OMRON
AUTOMATION & SAFETY

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!

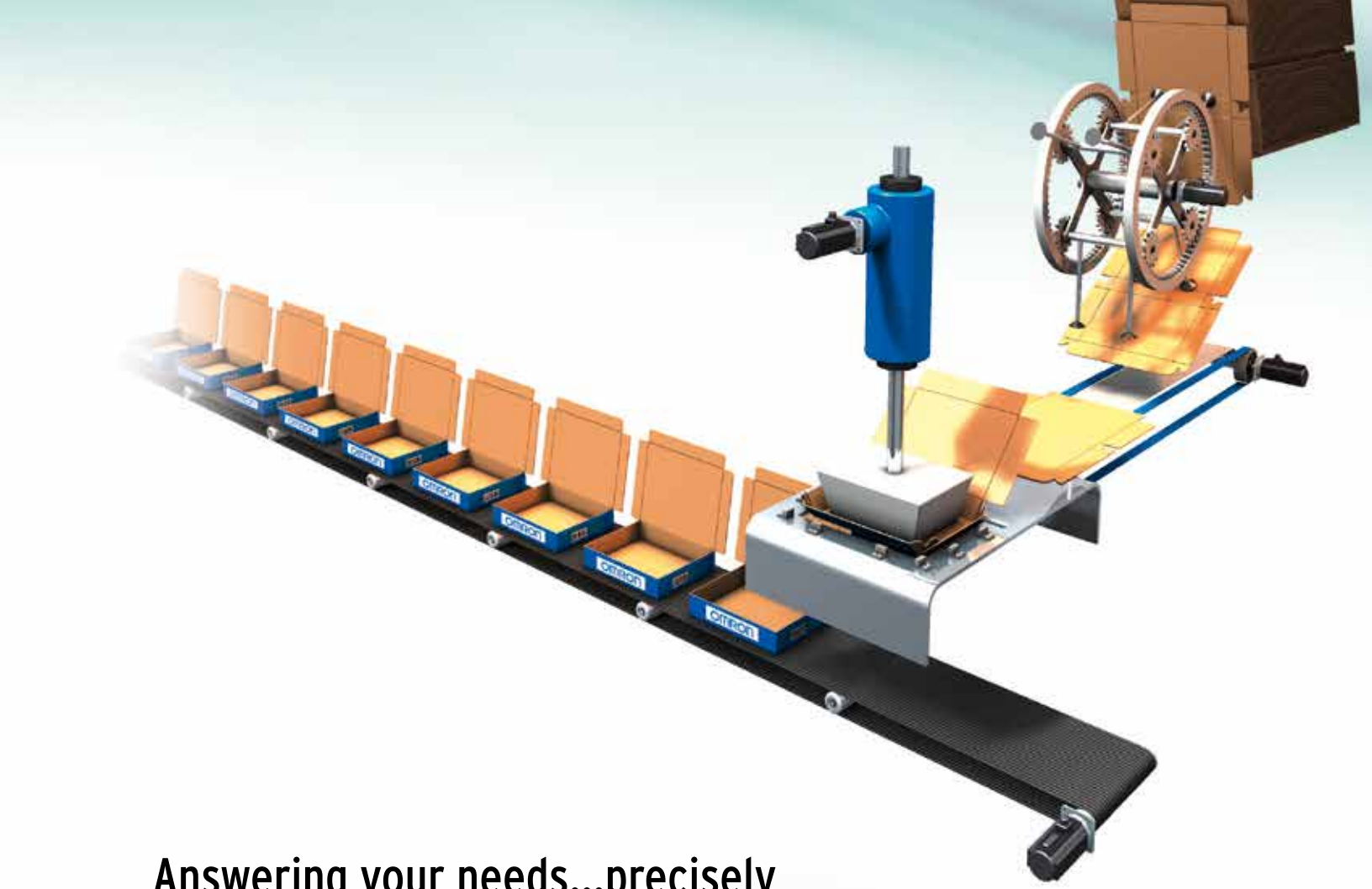
Omron's vast experience in the field of industrial automation has resulted in the creation of the right products for your applications, ranging from simple to more complex automation solutions. The CP1 family of micro programmable controllers provides you with a complete product line-up to automate a 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

