OMRON

THE CP1 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 CP1 family of programmable logic 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 PLCs. 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 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, and full positioning capabilities via ready-to-use Function Blocks. The CP1 family uses the same instruction set and professional programming software found in Omron's other modular PLCs.

CJ series

CP1H

CP1L

CP1E

FUNCTIONALITY

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 PLCs, 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 CP1 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 latest CP1L PLC features 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 CP1 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 CP1 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 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.

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. With the servo position feedback to the controller for position loop control you can monitor the actual positioning and it can also be used to synchronise with another axis. 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

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 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 CP1L's Automatic-Connect function, programming over Ethernet is as simple as using USB on the other models in the CP1 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

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 PLC 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 PLC

Operate and Monitoring

Socket Service

Remote access

Data Logging

Modbus/TCP

More options – greater possibilities!

More analogue I/Os

In addition to the two standard embedded analogue inputs, Omron's CP1L with embedded Ethernet also supports three new, optional analogue I/O boards. These enable you to add extra analogue inputs and outputs, and mixed inputs/outputs at minimum cost and without the need for more cabinet space. With its analogue I/O modules, auto-tuning PID function, and the Easy Modbus Master feature to communicating to temperature controllers, 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, analogue 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
- Analogue 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 instruction set compatible within Omron's modular PLC series
- USB or Ethernet port – no special cables needed
- No-Battery mode operation – retains the program and data

Maximize efficiency by selecting the optimum CPU unit for your applications

|		CP1E E-type					CP1E 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.)					
	Analogue I/O (embedded)	No					No		2 inputs, 1 output	No		
	Analogue Adjuster (0-255)	Yes (2)					Yes (2)					
	External Analogue 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					
	Analogue 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).

OMRON

| 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									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 units

Expansion I/O Units
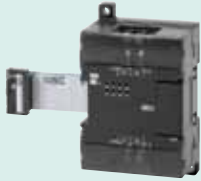
CP1W-8ED
DC inputs: 8

CP1W-8ER
Relay outputs: 8

CP1W-8ET
Transistor outputs (sinking): 8

CP1W-8ET1
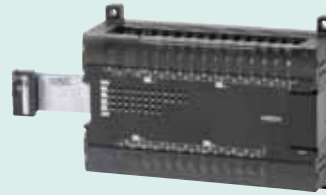Transistor outputs (sourcing): 8
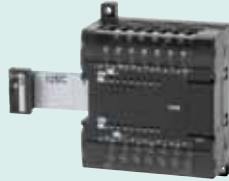
CP1W-16ER
Relay outputs: 16

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

Analogue I/O Units

Analogue Input Unit

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

Analogue Output Unit

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

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

Analogue I/O Unit

CP1W-MAD11
Analogue inputs: 2 (resolution: 6,000)
Analogue 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

DeviceNet I/O Link Unit

CPM1A-DRT21
Inputs: 32 bits
Outputs: 32 bits

PROFIBUS-DP I/O Link Unit

CPM1A-PRT21
Inputs: 16 bits
Outputs: 16 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
Analogue 2 inputs,
0-10 V, 0-20 mA

CP1W-DAB21V
Analogue
2 outputs, 0-10 V

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

USB Programming Cable

CP1W-CN221
A-type male to B-type male,
Length: 1,8 m

Memory Cassette

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

Switch Input Board

CP1W-SWB06

Battery Set

CP1W-BAT01

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.

OMRON
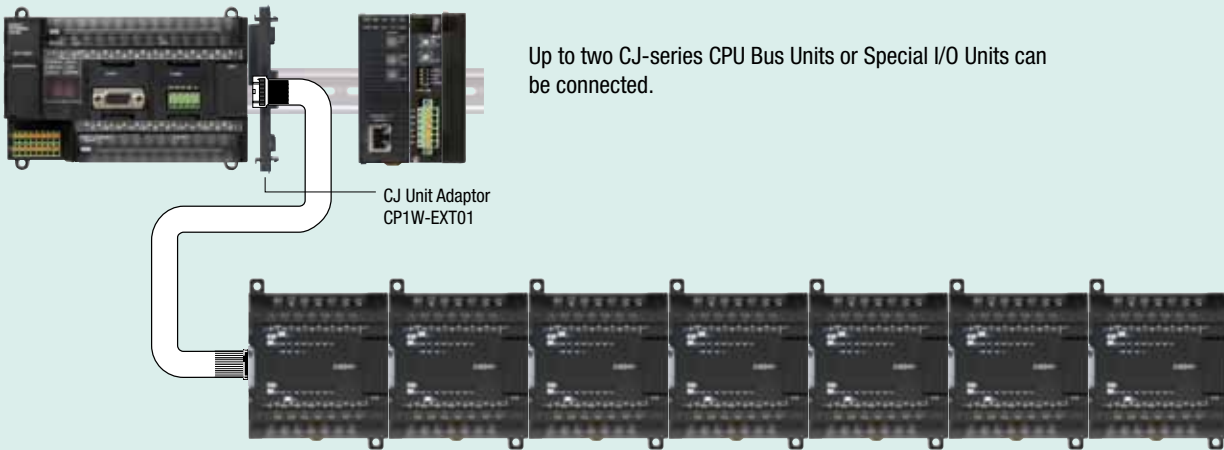
Software

		Media	Order code
CX-One FULL	Single user licence	Licence only	CXONE-AL01-EV4
	Three user licence	Licence only	CXONE-AL03-EV4
	Ten user licence	Licence only	CXONE-AL10-EV4
	Software only	DVD	CXONE-DVD-EV4
CX-One LITE	Single user licence	Licence only	CXONE-LT01-EV4
	Software only	CD	CXONE-LTCD-EV4

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).

Note: Except for Windows XP 64-bit version.

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.

CJ Unit Adaptor
CP1W-EXT01

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
Analogue I/O and Control Units	Universal Analogue Input Unit	CJ1W-AD04U
	Analogue Input Unit	CJ1W-AD041-V1
		CJ1W-AD042
		CJ1W-AD081-V1
	Analogue Output Unit	CJ1W-DA021
		CJ1W-DA041
		CJ1W-DA042V
		CJ1W-DA08V
		CJ1W-DA08C
	Analogue Input/Output Unit	CJ1W-MAD42
	Universal Analogue 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
		CJ1W-V600C11
		CJ1W-V600C12

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

OMRON

OMRON

Automation Systems
• Programmable logic controllers (PLC) • Human machine interfaces (HMI) • Remote I/O
• Industrial PC's • Software

Motion & Drives
• Motion controllers • Servo systems • Inverters • Robots

Control Components
• Temperature controllers • Power supplies • Timers • Counters • Programmable relays
• Digital panel indicators • Electromechanical relays • Monitoring products • Solid-state relays
• Limit switches • Pushbutton switches • Low voltage switch gear

Sensing & Safety
• Photoelectric sensors • Inductive sensors • Capacitive & pressure sensors
• Cable connectors • Displacement & width-measuring sensors • Vision systems
• Safety networks • Safety sensors • Safety units/relay units • Safety door/guard lock switches