Compact PLC series

CP1H

The All-in-One Controller

Combining the processing power and data capacity of the CJ1M series and the built-in digital I/O functionality of the CPM2A series in a compact PLC outline, the CP1H CPU series sets new standards.

With 4 high-speed encoder inputs up to 1 MHz (single phase) and 4 pulse outputs up to 1 MHz (line driver), CP1H CPUs are ideal for positioning and speed control.
Their optional 4 analogue inputs and 2 analogue outputs plus advanced PID control with auto-tuning also make them ideal for continuous control applications.

What's more, expandable with CPM1A I/O units (up to 320 I/O points) and up to two CJ1 Special I/O units or CPU bus units, CP1H CPUs offer a wide range of communication interfaces and advanced I/O units.

Equipped with a USB interface as standard for programming and monitoring, the new CPUs allows up to two serial ports to be plugged in for communication with HMI or field devices. And, of course, they provide 'Smart Platform' communication routing over multiple network layers.

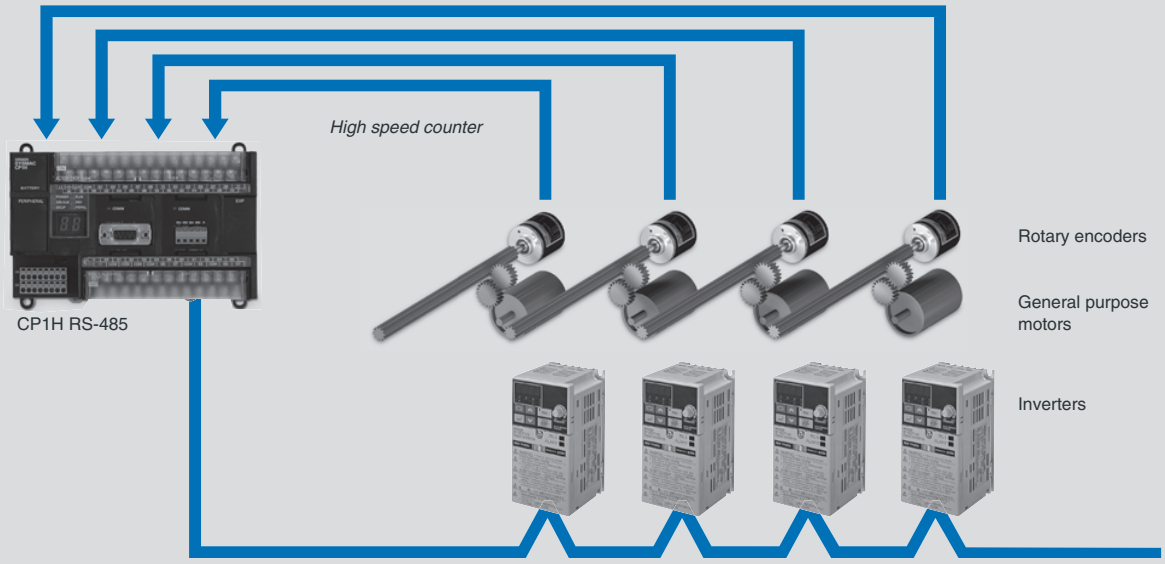
Using CX-One, programs can be created that enable the user to build, configure and program networks, PLCs, HMIs, motion-control systems, drives, temperature controllers and sensors.

The CP1H CPU series has the same architecture as the CS/CJ PLC series, which means programs are compatible for memory allocations and instructions and also support Function Blocks and Structured Text.

High-speed counter / encoder input

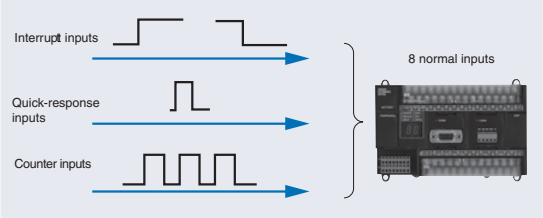
Four axes Counter Function (single phase or differential phase)

CP1H-X(A) CPU Units: Four axes, single-phase at 100 kHz or differential phases at 50 kHz
CP1H-Y CPU Units: Two axes, single phase at 1 MHz or differential phases at 500 kHz plus two axes, single phase at 100 kHz or differential phases at 50 kHz



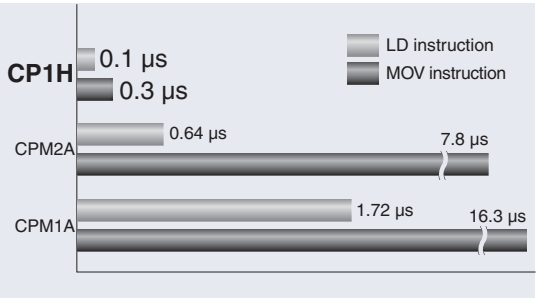
Eight Interrupt Inputs

Eight inputs be used as:
- 50 µs pulse catch inputs
- interrupt inputs
- simple counter inputs (<5 kHz)

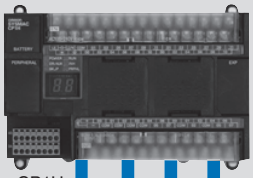


Program execution speed

Fast I/O requires fast response, the CJ1M core provides classleading program execution speed.



