OMRON

THE CP FAMILY

Compact machine controllers



» Fast programming with Function Blocks

» Flexible Ethernet connectivity

» Easy positioning functionality

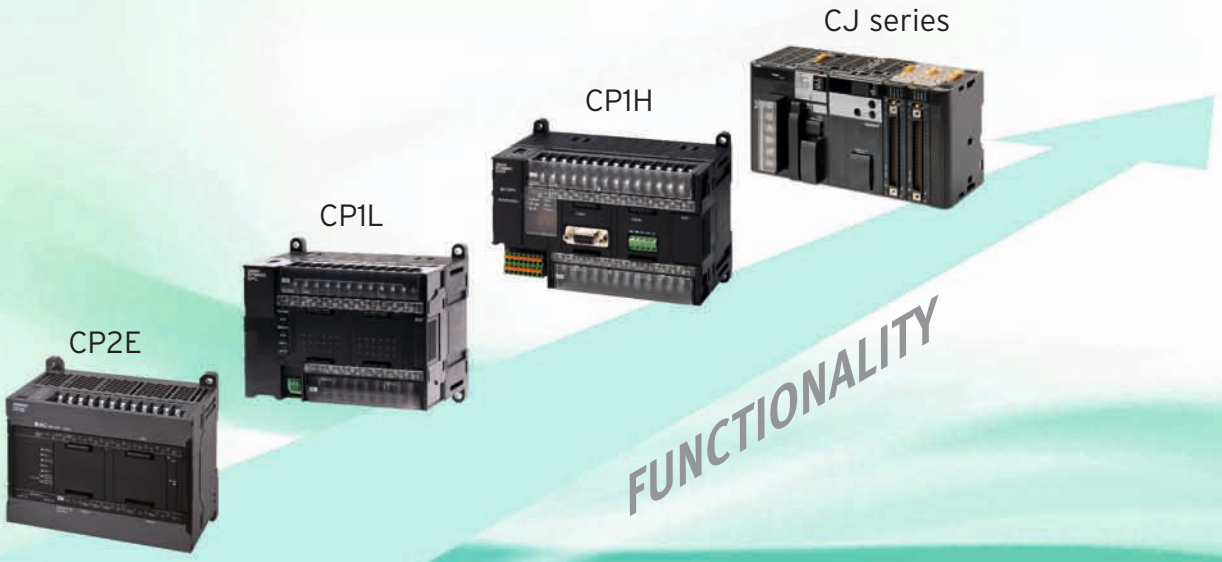
realizing

Think big... start small!

Omron's vast experience in the field of industrial automation has resulted in the creation of the right products for your applications, ranging from simple to more complex automation solutions. The CP family of programmable controllers provides you with a complete product line-up to automate compact machines and perform any other simple automation tasks, quickly and easily. Programming and operation are consistent with Omron's other modular Programmable controllers. And you are guaranteed the same high quality and reliability that you expect from any Omron product, ensuring that your equipment keeps on giving continuous dependable performance.

Scalable solution

The CP family is scalable; this means that you can choose the products with the right level of sophistication to meet your automation needs in terms of functionality, flexibility and pricing. Each of the CP family models, the CP2E, CP1L and CP1H, offers the functionality required for complete machine control. Benefits include: easy expansion of I/O, fast and versatile communication, and full positioning capabilities via ready-to-use Function Blocks. The CP family uses the same instruction set and professional programming software found in Omron's other modular Programmable controllers.





Answering your needs... precisely

Fast and versatile communication

Flexible, fast and yet cost-effective communication is essential in today's competitive market. This applies in particular to compact Programmable controllers, which not only need to connect with devices inside the machine, but also outside the machine for operating, data-logging and remote access. With this in mind, Omron has given the CP family excellent communication capabilities for both serial and Ethernet networking. In addition, Omron provides flexible and economical option boards for serial communication.

