1H-Y20DT-D DC power supply, 12 DC inputs, 8 transistor (sinking) outputs Two line-driver inputs	CP1H-XA40DR-A AC power supply, 24 DC inputs, 16 relay outputs, 4 analog inputs, 2 analog outputs	CP1H-X40DR-A AC power supply, 24 DC inputs, 16 relay outputs	CP1L-M60DR-A AC power supply, 36 DC inputs, 24 relay outputs		CP1L-M40DR-A AC power supply, 24 DC inputs, 16 relay outputs	CP1L-M30DR-A DC power supply, 18 DC inputs, 12 relay outputs	CP1L-L20DR-A AC power supply, 12 DC inputs, 8 relay outputs	CP1L-L14DR-A AC power supply, 8 DC inputs, 6 relay outputs	CP1L-L10DR-A AC power supply, 6 DC inputs, 4 relay outputs
	Two line-driver outputs	CP1H-XA40DT-D DC power supply, 24 DC inputs, 16 transistor (sinking) outputs,	CP1H-X40DT-D DC power supply, 24 DC inputs, 16 transistor (sinking) outputs	CP1L-M60DT-A AC power supply, 36 DC inputs, 24 transistor (sinking) outputs		CP1L-M40DT-A AC power supply, 24 DC inputs, 16 transistor (sinking) outputs	CP1L-M30DT-A AC power supply, 18 DC inputs, 12 transistor (sinking) outputs	CP1L-L20DT-A AC power supply, 12 DC inputs, 8 transistor (sinking) outputs	CP1L-L14DT-A AC power supply, 8 DC inputs, 6 transistor (sinking) outputs	CP1L-L10DT-A AC power supply, 6 DC inputs, 4 transistor (sinking) outputs
		4 analog inputs, 2 analog outputs  CP1H-XA40DT1-D	CP1H-X40DT1-D DC power supply, 24 DC inputs, 16 transistor (sourcing) outputs	CP1L-M60DR-D DC power supply, 36 DC inputs, 24 relay outputs		<b>CP1L-M40DR-D</b> DC power supply, 24 DC inputs, 16 relay outputs	CP1L-M30DR-D DC power supply, 18 DC inputs, 12 relay outputs	CP1L-L20DR-D DC power supply, 12 DC inputs, 8 relay outputs	CP1L-L14DR-D DC power supply, 8 DC inputs, 6 relay outputs	CP1L-L10DR-D DC power supply, 6 DC inputs, 4 relay outputs
		DC power supply, 24 DC inputs, 16 transistor (sourcing) outputs, 4 analog inputs, 2 analog outputs		CP1L-M60DT-D DC power supply, 36 DC inputs, 24 transistor (sinking) outputs		CP1L-M40DT-D DC power supply, 24 DC inputs, 16 transistor (sinking) outputs	CP1L-M30DT-D DC power supply, 18 DC inputs, 12 transistor (sinking) outputs	CP1L-L20DT-D DC power supply, 12 DC inputs, 8 transistor (sinking) outputs	CP1L-L14DT-D DC power supply, 8 DC inputs, 6 transistor (sinking) outputs	CP1L-L10DT-D DC power supply, 6 DC inputs, 4 transistor (sinking) outputs
				CP1L-M60DT1-D DC power supply, 36 DC inputs, 24 transistor (sourcing) outputs		CP1L-M40DT1-D DC power supply, 24 DC inputs, 16 transistor (sourcing) outputs	CP1L-M30DT1-D DC power supply, 18 DC inputs, 12 transistor (sourcing) outputs	CP1L-L20DT1-D DC power supply, 12 DC inputs, 8 transistor (sourcing) outputs	CP1L-L14DT1-D DC power supply, 8 DC inputs, 6 transistor (sourcing) outputs	CP1L-L10DT1-D DC power supply, 6 DC inputs, 4 transistor (sourcing) outputs
Pulse outputs (only for transistor outputs)	1 MHz for two axes (line driver outputs), 100 kHz for two axes (four axes total)	100 KHz fo	r four axes	100 kHz for two axes						
888B Counters	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	0 kHz (differential phases)	100 kHz (single-phase) for four axes, or 50 kHZ (differential phases) for two axes						
Serial communications	Two s (either R	serial ports can be added as op S-232C or RS-422A/485 Option	tions Boards).			optional serial ports can be ac S-232C or RS-422A/485 Option			ll port can be added S-422A/485 Option Board).	_
Ethernet communications		ernet ports can be added as an W-CIF41 Ver.1.0, one Ethernet p				ernet ports can be added as ar '1W-CIF41 Ver.1.0, one Etherne		One Ethernet port can	be added as an option.	_
USB peripheral port	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Analog Built-in analog I/O	_	4 analog inputs and 2 analog outputs (resolution: 6,000 or 12,000)	_	_		_	_	_	_	_
Memory Cassette	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
LCD display settings	An LCD Option Boa	rd can be added as an option to	o option board slot 1.	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.				_		
Function blocks (ladder diagrams or ST language)	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Inverter positioning	_	_	_	Yes		Yes	Yes	Yes	Yes	Yes
7-segment display	Yes	Yes	Yes	_		_	_	_	_	_
Program capacity		20K steps				10K	steps		5K steps	
Data memory capacity		32K words				32K v	words		10K words	
High-speed processing	0.1 μs/	/LD instruction, 0.3 μs/MOV inst	ruction			0.55	μs/LD instruction, 1.84 μs/MO	/ 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

Board

CP1W-CIF41



■ Ethernet Option ■ LCD Option Board CP1W-DAM01



■ Memory Cassette CP1W-ME05M

#### **CP1H and CP1L**

● Expansion I/O Units



•8 DC inputs

CP1W-8ER

•8 relay outputs

CP1W-8ET

CP1W-8ET1

●8 transistor outputs (sinking)

•8 Transistor outputs



#### CP1W-16ER

• 16 relay outputs

#### CP1W-16ET

#### CP1W-16ET1

(sourcing)

• 16 transistor outputs

• 16 transistor outputs

# CP1W-20EDR1

• 12 DC inputs

#### 8 relay outputs

CP1W-20EDT

#### • 12 DC inputs

CP1W-20EDT1

•8 transistor outputs

 8 transistor outputs (sourcing)

• 12 DC inputs

#### ■Analog Output Unit CP1W-DA041

Analog outputs: 4 (resolution: 6,000)

Analog outputs: 2 (resolution: 6,000)

#### 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)



#### CP1W-DA021 NEW



- ■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

■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

• Thermocouple inputs: 2 CP1W-TS002

●I/O Connecting

side-by-side connection

Cable

Thermocouple inputs: 4



■Temperature Sensor Unit CP1W-TS101

● CPM1A

**Expansion** Unit and

**Expansion** 

I/O Units

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



■CompoBus/S I/O Link Unit CP1W-SRT21

- •Inputs: 8
- Outputs: 8

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



**■ CPU Bus Units** 

Position Control Unit with MECHATROLINK-II

CJ1W-NCF71 (16 axes) CJ1W-NCF71-MA (16 axes)

Communications CJ1W-NC271 (2 axes)

CJ1W-NC471 (4 axes)





■ Special I/O Units

Analog Output Units CJ1W-DA042V CJ1W-AD041-V1 CJ1W-AD081-V1 CJ1W-DA021/041 CJ1W-DA08V/08C (2, 4, or 8 points)





Motion Control Unit with MECHATROLINK-II

CJ1W-MCH71 (30 axes)

FL-Net Unit CJ1W-FLN22





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



CJ1W-MAD42

(4 analog inputs, 2 analog outputs)



SYSMAC SPU High-speed Data CJ1W-SPU01-V2



DeviceNet Unit CJ1W-DRM21





CJ1W-PH41U CJ1W-AD04U CJ1W-PTS51/52 CJ1W-PTS15/16 CJ1W-PDC15

CompoBus/S Master Unit CJ1W-SRM21

Serial Comm



CompoNet Master Unit CJ1W-CRM21

Temperature Control

CJ1W-TC□□□ (4 or 2 loops)



CJ1W-CLK23

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





11

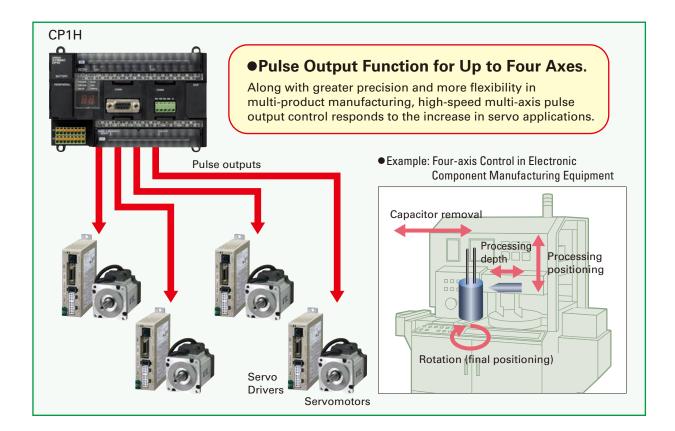


# **Pulse Outputs**

# **Up to Four Axes Are Standard.**

# **Advanced Power for High-precision Positioning Control.**

Sheet Feeding for Vertical Pillow Packer



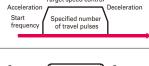
#### **A Full Range of Functions**

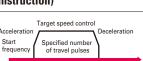
#### ■Origin Search Function (ORG Instruction)

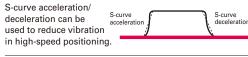
Origin searches are possible with a single ORG instruction.

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

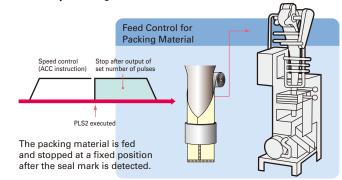
Easily achieved with special positioning instruction (PLS2).







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



#### **Applicable CPU Units and Functions**



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

#### **CP1H-X**□ **CPU Unit**



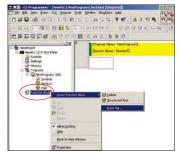
#### **CP1L CPU Unit**



#### **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.

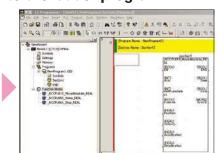
#### ■ Just use the CX-Programmer to paste function blocks into the ladder program.



the tree to select the required

library file.



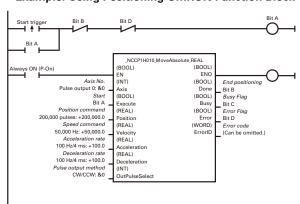


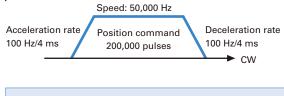
Pulse Outputs

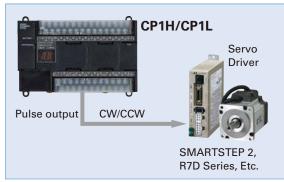
3 An instance of the function block will be created in the ladder program.

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

#### ● Example: Using Positioning OMRON Function Block

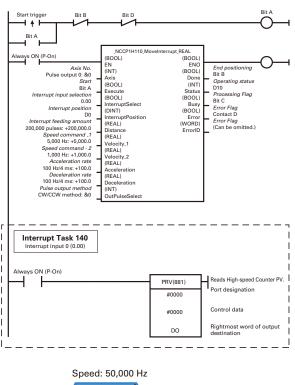


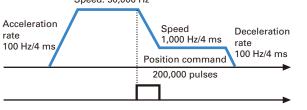




A positioning OMRON Function Block for the CP1H is used in the above application example. The positioning OMRON Function Blocks for the CP1L are the same as the positioning OMRON Function Blocks for the CJ1M-CPU21/22/23.