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

Common Applications

- 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

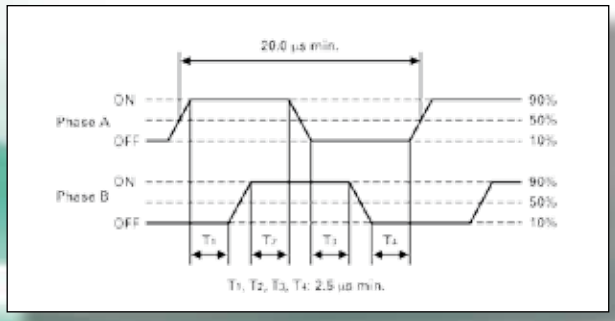
CP1E • The Economy Class Micro PLC

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

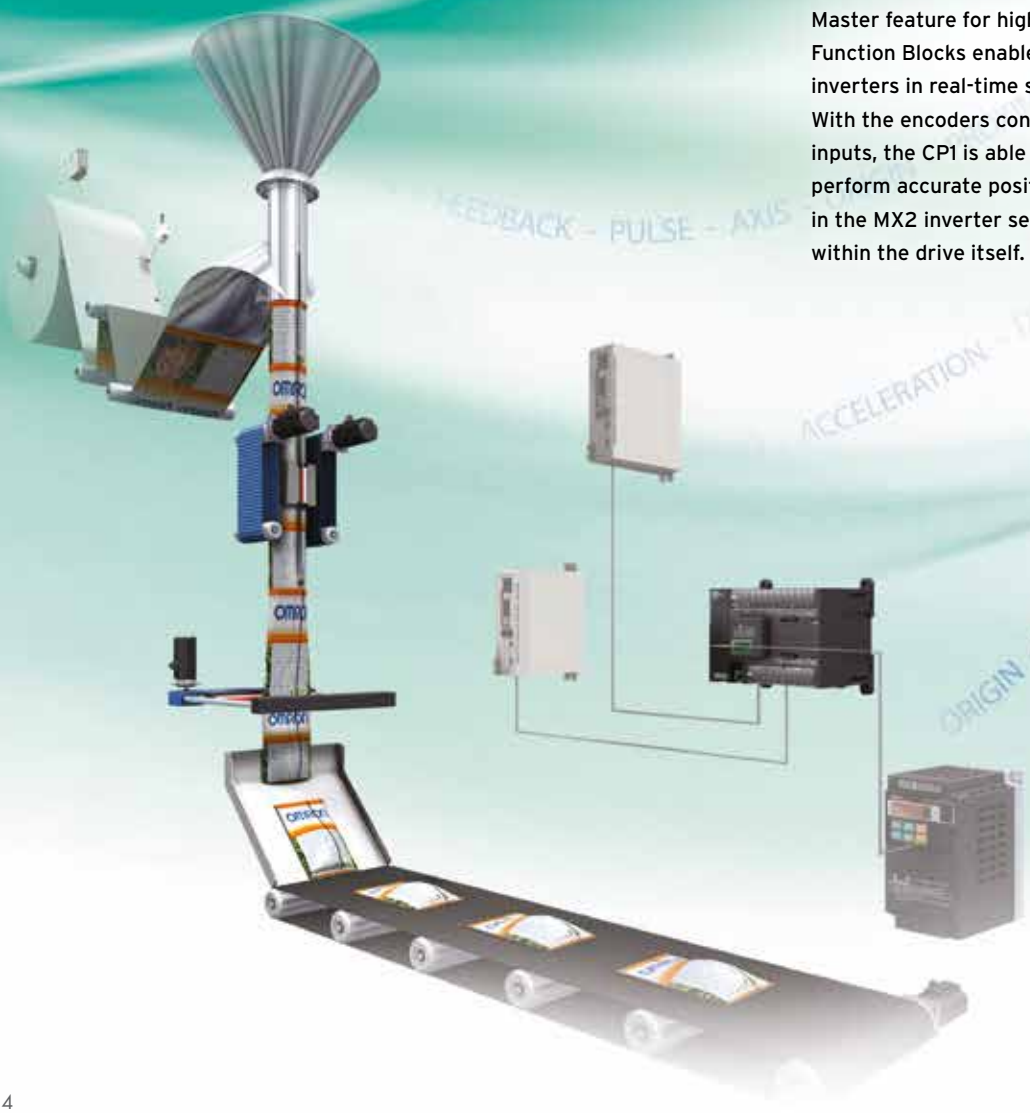
The CP1 family is the perfect choice for any application that requires positioning. Whether for conveyor control, point-to-point position control, or non-interpolated pick-and-place systems, the combination of high-speed pulse outputs, variable speed drive control and position feedback will provide all 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.