Flexible Ethernet connectivity

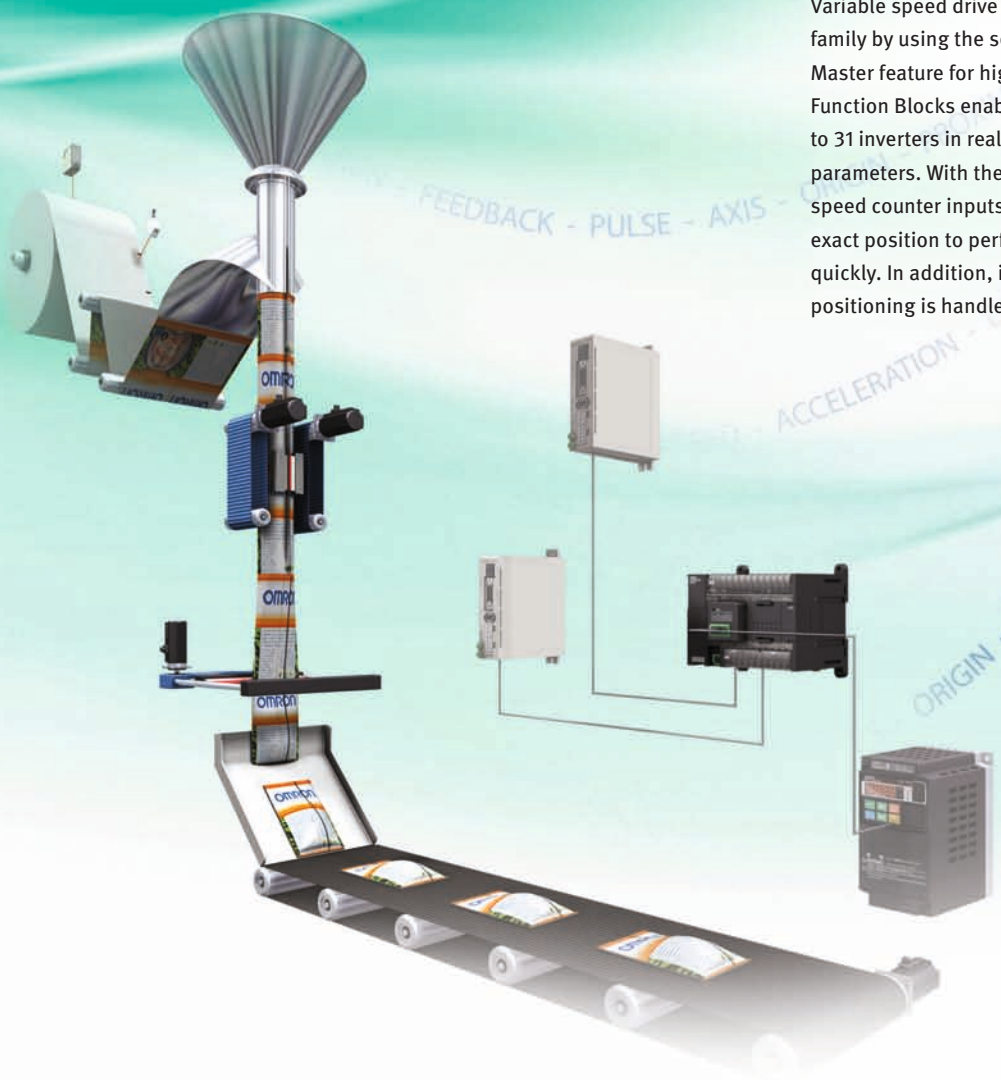
To meet communication needs over different protocols simultaneously and to easily connect for remote access, our CP2E-N-type, CP1L-EM, and CP1L-EL Programmable Controllers feature embedded Ethernet with socket services functionality. This offers, among other things, programmable connectivity to third-party devices and makes this outstanding product the best-in-class machine controller on the market.

Easy positioning functions

The CP family is designed to fulfill position control tasks. Up to four axes of servo-drives can be controlled with high-speed pulse outputs, while high-speed pulse inputs can allow the connection of up to four encoders. Control is easily achieved with Function Block or standard functions without the need of specialist motion boards or expansion units. Furthermore, thanks to its fast serial ports, the CP family is also capable of performing simple positioning tasks. With the use of Modbus Function Blocks, up to 31 inverters can be controlled and monitored in real-time.