#### Using Interrupt Feeding OMRON Function Block





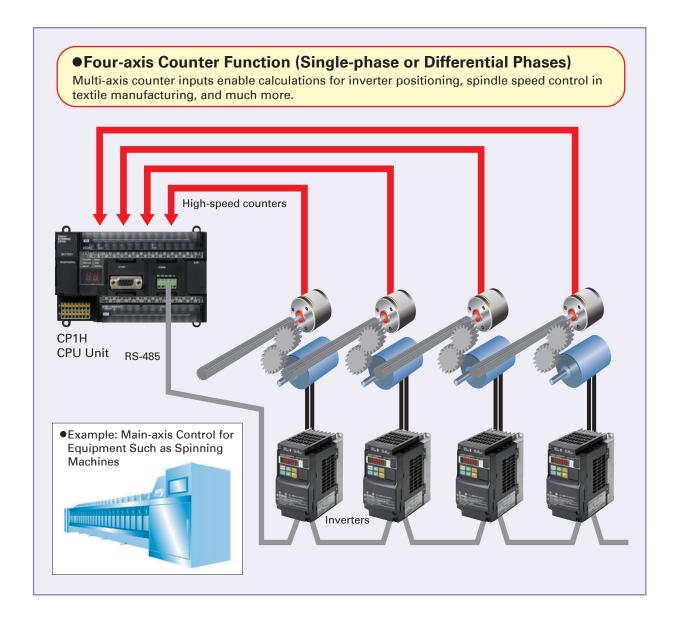
13

Interrupt input signal 00 (Input word 0, bit 00)



# **High-speed Counters**

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



#### **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**

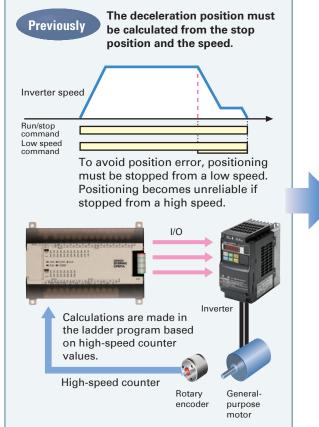


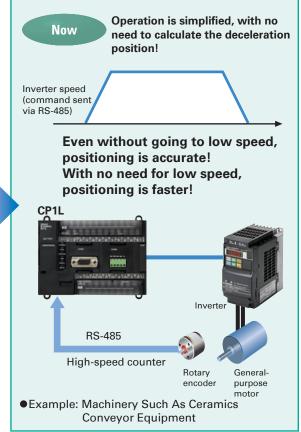
100 kHz (single-phase) for four axes, or 50 kHZ (differential phases) for two axes

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

High-speed Counters Inverter Positioning

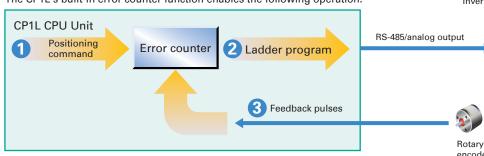
Machinery Such As Ceramics Conveyor Equipment



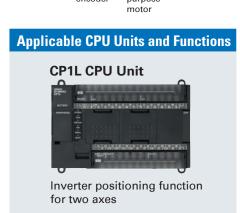


#### **■**Overview of Inverter Positioning

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



- Positioning commands are executed by means of pulse output nstructions. 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).
- 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.
- 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.



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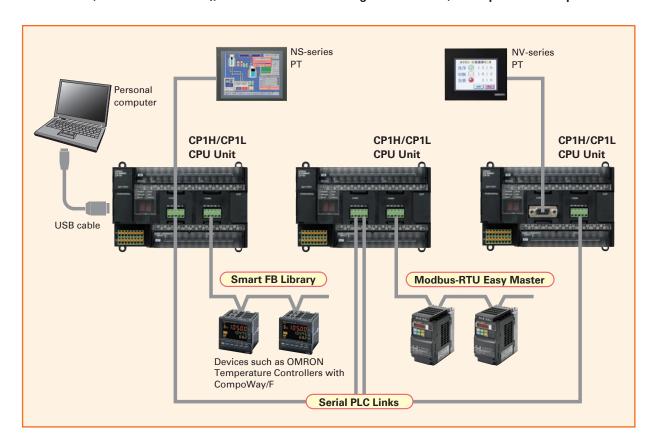


#### **Serial Communications**

#### Serial Communications

# A Standard USB Port and Two Serial Ports Enable Connections and 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)

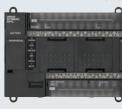
RS-422A/485(Isolated-type) Option Board CP1W-CIF12 (Maximum transmission distance 500m)

#### **Applicable CPU Units and Functions**



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)



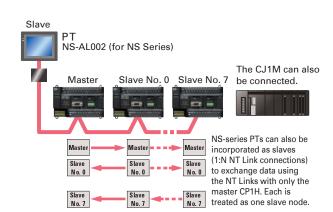
Serial Option Board for only one port.

#### **Serial PLC Links**



Setting/monitoring operation Set temperature/present temperature Errors

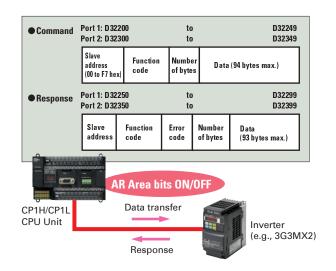
When multiple boilers are being controlled, up to 10 words/Unit of data for settings and monitoring can be exchanged using data links between up to nine CP1H, CP1L, and CJ1M CPU Units. Serial PLC Links can be used with either serial port 1 or serial port 2.



#### **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.

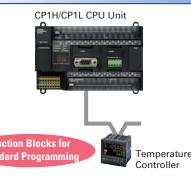




#### **Easy Communications Programming Using OMRON Function Blocks**

■ 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.



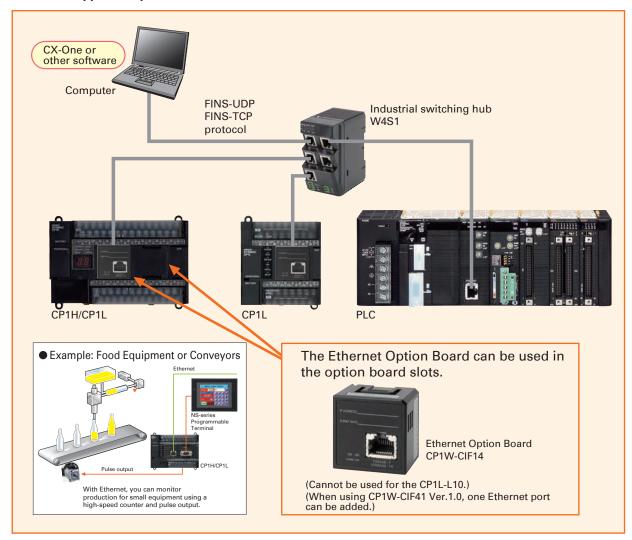


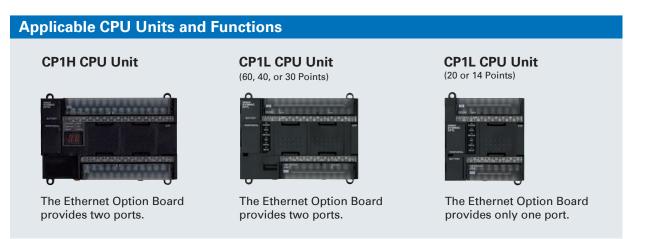
#### **Ethernet Communications**

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.







# Analog I/O

**Four Input Words and** 

Two Output Words for XA CPU Units.

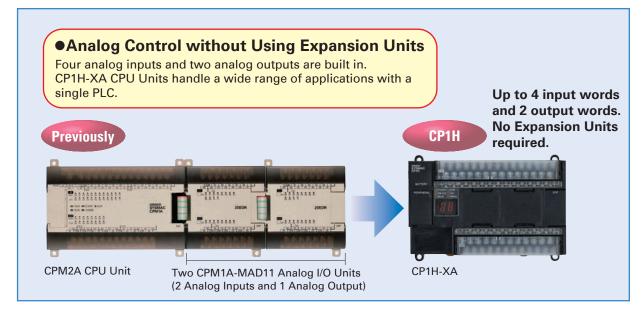
# **Analog Control and Monitoring with Only a Single CPU Unit**

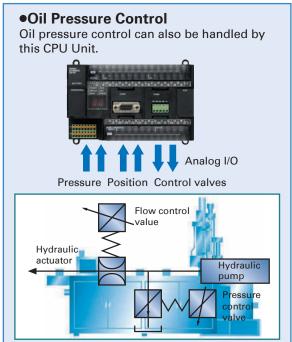
Surface Inspections Using Inspection Devices Mechanisms to Prevent Careless Mistakes in Cell Production (Such as Forgetting to Tighten Screws)

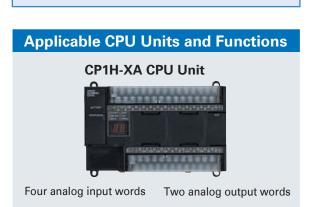
Oil Pressure Control in Forming Machines

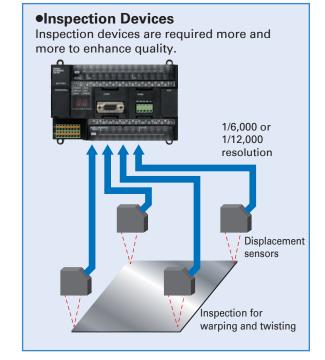
Ethernet Communications

Analog I/O









#### ● 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.



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.

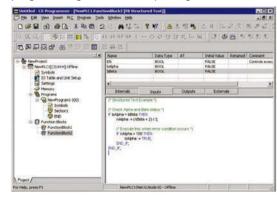
#### (The CP1H/CP1L USB port is used only for connecting to a Programming Device.)

Note: Programming Consoles (CQM1H-PRO01, 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.
IIF, THEN, ELSE, ELSIF, 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 (<=),

GreaterThan Comparison Operator (>),
GreaterThan 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, SQRT, LN, LOG, EXP, SIN, COS, TAN, ASIN, ACOS,

ATAN, EXPT

• Arithmetic Functions

Exponentiation (EXPT

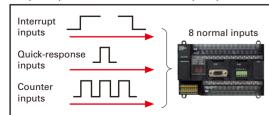
Note: The CP1H/CP1L CPU Units support the same function blocks and ST language as CS/CJ-series CPU Units with unit version 3.0.



# **High-speed Processing**

#### Up to Eight Interrupt Inputs Can Be Used.

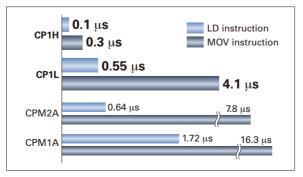
Eight interrupt inputs are built in. Quick-response inputs for pulse widths of 50 μs. The interrupt inputs can also be used as counters. (Response frequency: 5 kHz total for 8 interrupt inputs)



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 CP1I 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 PortLCD 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.



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



#### **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

advance and then displayed when a specified bit turns ON. This makes onsite setting and confirming faster. PRODUCTION TOTAL &01523 OK &01498 NG &00025

# Visual Checking of Status with Display of PLC Error Details

#### I/O Monitoring

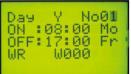
The backlight on the LCD screen will turn red when an error occurs to notify you of the error status. You can monitor the displayed error details and the error log.



# **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.



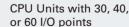
#### Applicable CPU Units and Functions

#### CP1H



Can be mounted to option board slot 1.

# CP1L CPU Units with





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.



#### **Integrated OMRON PLCs and Component Support Software**



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

CX-One
Configuration

1 Network Software
CX-Integrator CX-FLnet CX-Protocol
CX-ConfiguratorFDT Network Configurator

2 PLC Software
CX-Simulator
SwitchBox Utility

CX-Designer
Ladder Monitor software included. (See note 1.)
NV-Designer (See note 2.)

4 Motion Controller
CX-Drive
CX-Motion-NCF CX-Motion-MCH
CX-Position
CX-Position
CX-Motion
CX-Position
CX-Process Tool
NS-series Face Plate Auto-Builder

6 Component Software
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.

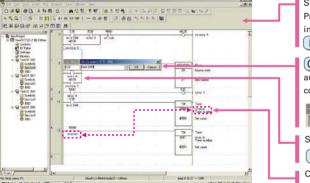
#### Easy-to-use Programming Software.

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

#### **CX-Programmer**

CP1L except for CPU Units with 60 points: Version 7.2 (CX-One version 2.1) or later CP1L CPU Units with 10 or 60 points: Version 7.3 (CX-One version 2.13) or later CP1H: Version 6.2 (CX-One version 1.1) or later

• 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.

© 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:



Ctrl + (-) (1)

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).

