

THE CP1 FAMILY

Industry Leading Micro PLCs



- » Powerful all-in-one solution with analog and positioning built-in
- » **Flexible Ethernet connectivity**
- » Easy programming with Function Blocks

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 CP1 family of micro programmable controllers provides you with a complete product line-up to automate a wide range of machines and perform many simple automation tasks, quickly and easily. Programming, configuration, and maintenance are all within the same software environment as other Omron PLCs. You are guaranteed the same high quality and reliability that you expect from any Omron product, ensuring that your equipment delivers continuous dependable performance.

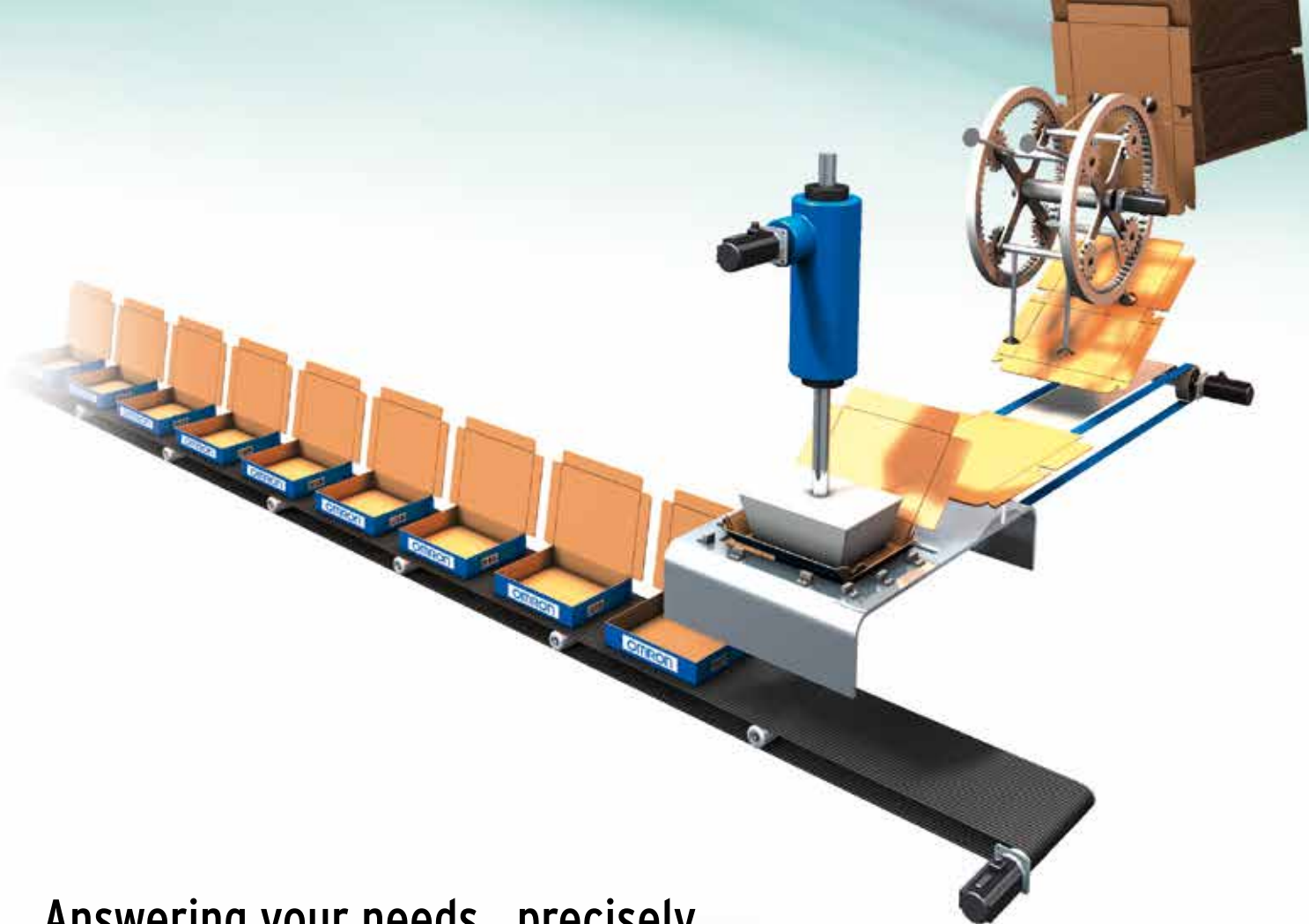
Scalable solution

The CP1 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 CP1 family models, the CP1E, CP1L and CP1H, offers the functionality required for complete machine control.