Easy positioning, quick results

The CP family is the perfect choice for any application that requires positioning. Whether for conveyor control, point-to-point position control, or non-interpolated pick-and-place systems, the combination of high-speed pulse outputs, variable speed drive control and position feedback will provide all the functionality that you need for your application.



Ideal for position control

When simplicity and ease of use are essential, there is no better solution for your position applications than combining the CP family with servos and inverters from Omron's extensive range. The SmartStep 2 servo drive is a perfect partner and offers high performance while keeping things simple and cost effective. Omron provides standard functions and Function Blocks for SmartStep 2 and other servo drives to create your application with minimal effort.

Easy variable speed drive control

Variable speed drive control is made easy within the CP family by using the serial port(s) and the Easy Modbus Master feature for high-speed communication. Omron Function Blocks enable you to control and monitor up to 31 inverters in real-time simply by configuration of parameters. With the encoders connected to the high-speed counter inputs, the CP is able to calculate the exact position to perform accurate positioning easily and quickly. In addition, in the MX2 inverter series, all simple positioning is handled within the drive itself.



Saving you time

For many standard functions Omron provide ready-to-use and tested Function Blocks that allow you to reduce your programming and testing time. With Function Blocks you achieve faster, easier and more structured programming that can also increase machine functionality. Ladder programming still remains the easiest language for many people to use, but for more complex mathematical calculations ‘Structured Text’ (ST) offers greater flexibility. These languages are supported in the CP2E, CP1L and CP1H. Omron’s software is renowned for its ease of use and intuitive style and CX-One is no exception.

Flexible Ethernet connectivity

As simple and quick– as USB!

Thanks to the CP2E-N-type's, CP1L-EM's, or CP1L-EL's Automatic-Connect function, programming over Ethernet is as simple as using USB on the other models in the CP family. This means that you don't need to waste time adjusting the Ethernet settings on the PC, but that you can simply plug and connect, just like USB.
The Automatic-Connect function connects instantly over a default IP address to the CP1L, saving you valuable set-up time.

Versatile communication

CP2E-N-type's, CP1L-EM's, or CP1L-EL's are equipped as standard with Socket Services. This facilitates the easy exchange of data with other Ethernet devices supporting a dedicated protocol. The Socket Services reduce effort and simplify programming and allow Ethernet protocols to be used directly from your Programmable controller program. Ethernet can also be used for applications that require remote access functionality, such as a secure VPN connection with a standard router.

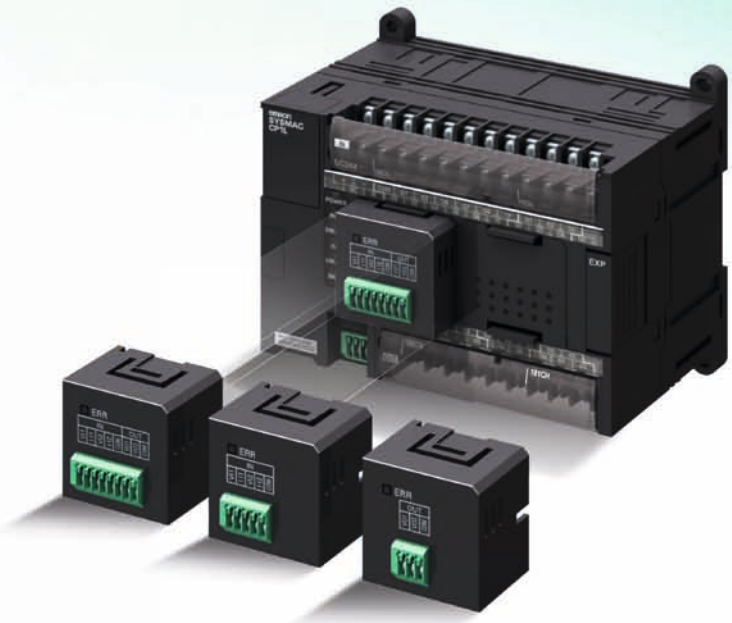


More options – greater possibilities!