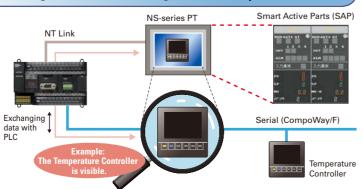
Password setting: Up to 8 alphanumeric characters (A-Z, a-z, 0-9)

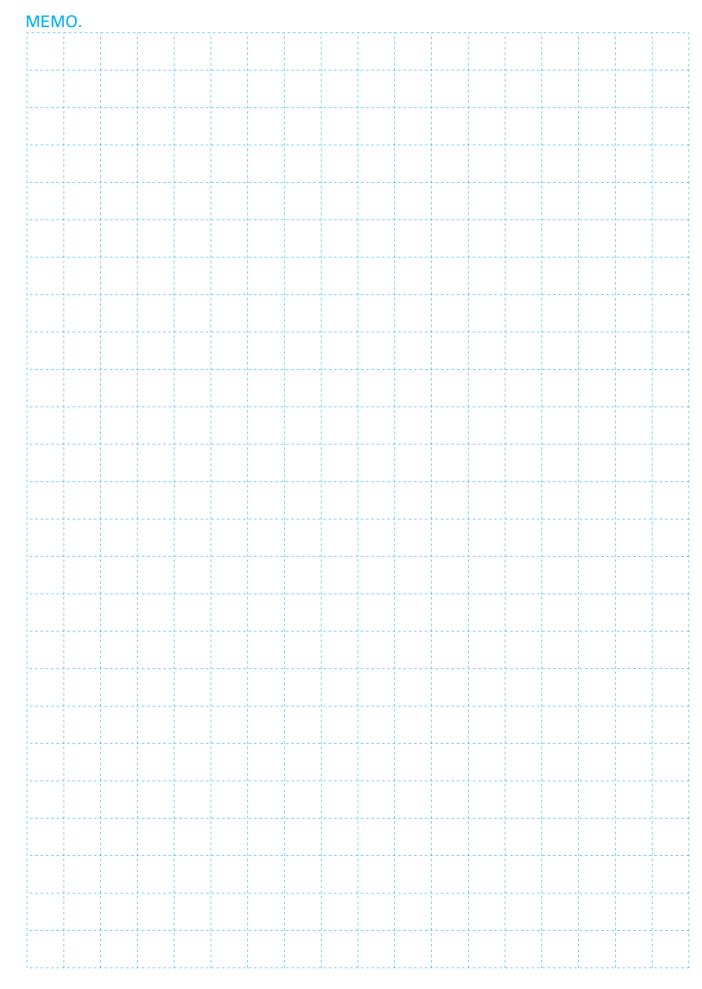
#### Improved Functional Connectivity with HMI Design Software and Integration of Component Software

#### 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.





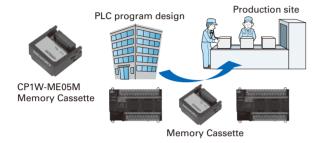
#### **CPU Unit Overview and Built-in Functions**





#### **Memory Cassette**

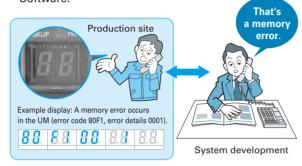
- Data, such as programs and initial memory values, can be stored on a Memory Cassette (optional) and copied to other systems.
- The Memory Cassette can also be used when installing new versions of application programs.



# 88

# 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

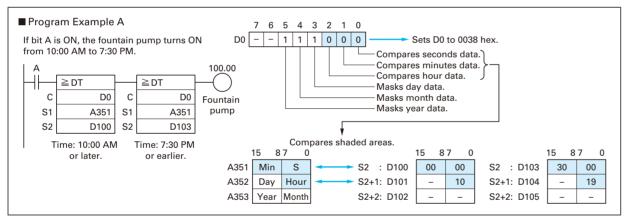




#### **Clock Function**

- All CP1H/CP1L CPU Units have a built-in clock.
- Shopping Mall Fountain Control

Controlling a Fountain for a Period of Time



#### ■ 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

value is changed, it is displayed (0 to FF) for three seconds on the 7-segment display.



(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.

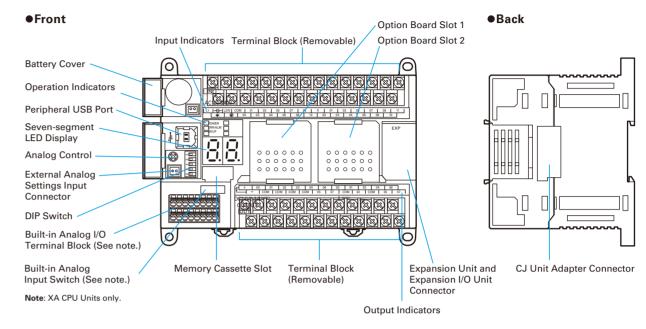
#### ■ Battery-free Operation

- 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.)

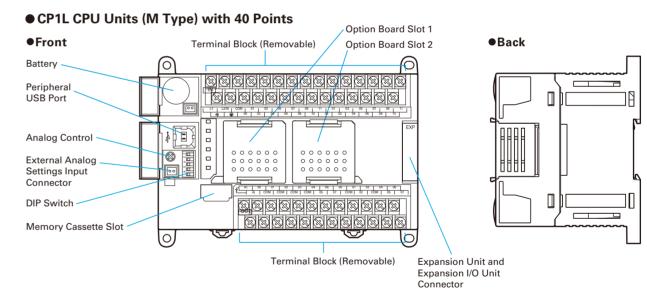
#### Note:

- 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**



#### **■ CP1L CPU Unit Nomenclature**



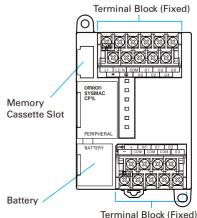
# ● CP1L CPU Units (L Type) with 20 or 14 Points

# Terminal Block (Fixed) Option Board Slot Memory Cassette Slot Battery Rattery

Terminal Block (Fixed)

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

25



# ● 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
	опи туре		Input	Output
		CP1W-40EDR		
	40 I/O points	CP1W-40EDT	2	2
		CP1W-40EDT1		
		CP1W-32ER		
	32 outputs	CP1W-32ET	—	4
		CP1W-32ET1		
		CP1W-20EDR1	1	
	20 I/O points	CP1W-20EDT	1	1
Expansion		CP1W-20EDT1	1 1 - 2 4 4 2 4 4 2 4 4	
I/O Units		CP1W-16ER		
	16 outputs	CP1W-16ET	1 —	2
		CP1W-16ET1		
	8 inputs	CP1W-8ED	1	_
		CP1W-8ER		
	8 outputs	CP1W-8ET	—	1
		CP1W-8ET1	1	
	2 analog inputs,1 analog output	CP1W-MAD11	2	1
Analog Units	4 analog inputs	CP1W-AD041	4	2
	4 analog outputs	CP1W-DA041	_	4
	2 analog outputs	CP1W-DA021	_	2
	2 thermocouple inputs	CP1W-TS001	2	_
	4 thermocouple inputs	CP1W-TS002	4	_
Temperature Sensor Units	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

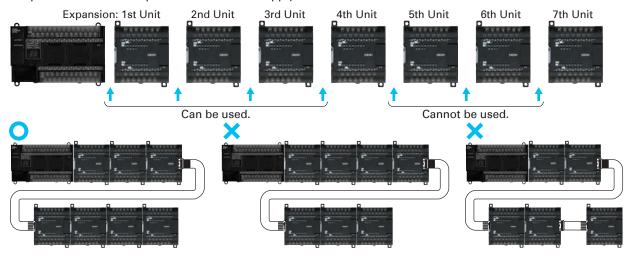
For example, the CP1W-TS002 Temperature Sensor Unit is allocated four words per Unit, so no more than three Units can be connected (4 words  $\times$  3 Units = 12 words). It would then be possible to mount a combination of other Units to use the remaining three input and 15 output words.

#### **Examples of Possible Combinations**

Input	Output
4 words x 3 Units = 12 words	0 words
2 words x 1 Unit = 2 words	0 words
1 word x 1 Unit = 1 word	1 word x 1 Unit = 1 word
0 words	4 words x 2 Units = 8 words
Total: 15 words	Total: 9 words
≦ 15 words	≦ 15 words
	4 words x 3 Units = 12 words 2 words x 1 Unit = 2 words 1 word x 1 Unit = 1 word 0 words Total: 15 words

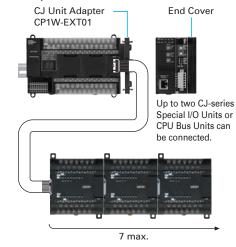
#### **Using CP1W-CN811 I/O Connecting Cable**

- 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)).

Position Control

CJ-series Special I/O Units and CPU Bus				
Unit name	Model	5 V Current consumption (A)		
Analog	CJ1W-AD042	0.52 A		
Input Units	CJ1W-AD081-V1	0.42 A		
	Model  CJ1W-AD042  CJ1W-AD081-V1  CJ1W-AD041-V1  CJ1W-DA08V  CJ1W-DA08C  CJ1W-DA041  CJ1W-DA021  CJ1W-DA021  CJ1W-PH41U  CJ1W-PTS51  CJ1W-PTS52  CJ1W-PTS52  CJ1W-PTS16  CJ1W-PTS16  CJ1W-PTS01  CJ1W-TC001  CJ1W-TC002  CJ1W-TC003  CJ1W-TC004  CJ1W-TC101  CJ1W-TC102  CJ1W-TC103  CJ1W-TC103  CJ1W-TC104			
	CJ1W-DA042V	0.40 A		
Analog	CJ1W-DA08V	0.14 A		
Output Units	CJ1W-DA08C			
	CJ1W-DA041	0.10.4		
	CJ1W-DA021	0.12 A		
Analog I/O Unit	CJ1W-MAD42	0.58 A		
	CJ1W-PH41U	0.30 A		
	CJ1W-AD04U	0.32 A		
	CJ1W-PTS51	0.05.4		
Process Input Units	CJ1W-PTS52	0.25 A		
Input Units	CJ1W-PTS15			
	CJ1W-PDC15			
	CJ1W-TC001			
	CJ1W-TC002			
	CJ1W-TC003			
Temperature	CJ1W-TC004	0.25 A		
Control Units	CJ1W-TC101	0.23 A		
	CJ1W-TC102			
	CJ1W-TC103			
	CJ1W-TC104			
CompoBus/S Master Unit	CJ1W-SRM21	0.15 A		
CompoNet Master Unit	CJ1W-CRM21	0.40 A		

Ullits	CJ1W-NC133	0.25 A	
	CJ1W-NC233 CJ1W-NC433	0.23 A	
	CJ1W-NC433	0.36 A	
High-speed Counter Unit	CJ1W-CT021	0.25 A	
	CJ1W-V680C11	0.26 A (24 VDC 0.13 A)	
ID Sensor Units	CJ1W-V680C12	0.32 A (24 VDC 0.26 A)	
TD Sensor Office	CJ1W-V600C11	0.26 A (24 VDC 0.12 A)	
	CJ1W-V600C12	0.32 A (24 VDC 0.24 A)	
Serial	CJ1W-SCU42	0.36 A*	
Communications	CJ1W-SCU22	0.28 A*	
Units	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	
	CJ1W-NC271		
MECHATROLINK-II	CJ1W-NC471	0.36 A	
Position Control Unit	CJ1W-NCF71	U.30 A	
	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	

CJ1W-NC113

CJ1W-NC213

CJ1W-NC413

0.25 A

0.36 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

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

#### ■ I/O Bits and I/O Allocations

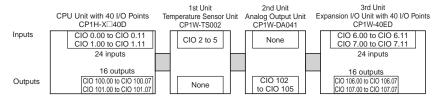
With CP1H and CP1L CPU Units, the beginning input and output words (CIO 0 and CIO 100) are allocated by the CPU Unit one or two words at a time. I/O bits are allocated in word units in order of connection to Expansion Units and Expansion I/O Units connected to a CPU Unit.

CPU Unit	Allocated words			
CFO OIIIL	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 CIO102		

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

Туре	AC power supply models	DC power supply models			
Item Model	CP1H-□□□-A CP1L-□□□-A	CP1H-□□□-D 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) 50 VA max. (CP1L-M60/-M40/-M30□□-A) (See next page.) 30 VA max. (CP1L-L20/-L14/-L10□□-A)	50 W max. (CP1H-□□□-D) 20 W max. (CP1L-M60/-M40/-M30□□-D) (See next page.) 13 W max. (CP1L-L20/-L14/-L10□□-D)			
Inrush current (See note.)	100 to 120 VAC inputs: 20 A max. (for cold start at room temperature) 8 ms max. 200 to 240 VAC inputs: 40 A max. (for cold start at room temperature), 8 ms max.	30 A max. (for cold start at room temperature) 20 ms max.			
External power supply	300 mA at 24 VDC (CP1H, CP1L-M60/-M40/-M30 -A) 200 mA at 24 VDC (CP1L-L20/-L14/-L10 -A) None				
Insulation resistance	$20~\text{M}\Omega$ 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 minutes each. Sweep time: 8 minutes × 10 sweeps = total time of				
Shock resistance	Conforms to JIS C0041. 147 m/s² three times each in X, Y, and Z	Z directions			
Ambient operating temperature	0 to 55°C				
Ambient humidity	10% to 90% (with no condensation)				
Ambient operating environ- ment	iron- 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.