Benefits include:

- Easy expansion of I/O
- Fast and versatile communication
- Full positioning capabilities via ready-to-use function Blocks





Answering your needs...precisely

Common Applications

CP1H • The Ultimate High-performance Micro PLC

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

- The CP1H-X standard units with 4 axes 100kHz pulse output and counters
- The CP1H-Y high-speed positioning units with 1MHz pulse output and counters
- The CP1H-XA built-in analog I/O units including standard pulse output and counters

- High-speed feeding and positioning applications
- Conveyor and Spindle speed control
- Pressure control and forming machines

CP1L / CP1L-E • The Standard Mid-range Micro PLC

Maximum cost effectiveness within a minimal product footprint. CPUs are selectable from 10 I/O to 60 I/O, with select models featuring built-in Ethernet and Analog Inputs. Additional I/O, Analog, and Communication expansion available.

- Multi-connection Ethernet HMI and third party printer or barcode reader applications
- Temperature control applications with PID Auto-tuning
- Function Block heavy programming using expanded memory

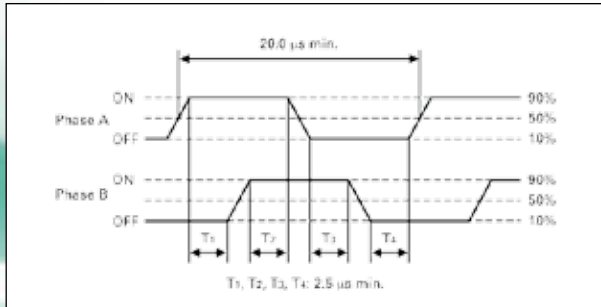
CP1E • The Economy Class Micro PLC

Satisfying entry-level requirements for basic applications. Select CPUs from 10 I/O to 60 I/O with basic expandability.

- Stand-alone 2-axis positioning control applications
- Intelligent remote I/O stations on larger serial network systems

Easy positioning, quick results

The CP1 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.



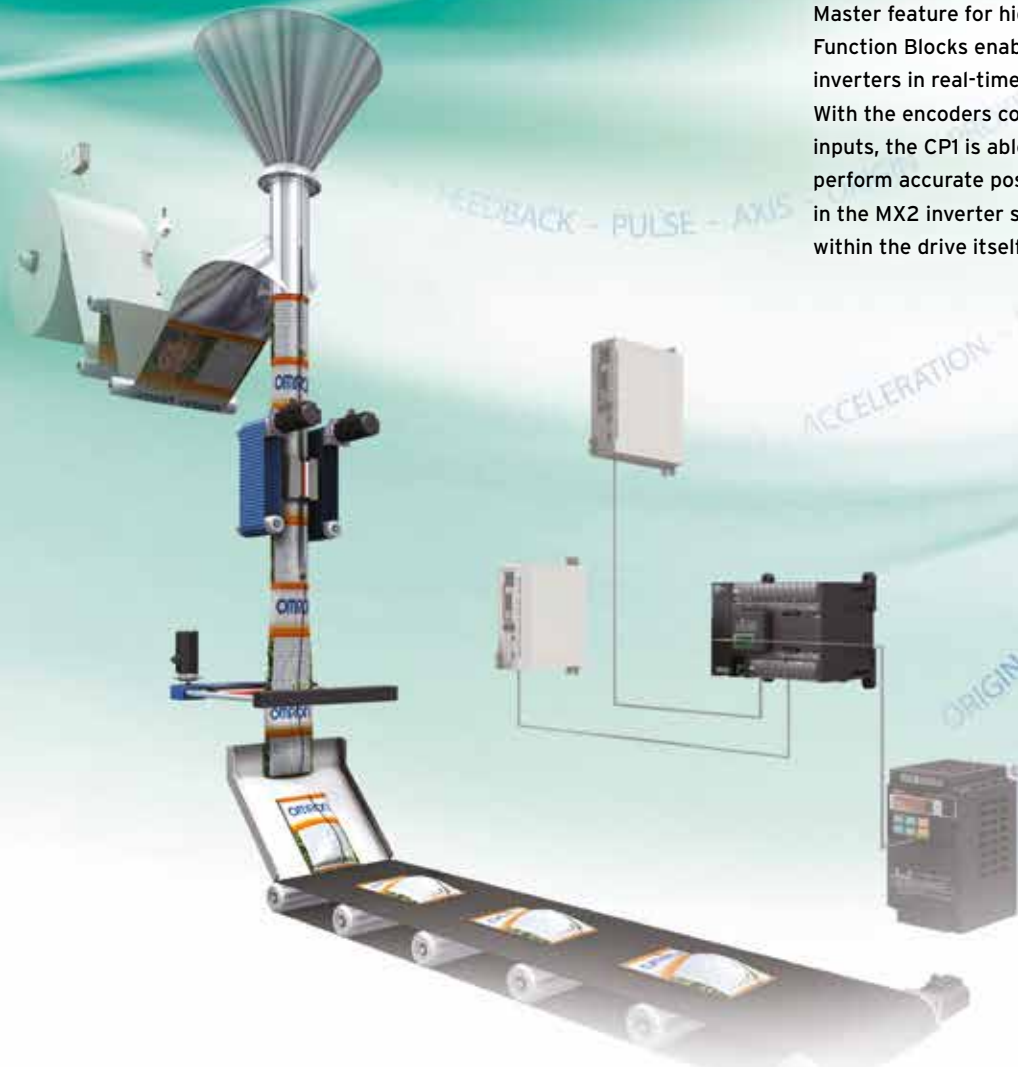
Phase A / Phase B pulse direction input mode