More analog I/Os

In addition to the two standard embedded analog inputs, Omron's CP1L with embedded Ethernet also supports three new, optional analog I/O boards. These enable you to add extra analog inputs and outputs, and mixed inputs/outputs at minimum cost and without the need for more cabinet space. With its analog I/O modules, auto-tuning PID function, the CP is ideal for accurate process control.

Note: The optional analog I/O board can be mounted in CP1L-EM, CP1L-EL, or CP2E-N-type.



CP family features at a glance

- 10 to 60 I/O base models, expandable to 320 I/O points
- Digital, analog and temperature sensor I/O expansion units
- 4 to 6 High-speed encoder inputs and 2 to 4 high-speed pulse outputs
- Modbus Master feature for easy inverter or temperature control
- Analog I/O option boards and auto-tuning PID for accurate process control
- Optional boards for RS-232/RS-422/485/Ethernet or LCD display
- Ladder diagram, Function Block or Structured Text programming
- Powerful instructions common within Omron's modular Programmable controller series
- USB or Ethernet port – no special cables needed
- No-Battery mode operation – retains the program and data

Expansion units for more flexibility

An analog unit with up to four embedded analog inputs and four outputs achieves a high resolution of 12,000. A wide variety of temperature sensor units are available including: multi-input (thermocouple and analog inputs), platinum-resistance thermometer input, and thermocouple input models. Units with up to 12 embedded thermocouple inputs can be used for multiple temperature input applications, e.g. molding machines.



Note: The functions that are supported depend on the model.

Maximize efficiency by selecting the optimum CPU unit for your applications



			CP2E													
			E-type					S-type			N-type					
			14 I/O Points	20 I/O Points	30 I/O Points	40 I/O Points	60 I/O Points	30 I/O Points	40 I/O Points	60 I/O Points	14 I/O Points	20 I/O Points	30 I/O Points	40 I/O Points	60 I/O Points
I/O	Digital Inputs		8	12	18	24	36	18	24	36	8	12	18	24	36
	Digital Outputs		6	8	12	16	24	12	16	24	6	8	12	16	24
	Removable Terminals		No												
	Total I/O Capacity		14	20	150	160	180	150	160	180	14	20	150	160	180
	CP1W Expansion Units		No		Yes (3 max.)			Yes (3 max.)			No		Yes (3 max.)		
	CJ-Series Special I/O and CPU Bus Units		No												
	Interrupt/Quick/ Counter Inputs		6								6	8			
	High Speed Counter Inputs		2 (100 kHz max.) / 4 (10 kHz max.)										3 (100 kHz max.) / 3 (10 kHz max.)		
	Pulse Outputs (transistor outputs models only)		No					2 axes (100 kHz max.)					4 axes (100 kHz max.)		
	Analog I/O (embedded)		No												
	Analog Adjuster (0-255)		No												
	External Analog Settings Input (resolution 1/256)		No												
Optional boards	Number of boards supported		0								1		2		
	Serial Communications (CP1W-CIF01/11/12-V1)		No								Yes				
	2-ports Serial Communications (CP1W-CIFD1/D2/D3)		No								Yes		Yes (1 unit only)		
	Ethernet (CP1W-CIF41)		No												
	LCD Display (CP1W-DAM01)		No												
	Analog I/O boards		No								Yes		Yes (1 unit only)		
CPU details	Built-in port		USB, RS-232C					USB, RS-232C, RS-485			Ethernet				
	Function Blocks support (Ladder diagrams or ST language)		Yes												
	Processing Speed (minimum)		0.23 µs / Basic instruction, 1.76 µs / Special instruction												
	Program Capacity		4K steps					8K steps			10K steps				
	Data Memory Capacity		4K words					8K words			16K words				
	Memory Cassette (CP1W-ME05M)		No												
	Real-Time Clock		No					Yes							
	Battery		Battery-free required for data memory backup					Battery-free required for data memory backup (CP2W-BAT02 is required to use the clock.)							
	7-Segment Display		No												
Relay Outputs	AC Power Supply		CP2E -E14DR-A	CP2E -E20DR-A	CP2E -E30DR-A	CP2E -E40DR-A	CP2E -E60DR-A	CP2E -S30DR-A	CP2E -S40DR-A	CP2E -S60DR-A	CP2E -N14DR-A	CP2E -N20DR-A	CP2E -N30DR-A	CP2E -N40DR-A	CP2E -N60DR-A
	DC Power Supply		-	-	-	-	-	-	-	-	CP2E -N14DR-D	CP2E -N20DR-D	CP2E -N30DR-D	CP2E -N40DR-D	CP2E -N60DR-D
Transistor Outputs	Sink Type	AC Power Supply	-	-	-	-	-	-	-	-	CP2E -N14DT-A	CP2E -N20DT-A	CP2E -N30DT-A	CP2E -N40DT-A	CP2E -N60DT-A
		DC Power Supply	-	-	-	-	-	CP2E -S30DT-D	CP2E -S40DT-D	CP2E -S60DT-D	CP2E -N14DT-D	CP2E -N20DT-D	CP2E -N30DT-D	CP2E -N40DT-D	CP2E -N60DT-D
	Source Type	DC Power Supply	-	-	-	-	-	CP2E -S30DT1-D	CP2E -S40DT1-D	CP2E -S60DT1-D	CP2E -N14DT1-D	CP2E -N20DT1-D	CP2E -N30DT1-D	CP2E -N40DT1-D	CP2E -N60DT1-D