#### **■** 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 co	onsumption	External power supply
Model	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	0.28A	0.03 A	
CP1L-M30DT1-D	0.28 A	0.03 A	
CP1L-L20DR-A	0.20 A	0.05 A	0.2 A max.
CP1L-L20DT-A	0.24 A	0.03 A	0.2 A max.
CP1L-L20DR-D	0.20A	0.05 A	
CP1L-L20DT-D	0.24 A	0.03 A	
CP1L-L20DT1-D	0.24 A	0.03 A	
CP1L-L14DR-A	0.18 A	0.04 A	0.2 A max.
CP1L-L14DT-A	0.21 A	0.03 A	0.2 A max.
CP1L-L14DR-D	0.18 A	0.04 A	
CP1L-L14DT-D	0.21 A	0.03 A	
CP1L-L14DT1-D	0.21 A	0.03A	
CP1L-L10DR-A	0.16 A	0.03 A	0.2 A max.
CP1L-L10DT-A	0.18 A	0.03 A	0.2 A max.
CP1L-L10DR-D	0.16 A	0.03A	
CP1L-L10DT-D	0.18 A	0.03 A	
CP1L-L10DT1-D	0.18 A	0.03 A	

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

- 2. 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.

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

Heit e	Unit name		Current consumption		
Unit name		Model	5 VDC	24 VDC	
	40 I/O points	CP1W-40EDR	0.080 A	0.090 A	
	24 inputs	CP1W-40EDT			
	16 outputs	CP1W-40EDT1	0.160 A		
		CP1W-32ER	0.049 A	0.131 A	
	32 outputs	CP1W-32ET	0.440.4		
		CP1W-32ET1	0.113 A		
	20 I/O points	CP1W-20EDR1	0.103 A	0.044 A	
Expansion I/O Units	12 inputs	CP1W-20EDT	0.400.4		
Expansion I/O Units	8 outputs	CP1W-20EDT1	0.130 A		
		CP1W-16ER	0.042 A	0.090 A	
	16 outputs	CP1W-16ET	0.070.4		
		CP1W-16ET1	0.076 A		
	8 inputs	CP1W-8ED	0.018 A		
	8 outputs	CP1W-8ER	0.026 A	0.044 A	
		CP1W-8ET	0.075.4		
		CP1W-8ET1	0.075 A		
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	
Analog Output Offit	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	
	K or J thermocouple	CP1W-TS001	0.040.4	0.050.4	
	inputs	CP1W-TS002	0.040 A	0.059 A	
Temperature Sensor Units	Pt or JPt platinum	CP1W-TS101			
	resistance thermometer inputs	CP1W-TS102	0.054 A	0.073 A	
CompoBus/S I/O Link Unit	8 inputs and 8 outputs	CP1W-SRT21	0.029 A		

#### **■** Characteristics

#### ● CP1H

	Туре	CP1H-XA CPU Units	CP1H-X CPU Units	CP1H-Y CPU Units			
Item	Models	CP1H-XA	CP1H-X	CP1H-Y□□-□			
Control meth	hod	Stored program method					
I/O control m	nethod	Cyclic scan with immediate refresh	ing				
Program lan		Ladder diagram					
		Maximum number of function block	definitions: 128 Maximum number	of instances: 256			
Function blo	ocks	Languages usable in function block					
Instruction le	ength	1 to 7 steps per instruction					
Instructions		Approx. 500 (function codes: 3 digital)	ts)				
Instruction e	execution time	Basic instructions: 0.10 μs min. Spo	·				
	ocessing time	0.7 ms					
Program cap		20K steps					
Number of ta	-	288 (32 cyclic tasks and 256 interru	upt tasks)				
	Scheduled inter- rupt tasks	1 (interrupt task No. 2, fixed)	, ,				
	Input interrupt	8 (interrupt task No. 140 to 147, fixe	ed)	6 (interrupt task No. 140 to 145, fixed)			
	tasks	(Interrupt tasks can also be specified	·				
Maximum sı	broutine number	256	or and oxecuted for high opeca coc	anormoroupio.			
Maximum ju		256					
maximum ju	•		CIO 99 15 (The 24 built in inputs of	are allocated in CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO			
	Input bits	1.11.)	Olo 99.10 (The 24 built-in inputs a	are anocated in Old 0.00 to Old 0.11 and Old 1.00 to Old			
	Output bits	,	to CIO 199.15 (The 16 built-in outp	puts are allocated in CIO 100.00 to CIO 100.07 and CIO			
I/O areas	Built-in Analog	,					
(See note.)	Inputs Built-in Analog	CIO 200 to CIO 203					
	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) 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	a	8,192 bits (512 words): H0.00 to H5	511.15 (H0 to H511)				
AR Area		Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447) Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959)					
Timers		4,096 bits: T0 to T4095					
Counters		4,096 bits: C0 to C4095					
DM Area		32 Kwords: D0 to D32767					
Data Registe	er Area	16 registers (16 bits): DR0 to DR15	j				
Index Regist	ter Area	16 registers (32 bits): IR0 to IR15					
Task Flag Ar	rea	32 flags (32 bits): TK0000 to TK003	31				
Trace Memo		4,000 words (500 samples for the ti	race data maximum of 31 bits and 6	6 words.)			
	-	A special Memory Cassette (CP1W	/-ME05M) can be mounted.	,			
Memory Cas	sette	Note: Can be used for program back	•				
Clock function	on	Supported. Accuracy (monthly devi -2.0 min to +2.0 min (ambient temp	ation): -4.5 min to -0.5 min (ambie				
		One built-in peripheral port (USB 1.	.1): For connecting Support Softwa	re only.			
Communication	tions functions	A maximum of two Serial Communications Option Boards can be mounted.					
Communicat	uons functions		<u> </u>	ing CP1W-CIF41 Ver.1.0, one Ethernet Option Board can be			
		mounted.					
Memory bac	kup	Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to flash memory as initial values.					
Battery servi	ice life	Battery backup: The Holding Area, DM Area, and counter values (flags, PV) are backed up by a battery.  5 years at 25°C. (Use the replacement battery within two years of manufacture.)					
Built-in inpu		40 (24 inputs, 16 outputs)	•	20 (12 inputs, 8 outputs) Line-driver inputs: Two axes for phases A, B, and Z			
Number of connectable		CP Evansion I/O Unite: 7 may - C	Learing Special I/O Units or CDUS	Line-driver outputs: Two axes for CW and CCW			
Expansion (I	I/O) Units	CP Expansion I/O Units: 7 max.; C		Jus Offics. 2 filax.			
Max. numbe	r 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)			
		8 inputs (Shared by the external int	errupt inputs (counter mode) and	6 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)			
Interrupt inp	outs	the quick-response inputs.)					
Interrupt inp	outs	8 inputs (Response frequency: 5 kl	Hz max. for all interrupt inputs),	6 inputs (Response frequency: 5 kHz max. for all interrupt			
	outs out counter mode	8 inputs (Response frequency: 5 kh 16 bits	Hz max. for all interrupt inputs),	inputs), 16 bits			
	out counter mode	8 inputs (Response frequency: 5 kl					

	Туре	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 Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison		2 inputs: Differential phases (4x), 500 kHz or Single-phase, 1 MHz and 2 inputs: Differential phases (4x), 50 kHz or Single-phas (pulse plus direction, up/down, increment), 100 kHz Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison		
Pulse outputs (models with transistor outputs only)  Pulse outputs  Pulse outputs  Pulse outputs		Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed) 4 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)		Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed) 2 outputs, 1 Hz to 1 MHz (CCW/CW or pulse plus direction) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)		
		Duty ratio: 0.0% to 100.0% (Unit: 0.1%) 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 i	nput	1 input (Resolution: 1/256, Input ra	nge: 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

	Туре	CP1L-M60 (60 points)	CP1L-M40 (40 points)	CP1L-M30 (30 points)	CP1L-L20 (20 points)	CP1L-L14 (14 points)	CP1L-L10 (10 points)	
Item	Models	CP1L-M60	CP1L-M40	CP1L-M30	CP1L-L20	CP1L-L14	CP1L-L10	
Control r	method	Stored program meth	od					
I/O contr	ol method	Cyclic scan with imm	ediate refreshing					
Program	language	Ladder diagram						
Function	blocks			ons: 128 Maximum nui ons: Ladder diagrams,	mber of instances: 256 structured text (ST)	3		
Instruction	on length	1 to 7 steps per instr	uction					
Instruction	ons	Approx. 500 (function	codes: 3 digits)					
Instruction	on execution time	Basic instructions: 0.	55 μs min. Special ins	tructions: 4.1 μs min.				
	n processing time	0.4 ms						
	capacity	10K steps			5K steps			
Number	of tasks	288 (32 cyclic tasks a	and 256 interrupt tasks	s)				
	Scheduled inter- rupt tasks	1 (interrupt task No. 2	2, fixed)			1	1	
	Input interrupt tasks	6 (interrupt task No.				4 (interrupt task No. 140 to 143, fixed)	2 (interrupt task No. 140 to 141, fixed)	
		· '	lso be specified and e	executed for high-spee	d counter interrupts ar	nd executed.)		
	n subroutine number	256						
Maximun	m jump number	256	Г	T		T		
	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	
I/O areas	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	s	,	s): W000.00 to W511. s (2,344 words): CIO 3	,	5 (CIO 3800 to CIO 6	143)		
TR Area		16 bits: TR0 to TR15						
Holding A	Area		s): H0.00 to H511.15 (					
AR Area		Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447) Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959)						
Timers		4,096 bits: T0 to T4095						
Counters		4,096 bits: C0 to C40						
DM Area		32 Kwords: D0 to D3			10 Kwords: D0 to D9	999, D32000 to D327	67	
	gister Area	16 registers (16 bits)						
	gister Area	16 registers (32 bits)						
Task Flag		32 flags (32 bits): TK						
Trace Me				a maximum of 31 bits				
Memory	Cassette	A special Memory Ca	assette (CP1W-ME05N	M) can be mounted. No	ote: Can be used for p	program backups and	auto-booting.	

	Туре	CP1L-M60	CP1L-M40	CP1L-M30	CP1L-L20	CP1L-L14	CP1L-L10
_		(60 points)	(40 points)	(30 points)	(20 points)	(14 points)	(10 points)
Item	Models	CP1L-M60□□-□	CP1L-M40□□-□	CP1L-M30□□-□	CP1L-L20	CP1L-L14	CP1L-L10
Clock function		-2.0 min to +2.0 min	(ambient temperature:	25°C), -2.5 min to +1	ambient temperature: 5 1.5 min (ambient temp	55°C), erature: 0°C)	
		One built-in periphera	al port (USB 1.1): For o	connecting Support So			
Communication	s functions	A maximum of two Se mounted.	erial Communications (	Option Boards can be	A maximum of one So Option Board can be	erial Communications mounted.	Not supported.
			thernet Option Board of the IF41 Ver.1.0, one Ethe		A maximum of one E can be mounted.	thernet Option Board	Not supported.
Memory backup		memory as initial valu	ies.	,	tup), comment data, ar (flags, PV) are backed		can be saved to flash
Battery service	life	5 years at 25°C. (Use	the replacement batte	ery within two years of	f manufacture.)		
Built-in input te	rminals	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 conr Expansion Units Expansion I/O U	s and	CP-series Expansion	Unit and Expansion I/	O Units: 3 max.	CP-series Expansion I/O Units: 1 max.	Units and Expansion	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 ti	me: 0.3 ms)			4 inputs (Response time: 0.3 ms)	2 inputs (Response time: 0.3 ms)
Interrupt inputs mode	counter	6 inputs (Response fi Up or down counters	requency: 5 kHz max.	for all interrupt inputs)	), 16 bits	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		ulse width: 50 μs max.	.)		4 points (Min. input pulse width: 50 μs max.)	2 points (Min. input pulse width: 50 μs max.)
Scheduled inter	rupts	1					
High-speed cou	inters		4-VDC input) 4 inputs:	Single-phase (pulse p Value range: 32 bits, Interrupts: Target value	olus direction, up/dowr Linear mode or ring m ue comparison or rang	ode	2
Pulse outputs (models with	Pulse outputs		re acceleration and de 0 kHz (CCW/CW or pu		50% fixed)		
transistor out- puts only)	PWM outputs	,	00.0% (specified in inc 3.5 Hz or 1 to 32,800 H		%) % at 0.1 Hz to 10,000 F	ار.4z 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.			