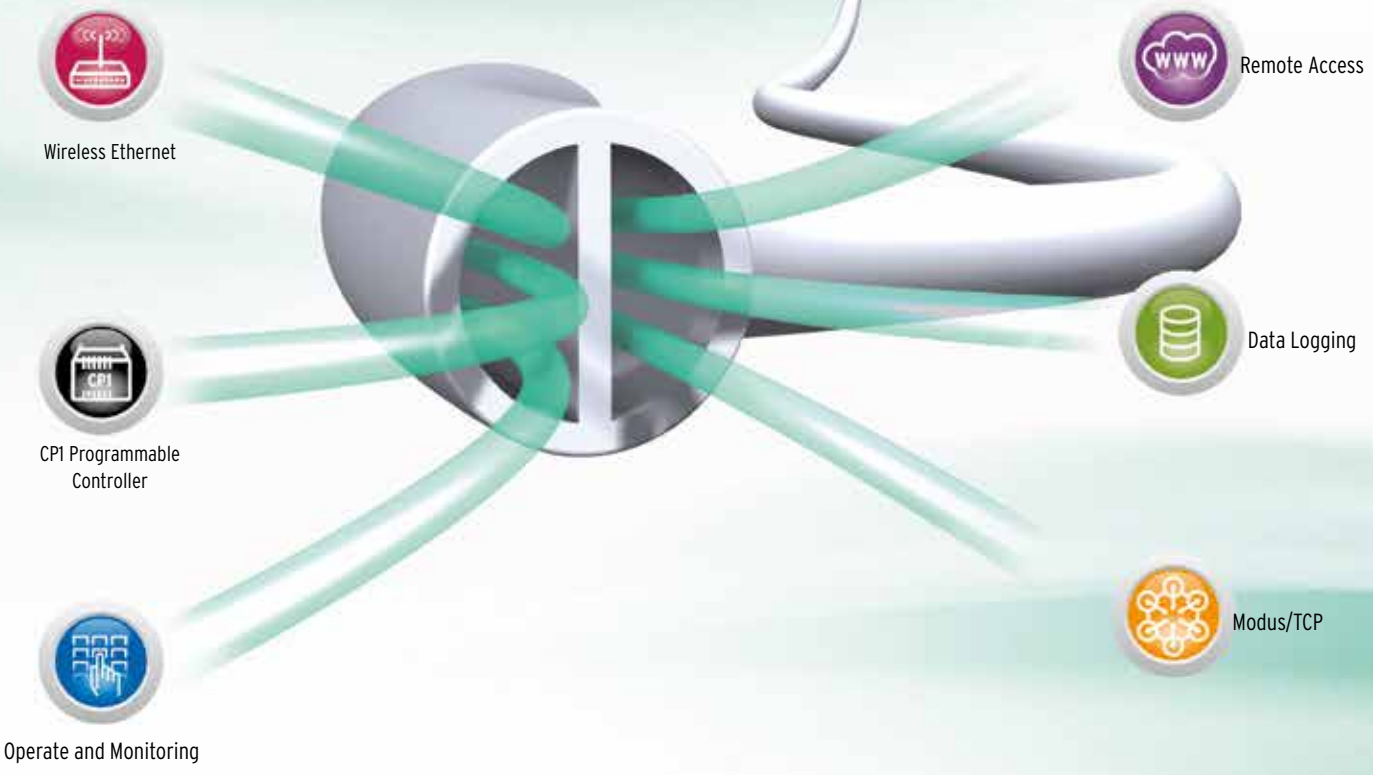
Flexible Embedded Ethernet connectivity

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.



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.

For CP1L-E Model CPUs

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

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)					
	Battery		No					Optional					
	7–Segment Display		No					No					
Relay Outputs	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
Transistor Outputs	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
	Source Type	AC Power Supply	CP1E –E10DT1–A	–	–	–	–	CP1E –N14DT1–A	CP1E –N20DT1–A	–	CP1E –N30DT1–A	CP1E– N14DT1–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)

Analog Output Unit

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

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

Analog I/O Unit

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

Temperature Sensor Unit

CP1W–TS001
Thermocouple inputs: 2

CP1W–TS002
Thermocouple inputs: 4

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 (Cannot be used with CP1L–E)

CP1W–GCTS2
Thermocouple inputs: 2
(Cannot be used with CP1E)

CP1W–DAM01
Display 4 rows,
12 characters

Ethernet Optional Boards for CP1L, CP1L–E & CP1H Only

CP1W–EIP61
EtherNet/IP Slave, 5 total connections (1 EIP Slave, 4UDP)

CP1W–MODTCP61
Modbus/TCP Slave or Master
(1 Modbus Slave & 4 UDP connections) or (1 Modbus Master)

CP1W–ETN61
Ethernet, 8 total connections (4TCP, 4UDP)

DeviceNet I/O Link Unit

CPM1A–DRT21
Inputs: 32 bits
Outputs: 32 bits

For CP1L–E Only

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

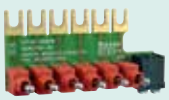
USB Programming Cable

USB–AB–6BLK
A–type male to B–type male,
Length: 6 ft.