Note: This table is a general overview only. For details, refer to the CP2E datasheet (Cat. No. P145), CP1L datasheet (Cat. No. P081) or CP1H datasheet (Cat. No. P080).





			CP1L									CP1H		
			L-type			M-type			EL-type	EM-type		Y-type	X-type	XA-type
			10 I/O Points	14 I/O Points	20 I/O Points	30 I/O Points	40 I/O Points	60 I/O Points	20 I/O Points	30 I/O Points	40 I/O Points	20 I/O Points	40 I/O Points	40 I/O Points
I/O	Digital Inputs		6	8	12	18	24	36	12	18	24	12	24	24
	Digital Outputs		4	6	8	12	16	24	8	12	16	8	16	16
	Removable Terminals		No			Yes			No	Yes		Yes		
	Total I/O Capacity		10	54	60	150	160	180	60	150	160	300	320	320
	CP1W Expansion Units		No	Yes (1 max.)		Yes (3 max.)			Yes (1 max.)	Yes (3 max.)		Yes (7 units or 15 input words / 15 output words max.)		
	CJ-Series Special I/O and CPU Bus Units		No						No			Yes (2 max.)		
	Interrupt/Quick/ Counter Inputs		2	4	6				6			6	8	
	High Speed Counter Inputs		4 (100 kHz max.)						4 (100 kHz max.)			2 (100 kHz max.) and 2 Line-driver (1 MHz)	4 (100 kHz max.)	
	Pulse Outputs (transistor outputs models only)		2 axes (100 kHz max.)						2 axes (100 kHz max.)			2 (100 kHz max.) and 2 Line-driver (1 MHz)	4 axes (100 kHz max.)	
	Analog I/O (embedded)		No						2 inputs			No		4 inputs, 2 outputs
	Analog Adjuster (0-255)		Yes (1)						No			Yes (1)		
	External Analog Settings Input (resolution 1/256)		Yes (0-10V)						No			Yes (0-10V)		
Optional boards	Number of boards supported		0	1		2			1	2		2		
	Serial Communications (CP1W-CIF01/11/12-V1)		No	Yes					Yes			Yes		
	2-ports Serial Communications (CP1W-CIFD1/D2/D3)		No											
	Ethernet (CP1W-CIF41)		No	Yes					No			Yes		
	LCD Display (CP1W-DAM01)		No	Yes					Yes			Yes		
	Analog I/O boards		No						Yes			No		
CPU details	Built-in port		USB						Ethernet			USB		
	Function Blocks support (Ladder diagrams or ST language)		Yes						Yes			Yes		
	Processing Speed (minimum)		0.55 µs / Basic instruction, 4.1 µs / Special instruction						0.55 µs / Basic instruction, 4.1 µs / Special instruction			0.10 µs / Basic instruction, 0.15 µs / Special instruction		
	Program Capacity		5K steps			10K steps			5K steps	10K steps		20K steps		