#### **■** Terminal Block Arrangement

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

			ICIO	0									IC	10 1									
Г	L1 -(	O L2	2/N C0	OM	01	0	3	05	0	7 (	9	11	П	01	0:	3	05	5 0	7	09	1	1	(Input
[	• 7	\$	$\oplus$	0	0	02	0	4	06	08	1	0	00		02	0	4	06	08	3	10	•	terminals)

	+	(	00	(	)1	(	02	-	13	0	14	0	6	(	00	0	11	(	)3	0	14	0	16	•	(Output
•			CC	M	CC	M	CO	М	CC	M	05	5	07		CC		02	2	CC	M	05	5	0	7	terminals)
			CIO	100											CIO	101									

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

			10	CIO 0												CIO	1											
+	Ŧ	-	T	COM	0	1	03		05	0	7	09	9	11	1	01	_	03	3	05	5	07	7	09	Т	1	1	(Input
•	NC		<b>(</b>	•	00	0	12	04	1	06	0	8	1	0	01	0	0	2	0	4	01	ŝ	90	3	10		•	terminals)

N	IC	С	10	0	11	0	12	0	13	0	4	0	6	0	0	0	1	0	13	0	14	C	16	•	(Output
•	N	-	СО	_	СО	М	СО	М	CO	М	05	5	07		CC		02	2	CO	M	05	5	0	7	terminals)

#### ■ Built-in Input Area

#### ● CP1H-XA and X CPU Units

PLC Se	etup		Input operati	on	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)	Pulse 0: Origin proximity input signal
	02	Normal input 2	Interrupt input 2	Quick-response input 2	High-speed counter 1 (phase-Z/reset)	Pulse output 1: Origin input signal
	03	Normal input 3	Interrupt input 3	Quick-response input 3	High-speed counter 0 (phase-Z/reset)	Pulse output 1: Origin proximity input signal
	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)	Pulse output 2: Origin input signal
	01	Normal input 13	Interrupt input 5	Quick-response input 5		Pulse output 2: Origin proximity input signal
	02	Normal input 14	Interrupt input 6	Quick-response input 6		Pulse output 3: Origin input signal
	03	Normal input 15	Interrupt input 7	Quick-response input 7		Pulse output 3: Origin proximity input signal
	04	Normal input 16				
	05	Normal input 17				
	06	Normal input 18				
	07	Normal input 19				
	80	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

	truc- ions	When the instructions to the right are not executed	•	output instruction , 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
PLC S	Satur	Normal outputs		Fixed duty ratio p	ulse outputs	Variable duty ratio pulse output
LO	Jetup	Normal outputs	CW/CCW	Pulse plus direction	When the origin search function is used	PWM output
CIO	00	Normal output 0	Pulse output 0 (CW)	Pulse output 0 (pulse)		
100	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)		
	07	Normal output 7	Pulse output 3 (CCW)	Pulse output 3 (direction)		
CIO	00	Normal output 8				PWM output 0
101	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)	
	04	Normal output 12			Origin search 2 (Error counter reset output)	
	05	Normal output 13			Origin search 3 (Error counter reset output)	
CIO	06	Normal output 14				
101	07	Normal output 15				

#### **■** 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 S	Setup		Input operation s	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
А	Ö				High-speed counter 0 (phase-A, increment, or count input) fixed	
В	0				High-speed counter 0 (phase-B, decrement, or direction input) fixed	
z	0				High-speed counter 0 (phase-Z/reset) fixed	Pulse 0: Origin input signal (line driver)
А	1				High-speed counter 1 (phase-A, increment, or count input) fixed	
В	1				High-speed counter 1 (phase-B, decrement, or direction input) fixed	
Z	1				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)	Pulse 3: Origin proximity input signal
CIO 1	Bit 00	Normal input 6	Interrupt 2	Quick-response input 2	High-speed counter 2 (phase-Z/reset)	Pulse 3: Origin input signal
	Bit 01	Normal input 7	Interrupt 3	Quick-response input 3		Pulse 2: Origin input signal
	Bit 02	Normal input 8	Interrupt 4	Quick-response input 4		Pulse 1: Origin input signal (open collector)
	Bit 03	Normal input 9	Interrupt 5	Quick-response input 5		Pulse 0: Origin input signal (open collector)
	Bit 04	Normal input 10				Pulse 1: Origin proximity input signal
	Bit 05	Normal input 11				Pulse 0: 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

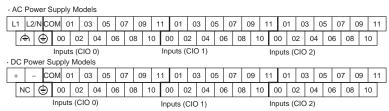
#### ● CP1H-Y CPU Units

Instr	uctions	When the instructions to the right are not executed	<u> </u>	output instruction , 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
DI (	C Setup	Normal autnut		Fixed duty ratio p	oulse output	Variable duty ratio pulse output
PL	Setup	Normal output	CW/CCW	Pulse plus direction	When the origin search function is used	PWM output
C)	Wo	Not supported.	Pulse output 0 (CW) fixed	Pulse output 0 (pulse) fixed		
cc	CW0	Not supported.	Pulse output 0 (CCW) fixed	Pulse output 1 (pulse) fixed		
C	W1	Not supported.	Pulse output 1 (CW) fixed	Pulse output 0 (direction) fixed		
cc	CW1	Not supported.	Pulse output 1 (CCW) fixed	Pulse output 1 (direction) fixed		
CIO	Bit 04	100.04	Pulse output 2 (CW)	Pulse output 2 (pulse)		
100	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	Bit 00	101.00			Origin search 2 (Error counter reset output)	PWM output 0
101	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)	

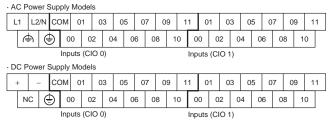
These areas are for line-driver inputs, so they can be used only for high-speed counters (1 MHz) and not for other purposes, such as normal inputs.

#### ■ Input Terminal Block Arrangement (Top Block)

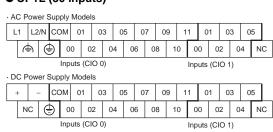
#### ● CP1L (60 Inputs)



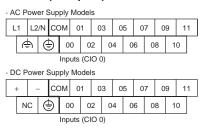
#### ● CP1L (40 Inputs)



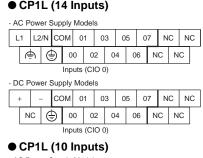
#### CP1L (30 inputs)

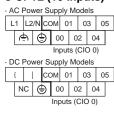


#### ● CP1L (20 Inputs)



#### ● CP1L (14 Inputs)





#### ■ Built-in Input Area

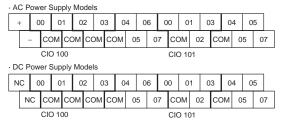
#### ● CP1L

		Input term	inal block		Input o	peration	High-speed	counter operation	0	rigin searc	:h
	ber of			Normal	Interrupt		Operation setti • High-speed c • Phase-Z sign	ounters enabled		earches en outputs 0	
int	outs	Word	Bit	inputs	inputs	Quick-response inputs	Single-phase (increment pulse input)	Two-phase (differential phase x4, up/down, or pulse plus direction)	CPU Units with 20 to 60 points	CPU Units with 14 points	CPU Units with 10 points
			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	
	10		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)			
		CIO 0	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 o Origin inp		
	14		07	Normal input 7	Interrupt input 3	Quick-response input 3	Counter 3, phase- Z/reset input			utput 1: out signal	
			08	Normal input 8	Interrupt input 4	Quick-response input 4					
			09	Normal input 9	Interrupt input 5	Quick-response input 5					
	20		10	Normal input 10					Pulse output 0: Origin proximity input signal		
			11	Normal input 11	1				Pulse output 1: Origin proximity input signal		
			00	Normal input 12							
	30		to	to	to	to	to	to	to	to	to
		CIO 1	05	Normal input 17							
		CIO I	06	Normal input 18							
	40		to	to Normal	to	to	to	to	to	to	to
			11	input 23							
			00	Normal input 24							
-	60	CIO 2	to	to Normal	to	to	to	to	to	to	to
			11	input 35							

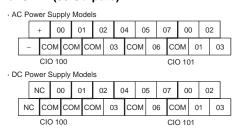
#### ■ Output Terminal Block Arrangement (Bottom Block)

#### ● CP1L (60 Outputs)

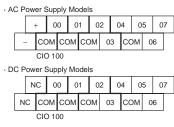
#### ● CP1L (40 Outputs)



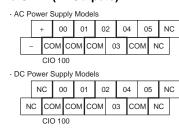
#### CP1L (30 Outputs)



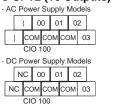
#### ● CP1L (20 Outputs)



#### ● CP1L (14 Outputs)



#### ● CP1L (10 Outputs)



#### ■ Built-in Output Area

#### ● CP1L

			Output To		When the instructions to the right are not executed		output instruction c, or ORG) is executed	and an origin se	earch function is the PLC Setup, arch is executed instruction	When the PWM instruction is executed
-		per of outs					Fixed duty ratio pulse	e output		Variable duty ratio pulse output
			Word	Bit	Normal output	CW/CCW	Pulse plus direction	When the origin is u	search function sed	PWM output
						CW/CCW	ruise plus direction	CPU Units with 14 to 60 points	CPU Units with 10 point	rww output
				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
		10		02	Normal output 2	Pulse output 1 (CW)	Pulse output 1 (pulse)			
				03	Normal output 3	Pulse output 1 (CCW)	Pulse output 1 (direction)		Origin search 0 (Error counter reset output)	PWM output 1
		14	CIO 100	04	Normal output 4			Origin search 0 (Error counter reset output)		
		14		05	Normal output 5			Origin search 1 (Error counter reset output)		
		20		06	Normal output 6					
		20		07	Normal output 7					
				00	Normal output 8					
		30		to	to	to	to	to	to	to
			CIO 101	03	Normal output 11					
			CIO IOI	04	Normal output 12					
	4	40		to	to	to	to	to	to	to
				07	Normal output 15					
				01	Normal output 16					
	6	0	CIO 102	to	to	to	to	to	to	to
				07	Normal output 23					

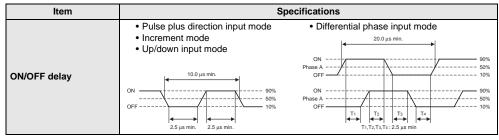
#### **■ Input Specifications**

		Specifications	
ITEM	High-speed counter inputs (phases A and B)	Interrupt inputs and 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, CIO 1.00 to CIO 1.11, and CIO 2.00 to 2.11
CP1H-XA/X CPU Units	CIO 0.04 to CIO 0.11	CIO 0.00 to CIO 0.03 and 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 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	Input LED Input LED Internal circuits	Input LED Internal circuits	Input LED Internal circuits

#### ● 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)



#### ● 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)

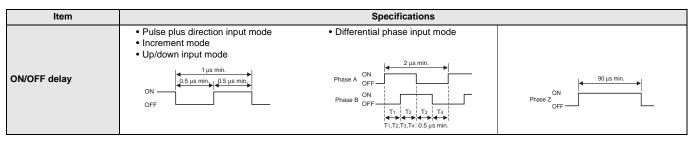
CP1H-Y CPU Units (Input bits: CIO 0.00, CIO 0.11, CIO 1.00 to CIO 1.03)

Item	Specifications
ON/OFF delay	ON

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

CP1H-Y CPU Units

Item	Specifications						
High-speed counter in- puts	Phases A and B	Phase Z					
Input voltage	RS-422A line-driver, AM26LS31 or equivalent 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	330 $\Omega$ 680 $\Omega$ \$330 pF  Internal circuits	180 Ω 560 Ω 6800 pF   Internal circuits					



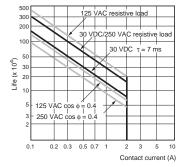
#### **■** Output Specifications

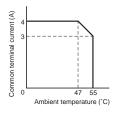
#### ● CPU Units with Relay Outputs

Item			Specifications				
Max. switching capacity		capacity	2 A, 250 VAC (cosφ = 1), 2 A, 24 VDC 4 A/common)				
Min. sv	vitching	capacity	5 VDC, 10 mA				
Ser- Elec- Resis-			100,000 operations (24 VDC)				
vice life of relay	trical	Induc- tive load	48,000 operations (250 VAC, cosφ = 0.4)				
	Mecha	nical	20,000,000 operations				
ON del	ay		15 ms max.				
OFF de	elay		15 ms max.				
Circuit configuration		uration	Output LED OUT OUT OUT OUT OUT A A COM Maximum 250 VAC: 2 A, 24 VDC: 2 A				

**Note:** Under the worst conditions, the service life of output contacts is as showr on the left.

The service life of relays is as shown in the following diagram as a guide-line.

