

The CP Family

Compact machine controllers



- Fast programming with function blocks
- Flexible EtherNet connectivity
- Easy positioning functionality

Think big, but start small

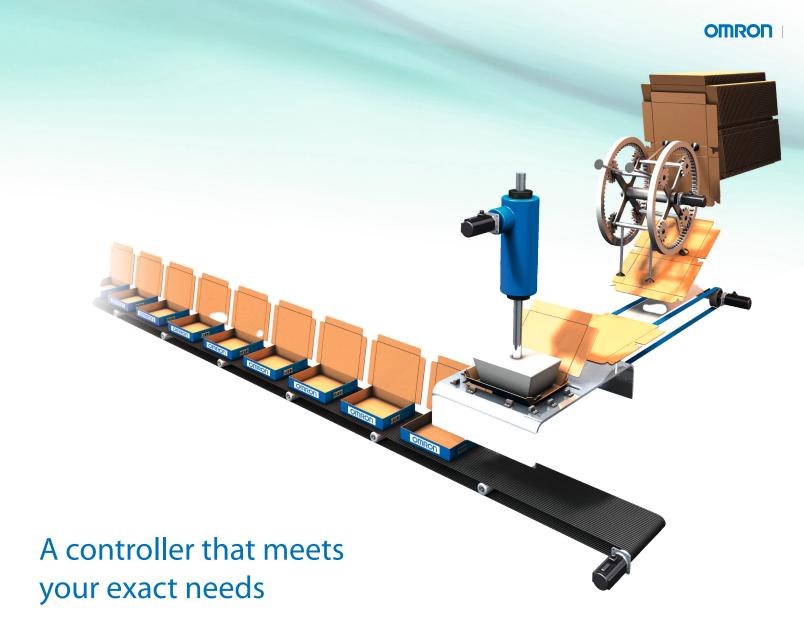
Omron has vast experience in products that are optimized for your applications, whether these be simple or complex. The CP family of programmable controllers offers a complete solution for automating compact machines and performing simple automation tasks quickly and efficiently. Programming and operation are consistent with that of other modular programmable controllers from Omron, and you are guaranteed the same exceptional quality and reliability that you expect from any Omron product. We are committed to ensuring that your equipment continues to provide dependable performance.

Scalable solution

The CP family is scalable, so 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, the CP1L and the CP1H -- offers the requisite functionality 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 other Omron modular programmable controllers.



Functionality



Fast and versatile communication

Flexible, fast yet cost-effective communication is essential in today's competitive market. This applies in particular to compact programmable controllers, which not need to connect not only with devices inside the machine, but also with those 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 can also accomplish 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.

JION - FORWARD - REVERSE



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

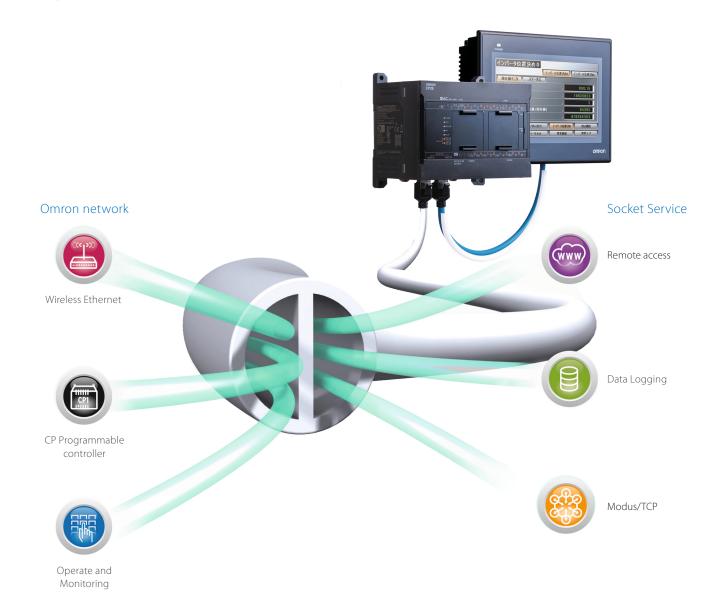
As simple and quick— as USB!

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.



- 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

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



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.



Product selection guide



			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
	Digital In	puts	8	12	18	24	36	18	24	36	8	12	18	24	36
	Digital O	utputs	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												
1/0	Interrupt/Quick/ Counter Inputs		6 8												
	High Speed Counter Inputs		2 (100 kHz max.) / 4 (10 kHz max.) / 3 (100 kHz max.) / 3 (10 kHz max.)										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												
	Number of boards supported		0	0							1		2		
Optional boards	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 No												
	Analog I/O boards		No Yes Yes (1 unit only)												
	Built-in port		USB, RS-232C												
	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				
CPU details	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						I					T	
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-E
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-