	Data Memory Capacity		10K words			32K words			10K words	32K words		32K words		
	Memory Cassette (CP1W-ME05M)		Yes						Yes			Yes		
	Real-Time Clock		Yes						Yes			Yes		
	Battery		Yes (CJ1W-BAT01)						Yes (CJ1W-BAT01)			Yes (CJ1W-BAT01)		
	7-Segment Display		No						No			Yes		
Relay Outputs	AC Power Supply		CP1L -L10DR-A	CP1L -L14DR-A	CP1L -L20DR-A	CP1L -M30DR-A	CP1L -M40DR-A	CP1L -M60DR-A	-	-	-	-	CP1H -X40DR-A	CP1H -XA40DR-A
	DC Power Supply		CP1L -L10DR-D	CP1L -L14DR-D	CP1L -L20DR-D	CP1L -M30DR-D	CP1L -M40DR-D	CP1L -M60DR-D	CP1L -EL20DR-D	CP1L -EM30DR-D	CP1L -EM40DR-D	-	-	-
Transistor Outputs	Sink Type	AC Power Supply	CP1L -L10DT-A	CP1L -L14DT-A	CP1L -L20DT-A	CP1L -M30DT-A	CP1L -M40DT-A	CP1L -M60DT-A	-	-	-	-	-	-
		DC Power Supply	CP1L -L10DT-D	CP1L -L14DT-D	CP1L -L20DT-D	CP1L -M30DT-D	CP1L -M40DT-D	CP1L -M60DT-D	CP1L -EL20DT-D	CP1L -EM30DT-D	CP1L -EM40DT-D	CP1H -Y20DT-D	CP1H -X40DT-D	CP1H -XA40DT-D
	Source Type	DC Power Supply	CP1L -L10DT1-D	CP1L -L14DT1-D	CP1L -L20DT1-D	CP1L -M30DT1-D	CP1L -M40DT1-D	CP1L -M60DT1-D	CP1L -EL20DT1-D	CP1L -EM30DT1-D	CP1L -EM40DT1-D	-	CP1H -X40DT1-D	CP1H -XA40DT1-D

Expansion units

Expansion I/O Units



CP1W-8ED
DC inputs: 8

CP1W-8ER
Relay outputs: 8

CP1W-8ET
Transistor outputs (sinking): 8

CP1W-8ET1
Transistor outputs (sourcing): 8



CP1W-16ER
Relay outputs: 16

CP1W-16ET
Transistor outputs (sinking): 16

CP1W-16ET1
Transistor outputs (sourcing): 16

CP1W-20EDR1
DC inputs: 12
Relay outputs: 8



CP1W-20EDT
DC inputs: 12
Transistor outputs (sinking): 8

CP1W-20EDT1
DC inputs: 12
Transistor outputs (sourcing): 8

CP1W-32ER
Relay outputs: 32

CP1W-32ET
Transistor outputs (sinking): 32

CP1W-32ET1
Transistor outputs (sourcing): 32

CP1W-40EDR
DC inputs : 24
Relay outputs: 16

CP1W-40EDT
DC inputs: 24
Transistor outputs (sinking): 16

CP1W-40EDT1
DC inputs: 24
Transistor outputs (sourcing): 16

Analog I/O Units



Analog Input Unit

CP1W-AD041
Analog inputs: 4
(resolution: 6,000)

CP1W-AD042
Analog inputs: 4
(resolution: 12,000)

Analog Output Unit

CP1W-DA021
Analog outputs: 2
(resolution: 6,000)

CP1W-DA041
Analog outputs: 4
(resolution: 6,000)