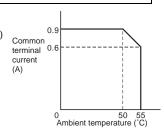




#### CPU Units with Transistor Outputs (Sinking/Sourcing)

Item	Specifications							
CP1L CPU Units	CIO 100.00 to CIO 100.03		CIO 100.04 to CIO 101.07 CIO 102.00 to CIO 102.11					
CP1H-XA/X CPU Units	CIO 100.00 to CIO 100.07	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.	1						
OFF delay	0.1 ms max. 1 ms max.							
Fuse	1/common (See note 2.)		1					
Circuit configuration	Sinking Outputs  OUT	Sinking Outputs  Sourcing Outputs  Sourcing Outputs	OUT					

- 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  $50^{\circ}\text{C}$ .



#### 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	OFF 90%

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

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

**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	OFF  ON $\frac{1}{T}$ ON $\frac{1}{T}$ ON $\frac{1}{T}$ $\frac{1}{T}$ $\frac{1}{T}$ $\frac{1}{T}$ $\frac{1}{T}$				

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

- The pulse widths during actual use may be smaller than the ones shown above due to pulse distortion caused by connecting cable impedance.
- 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				
	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 M $\Omega$ min.	Approx. 250 Ω				
Analog Input	Resolution	1/6,000 or 1/12,000 (full scale)					
Section	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	ull scale for –10 to 10 V: F448 (E890) to 0BB8 (1770) hex ull scale for other ranges: 0000 to 1770 (2EE0) hex					
	Averaging	Supported (Set for individual inputs in the PLC Setup.)					
	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				
Analog	Allowable external output load resistance	1 kΩ min.	600 Ω max.				
Output	External output impedance	0.5 Ω max.					
Section	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 Full scale for other ranges: 0000 to 1770 (2EE0) hex					
Conversi	on time	1 ms/point					
Isolation	method	Photocoupler isolation between analog I/O terminals and int	ternal circuits. No isolation between analog I/O signals				

Built-in Analog Input Switch (Factory Settings)



Built-	in A	\na	og	I/O	Ter	mir	nal	Bloc	K P	\rra	ınç	ger	ne	nt
AD1+	AD1-	AD2+	AD2-	AD3+	AD3-	AD4+	AD4-							



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

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

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  Note: The Ethernet Option Board cannot be used for the CP1L-L10.		
Number of Units that can be mounted		d	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.)		
	Media access method		CSMA/CD		
	Modulation method		Baseband		
	Transmission paths		Star form		
	Baud rate		100 Mbit/s (100Base-TX), 10 Mbit/s (10Base-T)		
Transfer	100 Mbit/s		• Unshielded twisted-pair (UDP) cable Categories: 5, 5e   • Shielded twisted-pair (STP) cable Categories: $100~\Omega$ at 5, 5e		
	Transmission media	10 Mbit/s	• Unshielded twisted-pair (UDP) cable Categories: 3, 4, 5, 5e   • Shielded twisted-pair (STP) cable Categories: $100~\Omega$ at 3, 4, 5, 5e		
	Transmission Distance	•	100 m (distance between hub and node)		

Item		FINS Communications Service Specifications
Number of noc	des	254
Message lengt	th	1016 bytes max.
Size of buffer		8k
Communicatio	ons Function	FINS Communications Service (UDP/IP, TCP/IP)
Protocol used		UDP/IP
FINS/UDP method	Port number	9600 (default) Can be changed.
metriou	Protection	No
	Protocol used	TCP/IP
FINS/TCP Number of connections		Up to 2 simultaneous connections and only one connection can be set to client
method	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.

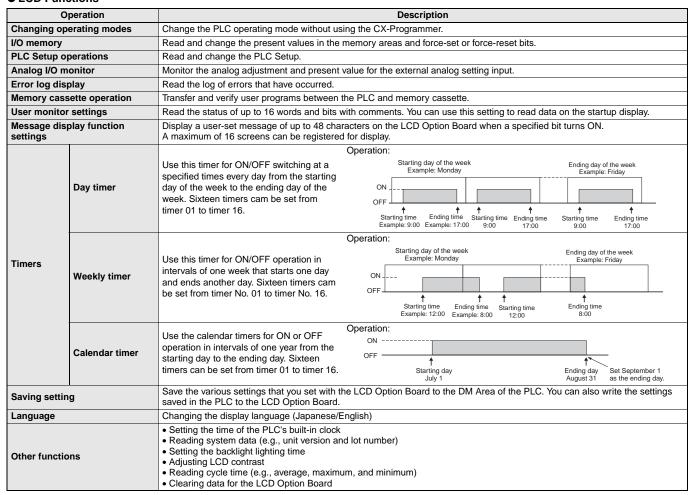
# **Option Unit Specifications**

#### ■ LDC Option Board (CP1W-DAM01)

#### Specifications

Item	Function
Mounting port	CP1H/CP1L: Option board slot 1  Note: The LCD Option Board cannot be used for the CP1L-L10.
Communications protocol	Peripheral bus (Turn ON DIP switch pin 4.)
Weight	30 g max.
Number of display characters	4 rows × 12 characters: 48 characters max.
Display characters	5 × 7 dots (alphanumeric, Japanese kana, and symbols). Display switchable between Japanese katakana and English.
Backlight	Electroluminescence (EL): Normal: Lit green; Error: Flashing red

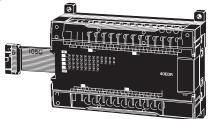
#### LCD Functions



# **Expansion I/O Unit Specifications**

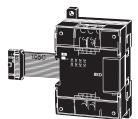
#### ■ CP1W-40EDR/40EDT/40EDT1/32ER/32ET/32ET1/20EDR1/20EDT1/16ER/16ET/16ET/16ET/18ED/8ER/8ET/8ET1 Expansion I/O Units

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	Input LED Internal circuits	

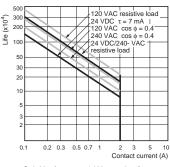
Note: 1. Do not apply a voltage exceeding the rated voltage to an input terminal.

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)

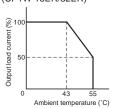
Item			Specifications	
Max. swi	Max. switching capacity		2 A, 250 VAC (cosφ = 1), 24 VDC 4 A/common	
Min. swit	ching c	apacity	5 VDC, 10 mA	
Service Elec-		Resistive load	150,000 operations (24 VDC)	
life of relay	trical	Inductive load	100,000 operations (24 VAC cos = 0.4)	
	Mecha	nical	20,000,000 operations	
ON delay	,		15 ms max.	
OFF dela	OFF delay		15 ms max.	
Circuit configuration		ation	Output LED OUT OUT Internal circuits  COM Maximum 250 VAC: 2 A, 24 VDC: 2 A	

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



Switching frequency: 1,800 operations/h

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



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

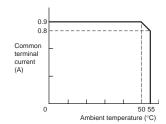
# **Expansion I/O Unit Specifications**

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

(01 111 402017					<u> </u>
	Specifications				
Item	CP1W-40EDT CP1W-40EDT1	CP1W-32E CP1W-32ET1	CP1W-20EDT CP1W-20EDT1	CP1W-16ET CP1W-16ET1	CP1W-8ET CP1W-8ET1
Max. switching ca- pacity (See note	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
3.)	0.9 A/common 3.6 A/common		0.9 A/common 1.8 A/common	0.9 A/common 3.6 A/common	0.9 A/common 1.8 A/common
Leakage current	0. 1mA max.				
Residual voltage	1.5 V max.				
ON delay	0.1ms max.				
OFF delay	1 ms max. at 24 VDC +10%/-5%, 5 to 300 mA				
Fuse (See note 2.)	1/common				
Circuit configura- tion	Sinking Outputs Output LED Internal circuits	OUT 30 VD COM (-)	Output   Intern circuit	al ts	COM (+)  24 VDC/ 4.5 to 30 VDC  OUT

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.
- A maximum of 0.9 A per common can be switched at an ambient temperature of 50°C.



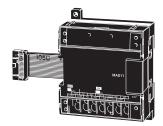
# **Expansion Unit Specifications**

#### ■ 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

1				
Model		CP1W-AD041		
Item		Input voltage	Input current	
Number of	of inputs	4		
Input sign	nal range	0 to 5 V, 1 to 5 V,	0 to 20 mA	
iliput sigi	iai range	0 to 10 V, -10 to 10 V	4 to 20 mA	
Max. rate	d input	±15 V	±30 mA	
External i		1 MΩ min.	Approx. 250 Ω	
Resolution	n	6000		
Overall	25°C	±0.3% of full scale	±0.4% of full scale	
accura- cy	0 to 55°C	±0.6% of full scale	±0.8% of full scale	
Conversi	on time	2.0 ms/point		
A/D conv	ersion	Binary data with resolution of 6,000		
data	CISIOII	Full scale for –10 to 10 V: F448 to 0BB8 hex		
		Full scale for other ranges: 0000 to 1770 hex		
Averagin	g	Supported.		
Open-circ detection		Supported.		
Insulation resis- tance		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).		
		No isolation between input signals.		

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

	Model	CP1W-DA	CP1W-DA041/DA021	
Item		Input voltage	Input current	
Number of outputs	of	DA041: 4, DA021: 2		
Output si range	gnal	0 to 5 V, 0 to 10 V, or –10 to 10 V	0 to 20 mA or 4 to 20 mA	
Allowable nal outpu resistance	it load	2 kΩ min.	350 Ω max.	
External impedant		0.5 Ω max.		
Resolution	n	6000		
Overall	25°C	±0.4% of full scale		
accura- cy 55°C		±0.8% of full scale		
Conversi	on time	2.0 ms/point		
D/A conv data	ersion	Binary data with resolution of 6,000 Full scale for –10 to 10 V: F448 to 0BB8 hex Full scale for other ranges: 0000 to 1770 hex		
Insulation resistance		$20~\text{M}\Omega$ 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.  No isolation between analog input signals.		

#### ■ Analog I/O Unit: CP1W-MAD11

	Model m		CP1W-MAD11		
Item			Voltage I/O	Current I/O	
	Number o f inputs		2 inputs	<u>.</u>	
	Input signal ra	ange	0 to 5 V, 1 to 5V, 0 to 10 V, or -10 to 10V	0 to 20 mA, 4 to 20 mA	
	Max. rated in	out	±15 V	±30 mA	
Analog	External inpu	t impedance	1 MΩ min.	250 Ω	
Anaiog Input	Resolution		1/6000 (full scale)		
Section	Overall	25°C	±0.3% of full scale	±0.4% of full scale	
	accuracy	0 to 55°C	±0.6% of full scale	±0.8% of full scale	
	A/D conversion data		Binary data (hexadecimal, 4 digits) -10 to 10 V: F448 to 0BB8 hex 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	0 to 20 mA, 4 to 20 mA	
	External output max. current				
Analog Output	Allowable external output load resistance		1 kΩ min.	600 Ω max.	
Section	External input impedance		0.5 Ω max.		
(See	Resolution		1/6000 (full scale)		
note 1.)	Overall	25°C	±0.4% of full scale		
	accuracy	0 to 55°C	±0.8% of full scale		
	Data setting				
	D/A conversion data		Binary data (hexadecimal, 4 digits) –10 to 10 V: F448 to 0BB8 hex Full scale for other ranges: 0000 to 1770 hex		
Conversion time (See note 2.)		te 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.)		

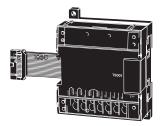
Note: 1. The voltage output and current output can be used at the same time for analog outputs, but the total output current must not exceed 21 mA.

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: ±0.5% and ±2°C (See note.)) ±1 (The larger of the indicated value: ±0.5% and ±1°C) ±1 (The larger of the indicated value: ±0.5% and ±1°C) ±1		(The larger of the indicated value: $\pm 0.5\%$ and $\pm 1^{\circ}C$ ) $\pm 1$ digit max.
Conversion time	250 ms/2 points (TS001, TS101); 250 ms/4 points (TS002, TS102)	
Converted tempera- ture 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 (°C)	Range (°F)
К	-200 to 1300	-300 to 2300
	0.0 to 500.0	0.0 to 900.0
J	-100 to 850	-100 to 1500
	0.0 to 400.0	0.0 to 750.0

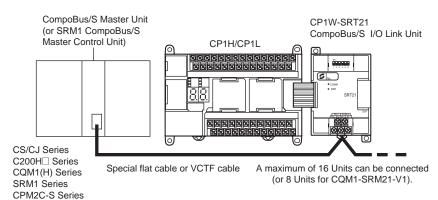
#### ● Input Temperature Ranges for CP1W-TS101/102 (The rotary switch can be used to make the following range and input type settings.)