			CP1L								СР1Н			
			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
	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.)		15 output	
	CJ-Series Specia	l I/O and CPU Bus Units	No					No			Yes (2 max.)			
	Interrupt/Quick/ Counter Inputs		2 4 6						6			6 8		
VO	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.)		z 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)		
	Number of boards supported		0 1 2						1 2			2		
	Serial Communications (CP1W-CIF01/11/12-V1)		No Yes					Yes			Yes			
Optional	2-ports Serial Communications (CP1W-CIFD1/D2/D3)		No											
boards	Ethernet (CP1W-CIF41)		No Yes					No			Yes			
	LCD Display (CP1W-DAM01)		No Yes					Yes			Yes			
	Analog I/O boards		No					Yes			No			
	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 i instruction	s / Basic instruction, 4.1 μs / Special 0.10 μs / Basic instruction, 0.15 μs / Special instruction			us / Special		
CPU .	Program Capacity		5K steps			10K steps		5K steps	10K steps		20K steps			
details	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)			
Relay Outputs	7-Segment Display		No						No	T	T	Yes	I	I
	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	-	-	-
	Sink Type	AC Power Supply	CP1L -L10DT-A	CP1L -L14DT-A	CP1L -L20DT-A	CP1L -M30DT-A	CP1L -M40DT-A	CP1L -M60DT-A	-	-	-	-	-	-
Transistor Outputs	/pc	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 and accessories

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-40FDR

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

(resolution: 12,000)

Analog outputs: 4

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)

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

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

CP1W-TS004 Thermocouple inputs: 12

CP1W-TS003

CP1W-TS101

Platinum-resistance thermometer inputs: 2

CP1W-TS102 Platinum-resistance thermometer inputs: 4

Optional Boards



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



CP1W-CIF41 Ethernet *2



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



CP1W-DAM01 Display 4 rows, 12 characters *2



CP1W-CIF12-V1 RS-422A/485 (Isolated-type) 2 x RS-232C *1 (500 m max.)



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



CP2W-CIFD1



CP1W-DAB21V 2 analog outputs, 0-10 V



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



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



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



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).



Expansion units and accessories

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.□.

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

This section is a general overview only. For details, refer to the CX-One Catalog (No. R134).

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 ¹	DVD	CXONE-AL01D-V4
FA Integrated Tool Package CX-One Lite Ver.4.□	Single user licence ¹	DVD	CXONE-LT01D-V4

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

CX-One and CX-One Lite supported OS:

Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1 (32-bit/64-bit version)/ Windows 10 (32-bit/64-bit version)

CJ-Series Units for use with CP1H

Description	Unit Name	Model
		CJ1W-AD041-V1
	Analog Input Unit	CJ1W-AD042
		CJ1W-AD081-V1
		CJ1W-DA021
		CJ1W-DA041
	Analog Output Unit	CJ1W-DA042V
		CJ1W-DA08V
		CJ1W-DA08C
	Analog Input/Output Unit	CJ1W-MAD42
		CJ1W-AD04U
	Isolated- type Units with Universal Inputs	CJ1W-PH41U
Analog I/O and Control Units	Isolated-type DC Input Units	CJ1W-PDC15
control ornio	7	CJ1W-PTS15
	Thermocouple Input Unit	CJ1W-PTS51
	Resistance Thermometer Input Unit	CJ1W-PTS52
		CJ1W-TC001
	Temerature Control Loops,	CJ1W-TC002
	Thermocouple Unit	CJ1W-TC003
		CJ1W-TC004
		CJ1W-TC101
	Towns of Controlling PTD	CJ1W-TC102
	Temperature Control Loops, RTD	CJ1W-TC103
		CJ1W-TC104
Motion/Position Control Units	High Speed Counter Unit	CJ1W-CT021

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The product photographs and figures that are used in this catalog may vary somewhat from the actual products.

Description	Unit Name	Model			
		CJ1W-NC113			
		CJ1W-NC133			
	Position Control Units	CJ1W-NC213			
	Position Control Units	CJ1W-NC233			
Motion/Position		CJ1W-NC413			
Control Units		CJ1W-NC433			
		CJ1W-NCF71			
	MECHATROLINK-II	CJ1W-NCF71-MA			
	Position Control Unit	CJ1W-NC271			
		CJ1W-NC471			
		CJ1W-SCU21-V1			
		CJ1W-SCU22			
	6 . 16	CJ1W-SCU31-V1			
	Serial Communication Units	CJ1W-SCU32			
		CJ1W-SCU41-V1			
		CJ1W-SCU42			
Communication Units	Ethernet Unit	CJ1W-ETN21			
· · · · · ·	EtherNet/IP Unit	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			
		CJ1W-V680C11			
CJ Series ID	CI Cavias ID Carrer I list	CJ1W-V680C12			
Sensor Unit	CJ Series ID Sensor Unit	CJ1W-V600C11			
		CJ1W-V600C12			



Expansion units and accessories

OMRON

Using CJ-series units and CP1W units with the CP1H



Up to 7 CP1W Expansion Units and Expansion I/O Units can be connected. (Up to 3 units for CP1L and CP2E)

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

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