Ideal for position control

When simplicity and ease of use are essential, there is no better solution for your position applications than combining the CP1 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 CP1 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 CP1 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

Omron's software is renowned for its ease of use and intuitive style and CX-One is no exception. For many standard functions Omron provides 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 CP1L and CP1H.



Flexible Embedded Ethernet connectivity

As simple and quick as USB!

Thanks to the 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 CP1 family. You no longer need to waste time adjusting the Ethernet settings on the PC, 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

Omron's CP1L Ethernet models 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.



Omron Network



Wireless Ethernet



CP1 Programmable Controller



Operate and Monitoring

Socket Services



Remote Access



Data Logging



Modbus/TCP

More options - greater possibilities!

More analog I/O

In addition to the two standard embedded analog inputs, Omron's CP1L with embedded Ethernet also supports three dedicated analog I/O option boards. These enable you to add extra analog inputs and outputs, and mixed inputs/outputs at minimum cost without the need for more cabinet space. With its analog I/O modules, auto-tuning PID function, the CP1 is ideal for accurate process control.

CP1 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 operation mode - retains the program and data

For CP1L-E Model CPUs



CP1 Expansion Units



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

Select the optimum CPU for your application



			CP1E											
			E-type					N-type						
			CP1E -E10D□-□	CP1E -E14DR-A	CP1E -E20DR-A	CP1E -E30DR-A	CP1E -E40DR-A	CP1E -N14D□-□	CP1E -N20D□-□	CP1E -NA20D□-□	CP1E -N30D□-□	CP1E -N40D□-□	CP1E -N60D□-□	
I/O	Digital Inputs		6	8	12	18	24	8	12	12	18	24	36	
	Digital Outputs		4	6	8	12	16	6	8	8	12	16	24	
	Removable Terminals		No					No						
	Total I/O Capacity		10	14	20	150	160	14	20	140	150	160	180	
	CP1W Expansion Units		No			Yes (3 max.)		No		Yes (3 max.)				
	CJ-Series Special I/O and CPU Bus Units		No					No						
	Interrupt/Quick/Counter Inputs		4	6				6						
	High-speed Counter Inputs		5 (10 kHz max.)	6 (10 kHz max.)				2 (100 kHz max.) and 4 (10 kHz max.)						
	Pulse Outputs (transistor outputs models only)		No					2 axes (100 kHz max.)						
	Analog I/O (embedded)		No					No		2 inputs, 1 output	No			
	Analog Adjuster (0-255)		Yes (2)					Yes (2)						
	External Analog Settings Input (resolution 1/256)		No					No						
Optional boards	Number of boards supported		0					0		1				
	Serial Communications (CP1W-CIF01/11/12)		No					No		Yes				
	Ethernet (CP1W-CIF41)		No					No		Yes				
	LCD Display (CP1W-DAM01)		No					No						
	Analog I/O boards		No					No						
CPU details	Programming port		USB					USB						
	RS-232C port (embedded)		No					Yes (1)						
	Function Blocks support (Ladder diagrams or ST language)		No					No						