CP1W-DA042
Analog outputs: 4
(resolution: 12,000)



Analog I/O Unit

CP1W-MAD11
Analog inputs: 2 (resolution: 6,000)
Analog outputs: 1 (resolution: 6,000)

CP1W-MAD42
Analog inputs: 4 (resolution: 12,000)
Analog outputs: 2 (resolution: 12,000)

CP1W-MAD44
Analog inputs: 4 (resolution: 12,000)
Analog outputs: 4 (resolution: 12,000)

Temperature Sensor Unit





CP1W-TS001
Thermocouple inputs: 2

CP1W-TS002
Thermocouple inputs: 4

CP1W-TS003
Thermocouple inputs: 4
Analog inputs: 2
(instead of 2 thermocouple inputs)
12,000 resolution

CP1W-TS004
Thermocouple inputs: 12

CP1W-TS101
Platinum-resistance
thermometer inputs: 2

CP1W-TS102
Platinum-resistance
thermometer inputs: 4

Optional Boards



CP1W-CIF01
RS-232C
(15 m max.)



CP1W-CIF11
RS-422A/485
(50 m max.)



CP1W-CIF12-V1
RS-422A/485 (Isolated-type)
(500 m max.)



CP2W-CIFD1
2 x RS-232C *1



CP2W-CIFD2
RS-232C, RS-485
(Isolated-type) *1



CP2W-CIFD3
2 x RS-485
(Isolated-type) *1



CP1W-CIF41
Ethernet *2



CP1W-DAM01
Display 4 rows,
12 characters *2



CP1W-ADB21
2 analog inputs,
0-10 V, 0-20 mA



CP1W-DAB21V
2 analog outputs, 0-10 V



CP1W-MAB221
2 analog inputs 0-10 V, 0-20 mA &
2 outputs 0-10 V

Memory Cassette



CP1W-ME05M *2
512K words
(upload/download program)

Battery Set



CP2W-BAT02
(for CP2E)



CJ1W-BAT01
(for maintenance
of CP1L/CP1H)

CJ Unit Adapter



CP1W-EXT01
CJ Unit adapter for use with
CP1H. Includes CJ endplate.

I/O Connecting Cable



CP1W-CN811
Length: 80 cm

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

Note: This table is a general overview only. For details, refer to the CP2E datasheet (Cat. No. P145), CP1L datasheet (Cat. No. P081) or CP1H datasheet (Cat. No. P080).

*1. Can be used with CP2E.
*2. Cannot be used with CP2E.

Software

The CX-One is a comprehensive software package that integrates Support Software for OMRON PLCs and components. CX-One Ver. 4.□ includes CX-Programmer Ver. 9.□. CX-One Lite is a subset of the complete CX-One package that provides only the Support Software required for micro PLC applications. CX-One Lite Ver. 4.□ includes Micro PLC (the CP family) Edition CX-Programmer Ver. 9.□.

Note 1: The CX-One and CX-One Lite cannot be simultaneously installed on the same computer.

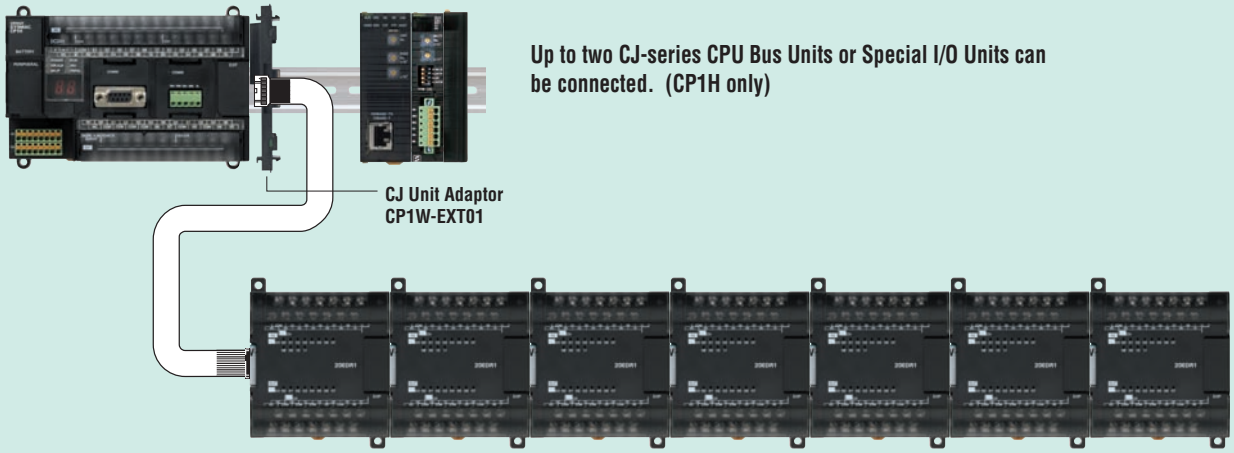
Note 2: For details, refer to the CX-One Catalog (Cat. No. R134), visit your local OMRON website.