Memory Cassette

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

Switch Input Board



CP1W–SWB06

CP1W–BAT01 (CP1E) CJ1W–BAT01 (CP1L/H)

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/CPM1A Expansion Units include I/O Connection Cables (in lengths of approx. 6 cm) for side–by–side connection.

Note 1: 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).
Note 2: CPM1A Expansion Unit and Expansion I/O Units can be used with CP1H, CP1L or CP1E CPU Units under the same conditions as for the CP1W.

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

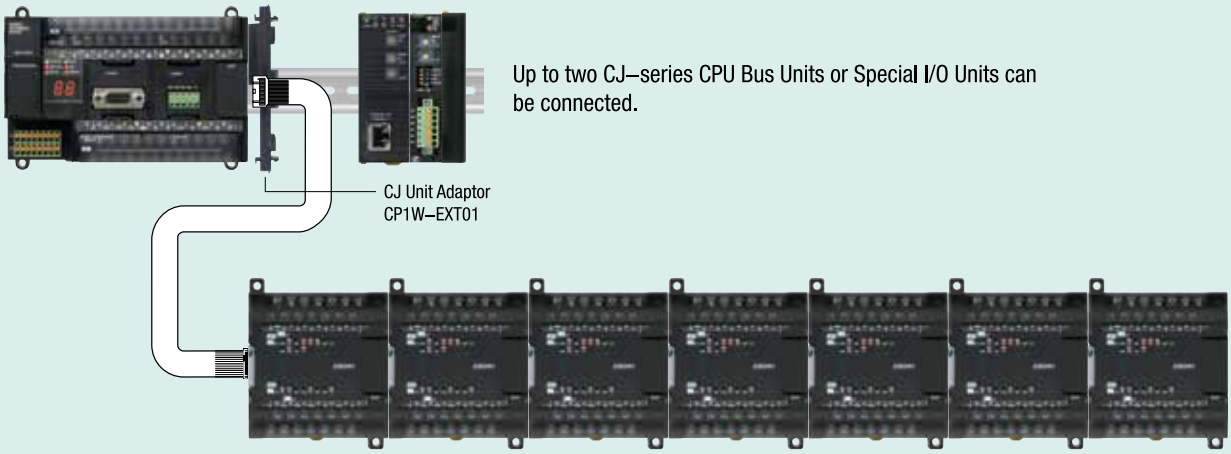
** Indicates number of users, either 01, 03, 10, 30, 50, or XX (Site)

CX–One LITE includes: CX–Programmer, CX–Designer, CX–Simulator, CX–Drive, CX–Thermo, CX–Sensor, CX–Integrator, CX–Server, CX–Configurator FDT, 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



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

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

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

CJ–Series Units for use with CP1H

Description	Unit Name	Model
Analog I/O and Control Units	Universal Analog Input Unit	CJ1W–AD04U
	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
	Universal analog Input Unit	CJ1W–PH41U
	Process Input Unit	CJ1W–PDC15
	Thermocouple Input Unit	CJ1W–PTS15
		CJ1W–PTS51
	Resistance Thermometer Input Unit	CJ1W–PTS16
		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	SSI Input Unit	CJ1W–CTS21–E
	High–speed Counter Unit	CJ1W–CT021
	4–Channel Counter Unit	CJ1W–CTL41–E
	24VDC Motor Control Unit	CJ1W–DCM11–E

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
	MECHATROLINK–II Motion Control Unit	CJ1W–MCH71
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–EIP21
	High–speed Data Logging Unit	CJ1W–SPU01–V2
	DeviceNet Master Unit	CJ1W–DRM21
	CompoNet Master Unit	CJ1W–CRM21
	CompoBus/S Master Unit	CJ1W–SRM21
	PROFINET I/O Controller Unit	CJ1W–PNT21
	PROFIBUS DP–V1 Master Unit	CJ1W–PRM21
	PROFIBUS DP Slave Unit	CJ1W–PRT21
	Controller Link Unit	CJ1W–CLK23
	CAN Communication Unit	CJ1W–CORT21
Control Units	RFID Sensor Controller Unit	CJ1W–V680C11
		CJ1W–V680C12

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Sensors & Vision
• Proximity Sensors • Photoelectric Sensors • Fiber-Optic Sensors
• Amplified Photomicrosensors • Measurement Sensors
• Ultrasonic Sensors • Vision Sensors • RFID/Code Readers

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

Safety
• Laser Scanners • Safety Mats • Edges and Bumpers
• Programmable Safety Controllers • Light Curtains • Safety Relays
• Safety Interlock Switches

R08I-E-07 Note: Specifications are subject to change. Printed in U.S.A.

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