	Processing Speed (minimum)		1.19 µs / Basic instruction, 7.9 µs / Special instruction					1.19 µs / Basic instruction, 7.9 µs / Special instruction						
	Program Capacity		2K steps					8K steps						
	Data Memory Capacity		2K words					8K words						
	Memory Cassette (CP1W-ME05M)		No					No						
	Real-Time Clock		No					Yes (with optional battery)						
Relay Outputs	Battery		No					Optional						
	7-Segment Display		No					No						
	AC Power Supply		CP1E -E10DR-A	CP1E -E14DR-A	CP1E -E20DR-A	CP1E -E30DR-A	CP1E -E40DR-A	CP1E -N14DR-A	CP1E -N20DR-A	CP1E -NA20DR-A	CP1E -N30DR-A	CP1E -N40DR-A	CP1E -N60DR-A	
	DC Power Supply		CP1E -E10DR-D	-	-	-	-	CP1E -N14DR-D	CP1E -N20DR-D	-	CP1E -N30DR-D	CP1E -N40DR-D	CP1E -N60DR-D	
	Sink Type	AC Power Supply	CP1E -E10DT-A	-	-	-	-	CP1E -N14DT-A	CP1E -N20DT-A	-	CP1E -N30DT-A	CP1E -N40DT-A	CP1E -N60DT-A	
		DC Power Supply	CP1E -E10DT-D	-	-	-	-	CP1E -N14DT-D	CP1E -N20DT-D	CP1E -NA20DT-D	CP1E -N30DT-D	CP1E -N40DT-D	CP1E -N60DT-D	
		AC Power Supply	CP1E -E10DT1-A	-	-	-	-	CP1E -N14DT1-A	CP1E -N20DT1-A	-	CP1E -N30DT1-A	CP1E -N40DT1-A	CP1E -N60DT1-A	
		DC Power Supply	CP1E -E10DT1-D	-	-	-	-	CP1E -N14DT1-D	CP1E -N20DT1-D	CP1E -NA20DT1-D	CP1E -N30DT1-D	CP1E -N40DT1-D	CP1E -N60DT1-D	

Note: This table is a general overview only. For details, refer to the CP1E datasheet (Cat. No. P061), CP1L datasheet (Cat. No. P081) or CP1H datasheet (Cat. No. P080).



	CP1L									CP1H			
	L-type			M-type			EL-type	EM-type					
	CP1L -L10D□-□	CP1L -L14D□-□	CP1L -□L20D□-□	CP1L -□M30D□-□	CP1L -□M40D□-□	CP1L -M60D□-□	CP1L -EL20D□-□	CP1L -EM30D□-□	CP1L -EM40D□-□	CP1H -Y20DT-D	CP1H -X40D□-□	CP1H -XA40D□-□	
	6	8	12	18	24	36	12	18	24	12	24	24	
	4	6	8	12	16	24	8	12	16	8	16	16	
	No			Yes			No	Yes		Yes			
	10	54	60	150	160	180	60	150	160	300	320	320	
	No	Yes (1 max.)		Yes (3 max.)			Yes (1 max.)	Yes (3 max.)		Yes (7 units or 15 input words / 15 output words max.)			
	No						No			Yes (2 max.)			
	2	4	6				6			6	8		
	4 (100 kHz max.)						4 (100 kHz max.)			2 (100 kHz max.) and 2 Line-driver (1 MHz)		4 (100 kHz max.)	
	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.)	
	No						2 inputs			No		4 inputs, 2 outputs	
	Yes (1)						No			Yes (1)			
	Yes (0–10V)						No			Yes (0–10V)			
	0	1		2			1	2		2			
	No	Yes					Yes			Yes			
	No	Yes					No			Yes			
	No	Yes					Yes			Yes			
	No						Yes			No			
	USB						Ethernet			USB			
	No						No			No			
	Yes						Yes			Yes			
	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			
	5K steps			10K steps			5K (+10K FB) steps	10K (+10K FB) steps		20K steps			
	10K words			32K words			10K words	32K words		32K words			
	Yes						Yes			Yes			
	Yes						Yes			Yes			
	Yes						Yes			Yes			
	No						No			Yes			
	CP1L -L10DR-A	CP1L -L14DR-A	CP1L -L20DR-A	CP1L -M30DR-A	CP1L -M40DR-A	CP1L -M60DR-A	-	-	-	-	CP1H -X40DR-A	CP1H -XA40DR-A	
	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	-	-	-	
	CP1L -L10DT-A	CP1L -L14DT-A	CP1L -L20DT-A	CP1L -M30DT-A	CP1L -M40DT-A	CP1L -M60DT-A	-	-	-	-	-	-	
	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	
	-	-	-	-	-	-	-	-	-	-	-	-	
	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 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