Note 3: For corresponding version of CX-One and CX- Programmer, Refer to CPU Unit Hardware User's Manual.

		Media	Order code
FA Integrated Tool Package CX-One Ver.4.□	Single user licence *	DVD	CXONE-AL01D-V4
FA Integrated Tool Package CX-One Lite Ver.4.□	Single user licence	DVD	CXONE-LT01D-V4

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

Using CJ-series units and CP1W units with the CP1H



CJ-Series Units for use with CP1H

Description	Unit Name	Model
Analog I/O and Control Units	Analog Input Unit	CJ1W-AD041-V1
		CJ1W-AD042
		CJ1W-AD081-V1
	Analog Output Unit	CJ1W-DA021
		CJ1W-DA041
		CJ1W-DA042V
		CJ1W-DA08V
		CJ1W-DA08C
	Analog Input/Output Unit	CJ1W-MAD42
	Isolated- type Units with Universal Inputs	CJ1W-AD04U
		CJ1W-PH41U
	Isolated-type DC Input Units	CJ1W-PDC15
	Thermocouple Input Unit	CJ1W-PTS15
		CJ1W-PTS51
	Resistance Thermometer Input Unit	CJ1W-PTS52
	Temperature Control Loops, Thermocouple Unit	CJ1W-TC001
		CJ1W-TC002
		CJ1W-TC003
		CJ1W-TC004
	Temperature Control Loops, RTD	CJ1W-TC101
		CJ1W-TC102
		CJ1W-TC103
		CJ1W-TC104
Motion/Position Control Units	High Speed Counter Unit	CJ1W-CT021

Note: Including models no longer available to order.

Description	Unit Name	Model
Motion/Position Control Units	Position Control Units	CJ1W-NC113
		CJ1W-NC133
		CJ1W-NC213
		CJ1W-NC233
		CJ1W-NC413
		CJ1W-NC433
	MECHATROLINK-II Position Control Unit	CJ1W-NCF71
		CJ1W-NCF71-MA
		CJ1W-NC271
		CJ1W-NC471
Communication Units	Serial Communication Units	CJ1W-SCU21-V1
		CJ1W-SCU22
		CJ1W-SCU31-V1
		CJ1W-SCU32
		CJ1W-SCU41-V1
		CJ1W-SCU42
	Ethernet Unit	CJ1W-ETN21
	EtherNet/IP Unit	CJ1W-EIP21S
		CJ1W-EIP21
	FL-net Ethernet Unit	CJ1W-FLN22
	DeviceNet Master Unit	CJ1W-DRM21
	CompoNet Master Unit	CJ1W-CRM21
	CompoBus/S Master Unit	CJ1W-SRM21
	Controller Link Unit	CJ1W-CLK23
High-speed Data Storage Unit	High-speed Data Storage Unit	CJ1W-SPU01-V2
CJ Series ID Sensor Unit	CJ Series ID Sensor Unit	CJ1W-V680C11
		CJ1W-V680C12
		CJ1W-V600C11
		CJ1W-V600C12

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