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

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

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





#### Specifications

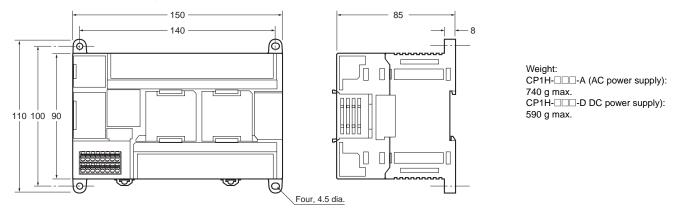
Item Model	CP1W-SRT21
Master/Slave	CompoBus/S Slave
Number of I/O bits	8 input bits, 8 output bits
Number of words occupied in CP1H/CP1L I/O memory	1 input word, 1 output word (Allocated in the same way as for other Expansion Units)
Node number setting	Set using the DIP switch (before the CPU Unit is turned ON.)

# **Dimensions**

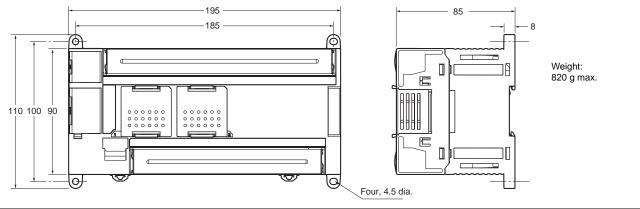
**Dimensions** (Unit: mm)

#### **■ CPU Units**

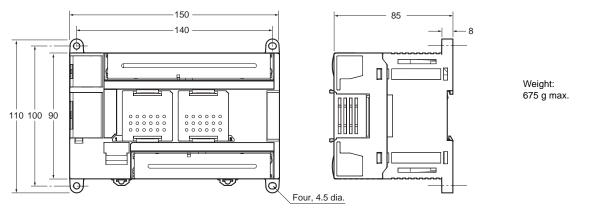
#### **CP1H CPU Units (X/XA/Y Types)**



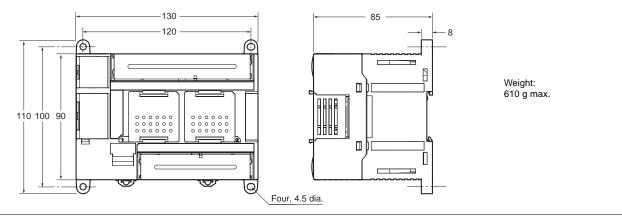
#### CP1L CPU Units with 60 I/O Points



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

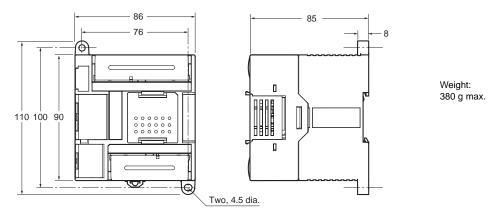


#### CP1L CPU Units with 30 I/O Points

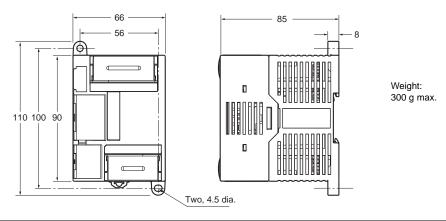


# **Dimensions**

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



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



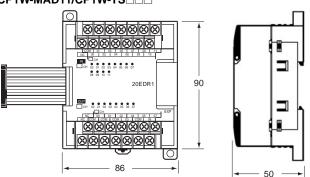
### **Dimensions**

### **■** Expansion Units and Expansion I/O Units

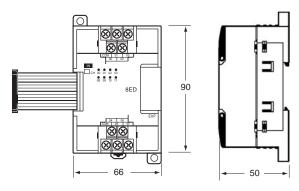
CP1W-20ED□ CP1W-16E□□

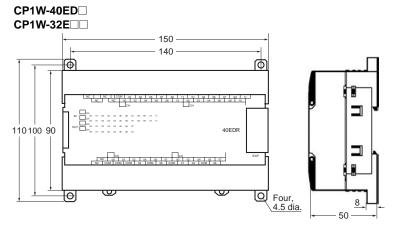
CP1W-AD041/CP1W-DA041/CP1W-DA021

CP1W-MAD11/CP1W-TS



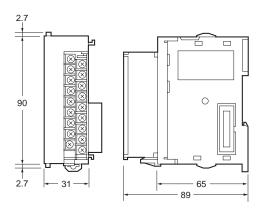


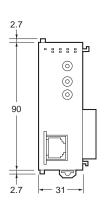




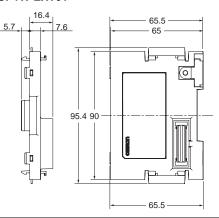
Unit name	Model number	Weight
	CP1W-40ER	380 g
	CP1W-40EDT/-40EDT1	320 g
	CP1W-32ER	465 g
Evnancian I/O	CP1W-32ET/-32ET1	325 g
Expansion I/O Units	CP1W-20EDR1/-20EDT/-20EDT1	300 g
Onits	CP1W-16ER	280 g
	CP1W-16ET/-16ET1	225 g
	CP1W-8ED	200 g
	CP1W-8ER/-8ET/-8ET1	250 g
Analog Units	CP1W-AD041/-DA041/-DA021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

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



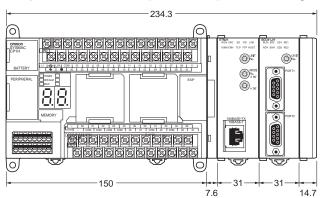


# ■ CJ Unit Adaptor CP1W-EXT01



### ■ CP1H

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



### A Wealth of Instructions

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

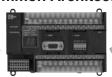
Just like the CS/CJ-series PLCs, the CP1H and CP1L have approximately 500 instructions for ladder programming.

### **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.



### **Common Architecture**



All-in-one Package CP Series

### Note:

The CP1H and CP1L FB (Function Block)/ST language is compatible with the CS/CJ Series version 3.0.

### 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	
THVILIX	BIN	TIMX	550
COUNTER	BCD	CNT	
OOONIEK	BIN	CNTX	546
HIGH-SPEED	BCD	TIMH	015
TIMER	BIN	TIMHX	551
ONE-MS	BCD	TMHH	540
TIMER	BIN	TMHHX	552
ACCUMULA- TIVE TIMER	BCD	TTIM	087
	BIN	TTIMX	555
LONG TIMER	BCD	TIML	542
LONG TIMER	BIN	TIMLX	553
MULTI-OUT- PUT TIMER	BCD	MTIM	543
	BIN	MTIMX	554
REVERSIBLE	BCD	CNTR	012
COUNTER	BIN	CNTRX	548
RESET TIMER/	BCD	CNR	545
COUNTER	BIN	CNRX	547

### Data Comparison Instructions

Instruction	Mnemonic	Function code
Symbol Comparison (Unsigned)	LD,AND, OR + =, < >, <, < =, >, > =	300 (=) 305 (< >) 310 (<) 315 (< =) 320 (>) 325 (> =)
Symbol Comparison (Double-word, unsigned)	LD, AND, OR + =, < >, <, < =, >, > = + L	301 (=) 306 (< >) 311 (<) 316 (< =) 321 (>) 326 (> =)
Symbol Comparison (Signed)	LD, AND, OR + =, < >, <, < =, >, > = + S	302 (=) 307 (< >) 312 (<) 317 (< =) 322 (>) 327 (> =)
Symbol Comparison (Double-word, signed)	LD, AND, OR + =, < >, <, < =, >, > = + SL	303 (=) 308 (< >) 313 (<) 318 (< =) 323 (>) 328 (> =)
Time Comparison	LD, AND, OR + = DT, < > DT, < DT, < = DT, > DT, > = DT	341 (= DT) 342 (< > DT) 343 (< DT) 344 (< = DT) 345 (> DT) 346 (> = DT)
COMPARE	CMP	020
DOUBLE COMPARE	CMPL	060
SIGNED BINARY COMPARE	CPS	114
DOUBLE SIGNED BINARY COMPARE	CPSL	115
TABLE COMPARE	TCMP	085
MULTIPLE COMPARE	MCMP	019
UNSIGNED BLOCK COMPARE	ВСМР	068
EXPANDED BLOCK COMPARE	BCMP2	502
AREA RANGE COMPARE	ZCP	088
DOUBLE AREA RANGE COMPARE	ZCPL	116

### 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 WITH CARRY	-CL	413
BCD SUBTRACT WITHOUT CARRY	-В	414
DOUBLE BCD SUBTRACT WITHOUT CARRY	-BL	415
BCD SUBTRACT WITH CARRY	-ВС	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	1	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

### ● Floating-point Math Instructions

• Floating-point wath 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	FLTL	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 + = F, < > F, < F, < = F, > F, > = F	329 (= F) 330 (< >F) 331 (< F) 332 (< = F) 333 (> F) 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 + = D, <> D, < D, <= D, > D, >= D	335 (= D) 336 (< >D) 337 (< D) 338 (< = D) 339 (> D) 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	ТРО	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

Output moti dotions		
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	800
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

### 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 PROGR	AM	BPRG	096
BEGIN BLOCK PROGRA	AM	BEND	801
END BLOCK PROGR	Λ N /I	BLIND	801
PAUSE	AIVI	BPPS	811
BLOCK PROGR. RESTART	AM	BPRS	812
CONDITIONAL BLOCK EXIT		ccs	282
CONDITIONAL BLOCK EXIT		CONDITI ON EXIT	806
CONDITIONAL BLOCK EXIT		EXIT Bit operand	806
CONDITIONAL BLOCK EXIT (NO	OT)	EXIT NOT Bit operand	806
CONDITIONAL BLOCK BRANCE	HING	CONDITI ON IF	802
CONDITIONAL BLOCK BRANCE	HING	IF Bit operand	802
CONDITIONAL BLOCK BRANCH (NOT)	HING	IF NOT Bit operand	802
CONDITIONAL BLOCK BRANCH (ELSE)	HING	ELSE	803
CONDITIONAL BLOCK BRANCH END	HING	IEND	804
ONE CYCLE AN WAIT	D	CONDITI ON WAIT	805
ONE CYCLE AN WAIT	D	WAIT Bit operand	805
ONE CYCLE AND WAIT (NOT)		WAIT NOT Bit operand	805
TIMER WAIT	BCD	TIMW	813
COUNTED	BIN	TIMWX	816
COUNTER WAIT	BCD	CNTWX	814 817
HIGH-SPEED	BCD	TMHW	815
TIMER WAIT	BIN	TMHWX	818
LOOP		LOOP	809

### Block Programming Instructions

• Blook i rogialilling moti dottons		
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 + = \$, < > \$, < \$, < = \$, > \$, > = \$	670 (= \$) 671 (< > \$) 672 (< \$) 673 (< = \$) 674 (> \$) 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

■ CPU Units	56
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I/O Connecting Cable	
Optional Products, Maintenance Products and DIN Track Accessories	
■ CJ-series Special I/O Units and CPU Bus Units	

### **Standards and Directives**

#### International Standards

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

#### 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.

### **■ CPU Units**

### CP1H CPU Units

CPU Unit	CPU type	Power supply	Output method	Inputs	Outputs	Model	Standards
CP1H-X CPU Units	Memory capacity: 20K steps High-speed counters:	AC power supply	Relay output			CP1H-X40DR-A	
	100 kHz, 4 axes	DC power	Transistor output (sinking)	24	16	CP1H-X40DT-D	
		supply	Transistor output (sourcing)			CP1H-X40DT1-D	
CP1H-XA CPU Units	Memory capacity: 20K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 4 axes (Models with transistor outputs only) Analog inputs: 4 Analog outputs: 2	AC power supply	Relay output		16	CP1H-XA40DR-A	
		DC power	Transistor output (sinking)	24		16	CP1H-XA40DT-D
		supply	Transistor output (sourcing)			CP1H-XA40DT1-D	
CP1H-Y CPU Units	Memory capacity: 20K steps High-speed counters: 1 MHz, 2 axes 100 kHz, 2 axes Pulse outputs:1 MHz, 2 axes 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	

### ● CP1L CPU Units

CPU Unit	CPU type	Power supply	Output method	Inputs	Outputs	Model	Standards
		10	Relay output			CP1L-M60DR-A	
CP1L-M CPU Units with 60 Points	Memory capacity: 10K steps High-speed counters:	AC power supply	Transistor output (sinking)			CP1L-M60DT-A	
Co.	100 kHz, 4 axes		Relay output	36	24	CP1L-M60DR-D	UC1, N,
	Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	DC power supply	Transistor output (sinking)			CP1L-M60DT-D	L, CE
	Janyy	очрыу	Transistor output (sourcing)			CP1L-M60DT1-D	
		AC power	Relay output			CP1L-M40DR-A	
CP1L-M CPU Units with 40 Points	Memory capacity: 10K steps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	supply	Transistor output (sinking)			CP1L-M40DT-A	UC1, N, L, CE
C. C			Relay output	24	16	CP1L-M40DR-D	
		DC power supply	Transistor output (sinking)			CP1L-M40DT-D	
Tonnana III			Transistor output (sourcing)			CP1L-M40DT1-D	
		AC power	Relay output			CP1L-M30DR-A	UC1, N, L, CE
CP1L-M CPU Units with 30 Points	Memory capacity: 10K steps High-speed counters:	supply	Transistor output (sinking)			CP1L-M30DT-A	
	100 kHz, 4 axes	DC power supply	Relay output	18	12	CP1L-M30DR-D	
	Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)		Transistor output (sinking)			CP1L-M30DT-D	
himiting 10			Transistor output (sourcing)			CP1L-M30DT1-D	
		AC power	Relay output			CP1L-L20DR-A	
CP1L-L CPU Units with 20 Points	Memory capacity: 5K steps High-speed counters:	supply	Transistor output (sinking)	12		CP1L-L20DT-A	
	100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)		Relay output		8	CP1L-L20DR-D	UC1, N,
		DC power supply	Transistor output (sinking)			CP1L-L20DT-D	L, CE
			Transistor output (sourcing)			CP1L-L20DT1-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.