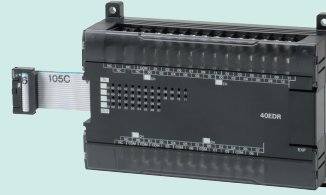


CP1W-16ER
Relay outputs: 16

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

CompoBus/S I/O Link Unit



CP1W-SRT21
Inputs: 8 bits
Outputs: 8 bits

Optional Boards



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



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



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



CP1W-CIF41
Ethernet



CP1W-DAM01
Display 4 rows,
12 characters



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



CP1W-DAB21V
Analog
2 outputs, 0-10 V



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

Memory Cassette



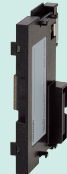
CP1W-ME05M
512K words
(upload/download program)

Battery Set



CP1W-BAT01
(for CP1E)

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 CP1E datasheet (Cat. No. P061), CP1L datasheet (Cat. No. P081) or CP1H datasheet (Cat. No. P080).

Software

Software	License	Media	Model
CX-One	Standard License, ** user	DVD	CXONE-AL**D-V4
	Upgrade License, ** user	DVD	CXONE-AL**D-V4-UP
	Standard License, ** user	CD	CXONE-AL**D-V4
	Upgrade License, ** user	CD	CXONE-AL**D-V4-UP
CX-One LITE	Standard License, 1 user	CD	CXONE-LT01C-V4
	Upgrade License, 1 user	CD	CXONE-LT01C-V4-UP

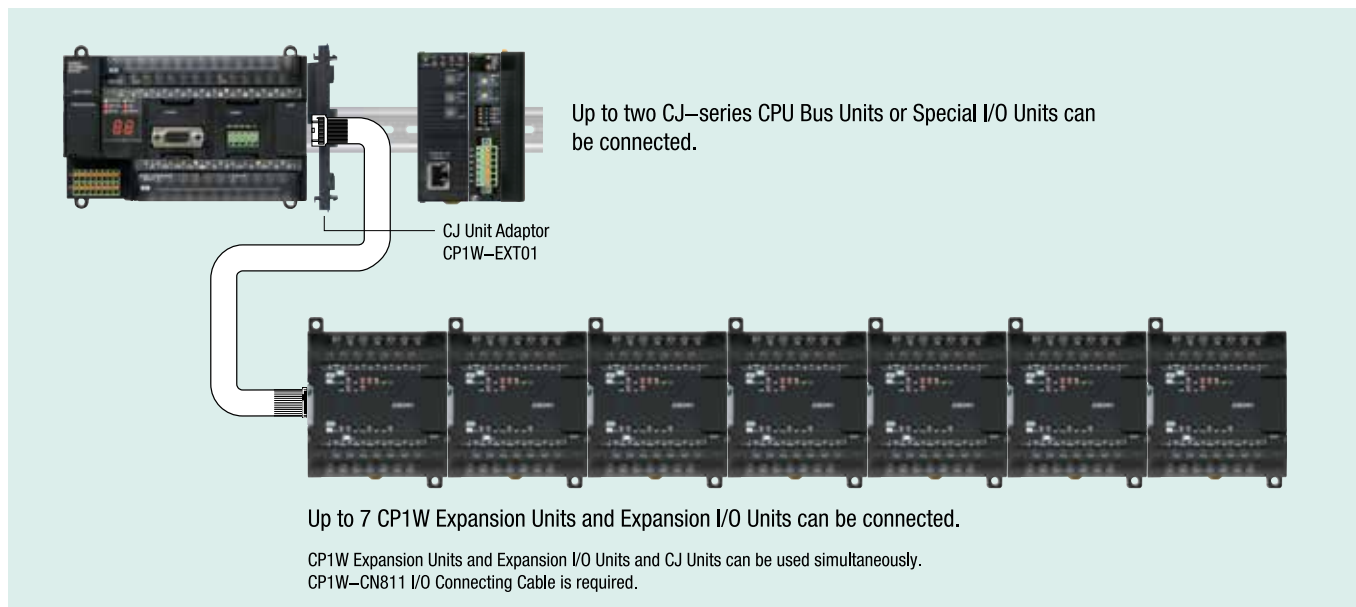
** Indicates number of users, either 01, 03, 10, 30, 50, or XX (Site)

CX-One LITE includes: CX-Programmer, CX-Designer, CX-Simulator, CX-Drive, CX-Thermo, CX-Sensor, CX-Integrator, CX-Server, CX-ConfiguratorFDT, NV-Designer, FB/SAP, PLC Tools/Utilities.

Supported PLCs: CP1E, CP1L, CP1H, CPM1, CPM1A, CPM2A, CPM2C, SRM1.

CX-One supported OS: Windows 7, Windows Vista® or Windows XP (SP3 or higher).

Using CJ-series units and CP1W units with the CP1H



CJ-Series Units for use with CP1H

Description	Unit Name	Model	Description	Unit Name	Model
Analog I/O and Control Units	Universal Analog Input Unit	CJ1W-AD04U	Motion/Position Control Units	Position Control Units	CJ1W-NC113
	Analog Input Unit	CJ1W-AD041-V1			CJ1W-NC133
		CJ1W-AD042			CJ1W-NC213
		CJ1W-AD081-V1			CJ1W-NC233
	Analog Output Unit	CJ1W-DA021			CJ1W-NC413
		CJ1W-DA041			CJ1W-NC433
		CJ1W-DA042V		MECHATROLINK-II Position Control Unit	CJ1W-NCF71
		CJ1W-DA08V			CJ1W-NCF71-MA
		CJ1W-DA08C			CJ1W-NC271
	Analog Input/Output Unit	CJ1W-MAD42			CJ1W-NC471
	Universal analog Input Unit	CJ1W-PH41U		MECHATROLINK-II Motion Control Unit	CJ1W-MCH71
	Process Input Unit	CJ1W-PDC15	Communication Units	Serial Communication Units	CJ1W-SCU21-V1
	Thermocouple Input Unit	CJ1W-PTS15			CJ1W-SCU22
		CJ1W-PTS51			CJ1W-SCU31-V1
	Resistance Thermometer Input Unit	CJ1W-PTS16			CJ1W-SCU32
		CJ1W-PTS52			CJ1W-SCU41-V1
					CJ1W-SCU42
	Temperature Control Loops, Thermocouple Unit	CJ1W-TC001		Ethernet Unit	CJ1W-ETN21
		CJ1W-TC002		EtherNet/IP Unit	CJ1W-EIP21
		CJ1W-TC003		High-speed Data Logging Unit	CJ1W-SPU01-V2
		CJ1W-TC004		DeviceNet Master Unit	CJ1W-DRM21
Motion/Position Control Units	Temperature Control Loops, RTD	CJ1W-TC101		CompoNet Master Unit	CJ1W-CRM21
		CJ1W-TC102		CompoBus/S Master Unit	CJ1W-SRM21
		CJ1W-TC103		PROFINET I/O Controller Unit	CJ1W-PNT21
		CJ1W-TC104		PROFIBUS DP-V1 Master Unit	CJ1W-PRM21
	SSI Input Unit	CJ1W-CTS21-E		PROFIBUS DP Slave Unit	CJ1W-PRT21
	High-speed Counter Unit	CJ1W-CT021		Controller Link Unit	CJ1W-CLK23
	4-Channel Counter Unit	CJ1W-CTL41-E		CAN Communication Unit	CJ1W-CORT21
	24VDC Motor Control Unit	CJ1W-DCM11-E		RFID Sensor Controller Unit	CJ1W-V680C11
					CJ1W-V680C12
			Control Units		

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Temperature & Process Controllers

- Single and Multi-loop Controllers

Sensors & Vision

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- Amplified Photomicrosensors • Measurement Sensors
- Ultrasonic Sensors • Vision Sensors • RFID/Code Readers

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- Relays • Pushbuttons & Indicators • Limit and Basic Switches • Timers
- Counters • Metering Devices • Power Supplies

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- Programmable Safety Controllers • Light Curtains • Safety Relays
- Safety Interlock Switches