		Specification	ıs								
CPU Unit	CPU type	Power supply	Output method	Inputs	Outputs	Model	Standards				
		AC power	Relay output			CP1L-L14DR-A					
CP1L-L CPU Units with 14 Points	Memory capacity: 5K steps High-speed counters:	supply	Transistor output (sinking)			CP1L-L14DT-A					
Ď	100 kHz, 4 axes		Relay output	8	6	CP1L-L14DR-D	UC1, N,				
	Pulse outputs: 100 kHz, 2 axes (Models with transistor outputs only)	(Models with transistor outputs	DC power supply	Transistor output (sinking)			CP1L-L14DT-D	L, CE			
interest of		Supply	Transistor output (sourcing)			CP1L-L14DT1-D					
			Relay output			CP1L-L10DR-A					
CP1L-L CPU Units with 10 Point	Memory capacity: 5K steps High-speed counters:	AC power supply	Transistor output (sinking)			CP1L-L10DT-A					
	100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes		Relay output	6	4	CP1L-L10DR-D	UC1, N, L, CE				
	(Models with transistor outputs only)	DC power	Transistor output (sinking)			CP1L-L10DT-D					
		supply	Transistor output (sourcing)			CP1L-L10DT1-D					

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
RS-232C Option Board		CP1W-CIF01	UC1, N,
RS-422A/485 Option Board	Can be mounted in either CPU Unit Option Board slot 1 or 2.  Note: Cannot be used for the CP1L-L10.	CP1W-CIF11	L, CE
RS-422A/485 (Isolated-type) Option Board		CP1W-CIF12	UC1, N, L, CE
Ethernet Option Board	Can be mounted in either CPU Unit Option Board slot 1 or 2.  Note: 1. Cannot be used for the CP1L-L10.  2. When using CP1W-CIF41 Ver.1.0, one Ethernet port can be added.	CP1W-CIF41	UC1, N, L, CE
LCD Option Board	Can be mounted only in the CPU Unit Option Board slot 1.  Note: Cannot be used for the CP1L-L10.	CP1W-DAM01	UC1, L, N, CE
Memory Cassette	Can be used for backing up programs or auto-booting.	CP1W-ME05M	UC1, N, L, CE

### **■** Programming Devices

	Specifications				
Name		Number of licenses Media		Model	Standards
FA Integrated Tool Package CX-One Lite Version 4.□	CX-One Lite is a subset of the complete CX-One package that provides only the Support Software required for micro PLC applications. CX-One Lite runs on the following OS. OS: Windows XP (Service Pack 3 or higher), Vista or 7 Note: Except for Windows XP 64-bit version.	1 license	CD	CXONE-LT01C-V4	
	CX-One Lite Ver. 4.□ includes Micro PLC Edition CX-Programmer Ver. 9.□.				
FA Integrated Tool Package CX-One Ver. 4.□	CX-One is a package that integrates the Support Software for OMRON PLCs and components. CX-One runs on the following OS. OS: Windows XP (Service Pack 3 or higher), Vista or 7 Note: Except for Windows XP 64-bit version.	1 license (See note 3.)	DVD (See note 4.)	CXONE-AL01D-V4	
	CX-One Ver. 4. ☐ includes CX-Programmer Ver. 9. ☐.				
Programming Device	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	For anti-static	connectors	XW2Z-200S-CV	
Connecting Cable for CP1W-CIF01 RS-232C	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)	Tot anti-static connectors		XW2Z-500S-CV	
Option Board	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)		XW2Z-200S-V		
(See note 5.)	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-V		
USB-Serial Conversion Cable (See note 5.)	USB-RS-232C Conversion Cable (Length: 0.5 m) and PC drive included. Complies with USB Specification 1.1 On personal computer side: USB (A plug connector, male) On PLC side: RS-232C (D-sub 9-pin, male) Driver: Supported by Windows 98, Me, 2000, and XP	CS1W-CIF31	N		

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

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).
 The CX-One and CX-One Lite cannot be simultaneously installed on the same computer.
 Multi licenses are available for the CX-One (3, 10, 30 or 50 licenses).
 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-Or	ne	CX-One Lite Ver.4.□	CX-One Ver.4.□	Support Software in CX-One		CX-One Lite Ver.4.□	CX-One Ver.4.□
Micro PLC Edition CX-Programmer	Ver.9.□	Yes	No	CX-Drive	Ver.2.□	Yes	Yes
CX-Programmer	Ver.9.□	No	Yes	CX-Process Tool	Ver.5.□	No	Yes
CX-Integrator	Ver.2.□	Yes	Yes	Faceplate Auto-Builder for NS	Ver.3.□	No	Yes
Switch Box Utility	Ver.1.□	Yes	Yes	CX-Designer	Ver.3.□	Yes	Yes
CX-Protocol	Ver.1.□	No	Yes	NV-Designer	Ver.1.□	Yes	Yes
CX-Simulator	Ver.1.□	Yes	Yes	CX-Thermo	Ver.4.□	Yes	Yes
CX-Position	Ver.2.□	No	Yes	CX-ConfiguratorFDT	Ver.1.□	Yes	Yes
CX-Motion-NCF	Ver.1.□	No	Yes	CX-FLnet	Ver.1.□	No	Yes
CX-Motion-MCH	Ver.2.□	No	Yes	Network Configurator	Ver.3.□	Yes	Yes
CX-Motion	Ver.2.□	No	Yes	CX-Server	Ver.4.□	Yes	Yes

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

### **■** Expansion Units

Name	•	Output method	Inputs	Outputs	Model	Standards	
		Relay			CP1W-40EDR	N, L, CE	
		Transistor (sinking)	24	16	CP1W-40EDT		
	Tomamana P	Transistor (sourcing)			CP1W-40EDT1		
	ricenness	Relay			CP1W-32ER		
		Transistor (sinking)		32	CP1W-32ET	N, L, CE	
	Transistor (sourcing)			CP1W-32ET1			
	ā_	Relay			CP1W-20EDR1		
		Transistor (sinking)	12	8	CP1W-20EDT	U, C, N, L, CE	
Expansion I/O Units	E AND A DO DO DO DO	Transistor (sourcing)			CP1W-20EDT1		
	, G	Relay			CP1W-16ER		
		Transistor (sinking)		16	CP1W-16ET	N, L, CE	
	FERRENCE	Transistor (sourcing)			CP1W-16ET1		
			8		CP1W-8ED		
		Relay		8	CP1W-8ER		
		Transistor (sinking)		8	CP1W-8ET	U, C, N, L, CE	
	, , , , , , , , , , , , , , , , , , ,	Transistor (sourcing)			CP1W-8ET1	-	
Analog Input Unit	TANKET I	Analog (resolution: 1/6000)	4		CP1W-AD041	LICA N. L. CE	
Ameleo Outout Unit				4		- UC1, N, L, CE	
Analog Output Unit		Analog (resolution: 1/6000)		2	CP1W-DA021	UC1, CE	
Analog I/O Unit	a a a a a a a a a a a a a a a a a a a	Analog (resolution: 1/6000)	2	1	CP1W-MAD11	U, C, N, L, CE	
CompoBus/S I/O Link Unit			8 (I/O link input bits)	8 (I/O link input bits)	CP1W-SRT21		
		2 thermocouple inputs	1	<u>'</u>	CP1W-TS001	U, C, N, L, CE	
Temperature Sensor	£	4 thermocouple inputs			CP1W-TS002		
Unit					CP1W-TS101		
		4 platinum resistance thermon	neter 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 (Use batteries within two years of manufacture.)	CJ1W-BAT01	
	Length: 0.5 m; Height: 7.3 mm	PFP-50N	
DIN Track	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	

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

Name	Specifications	Model	Standards
CJ Unit Adapter		CP1W-EXT01	UC1, N, L, CE
	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))  Conversion Period: 20 μs/1 point, 25 μs/2 points, 30 μs/3 points, 35 μs/4 points	CJ1W-AD042	UC1, CE
Analog Input Units	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000, Conversion speed: 250 µs/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD081-V1	UC1, N, L,
	4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000, Conversion speed: 250 µs/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD041-V1	CE
	4 outputs (1 to 5 V (1/10,000), 0 to 10 V (1/20,000), and -10 to 10 V (1/40,000) 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) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8000, 250 µs/output.)	CJ1W-DA08V	UC1, N, L, CE
Analog Output Units	8 outputs (4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (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) Resolution: 1/4,000, Conversion speed: 1ms/point max.	CJ1W-DA041	
	2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000, Conversion speed: 1ms/point max.	CJ1W-DA021	UC1, N, L,
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) Resolution: 1/4000; Conversion speed: 1 ms/point max. (Can be set to 1/8,000, 500 µs/point.)	CJ1W-MAD42	
	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 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
Process Input Units	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 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	
		CJ1W-PTS52	
	Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS15	UC1, CE
	Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS16	
	-10 to 10 V, ±10-V selectable range, 0 to 20 mA, 4 to 20 mA	CJ1W-PDC15	
		CJ1W-TC001	_
			-
Temperature Control			UC1, N, L,
Units	1 1 1		CE
	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
	Pulse train, open collector output, 1 axis	CJ1W-NC113	
	Pulse train, open collector output, 2 axes	CJ1W-NC213	]
Position Control Units	Pulse train, open collector output, 4 axes	CJ1W-NC413	
. John Control Cints	Pulse train, line driver output, 1 axis	CJ1W-NC133	UC1, CE
	Pulse train, line driver output, 2 axes	CJ1W-NC233	]
	Pulse train, line driver output, 4 axes	CJ1W-NC433	
Space Unit		CJ1W-SP001	<u> </u>
	For V680 Series, 1 R/W Head	CJ1W-V680C11	
ID Sensor Units	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			UC1, N, L,
	Analog Input Units  Analog Output Units  Analog I/O Unit  Process Input Units  Temperature Control Units  High-speed Counter Unit  Position Control Units  Space Unit  ID Sensor Units  CompoNet Master Unit	Adapter   Adapter for connecting C-I-series, Special I/O Units and CPU Bus Units (Includes C-Iseries End Cover)	Adapter   Adapter   Adapter for comenting C-Jearnes Special I/O Units and CPU Bus Units (notuces C-Jearnes End Covere)

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.

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

		Specifications			Accesories	Current consumption (A)	Model	Standards
Product name	Product name Appearance Functions No. of pors	Failure detection						
Industrial	12000	Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3	No	Power supply connector	0.22	W4S1-03B	UC, CE
Switching Hubs	_		5	No		0.22	W4S1-05B	
			5	Yes	<ul><li>Power supply connector</li><li>Connector for informing error</li></ul>	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 f 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				
voltage	Pulse-string input	Rated output	Without brake	With brake		
	R7D-BPA5L	50 W	R88M-G05030H	R88M-G05030H-B		
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	50 W	R88M-G05030H	R88M-G05030H-B		
	R/D-BF01H	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		
	K/D-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		

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

Voltage	Servo Driver	Servomotor				
voltage	Pulse-string input	Rated output	Without brake	With brake		
Single-phase 100-V	R7D-BP01L	100 W	R88M-G10030L	R88M-G10030L-B		
Single-phase 100-v	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. 1813).

### 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.

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### **DIMENSIONS AND WEIGHTS**

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

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

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- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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