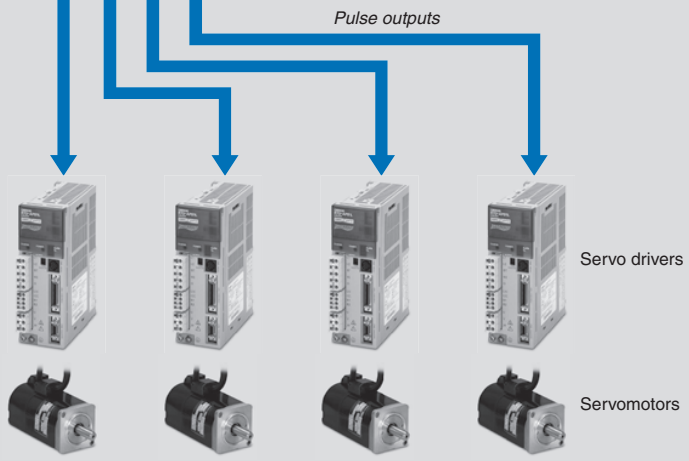
4 Pulse outputs for precise positioning



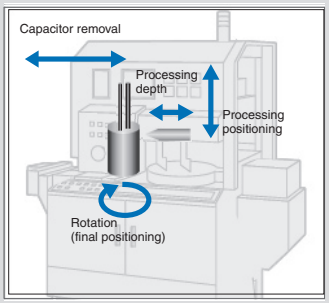
CP1H

Pulse Output Function for Up to Four Axes.

CP1H-X(A) CPU Units: Two axes at 100 kHz and two axes at 30 kHz
CP1H-Y CPU Units: Two axes at 1 MHz and two axes at 100 kHz

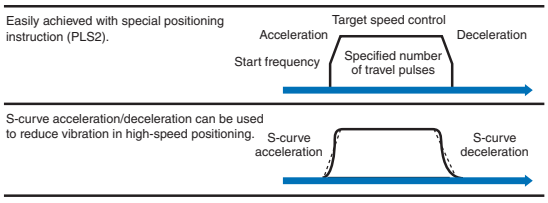


Example: Four-axes Control in Electronic Component manufacturing equipment

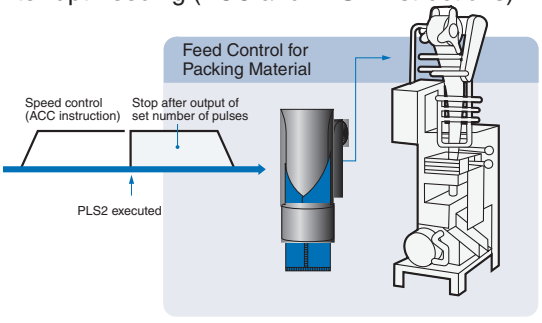


Easy engineering with standard functions

- Single-instruction Origin Search Function
- Positioning with Trapezoidal Acceleration and Deceleration (PLS2 Instruction)

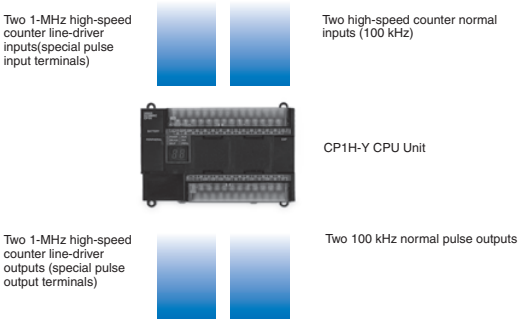


Interrupt Feeding (ACC and PLS2 Instructions)



1MHz High-speed Pulse Output

(CP1H-Y CPU Units : To be released soon.)



CP1H-Y CPU Units offer built-in 1-MHz line-driver I/O.

- Line-driver outputs: Two each for CW and CCW.
- Line-driver inputs: Two each for phases A, B, and Z.

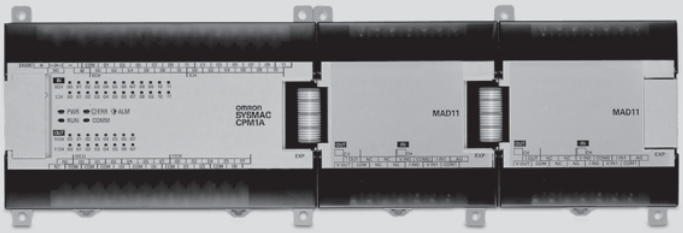
CP1H-Y CPU Units also have 20 normal I/O points (12 inputs and 8 outputs), and can provide 100-kHz high-speed counter inputs for two axes and 100 kHz pulse outputs for two axes.

Analogue I/O

Analogue Control without Using Expansion Units

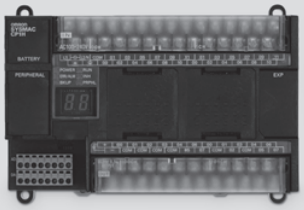
CP1H-XA CPU Units have four analogue inputs and two analogue outputs built in.

Previously



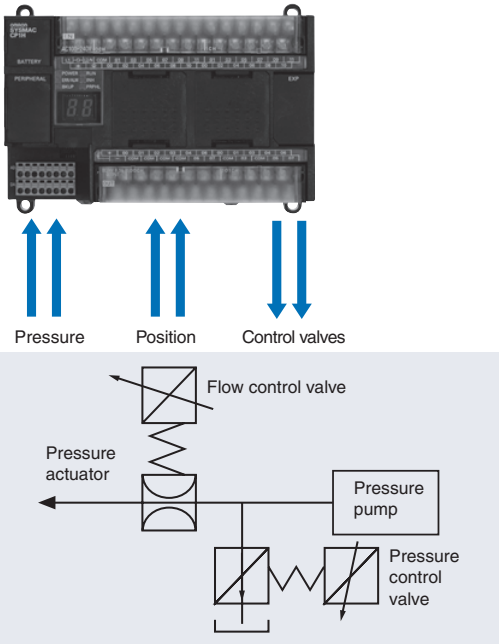
CPM2A CPU Unit with Two CPM1A-MAD11 Analogue I/O Units (2 Analogue Inputs and 1 Analogue Output)

CP1H

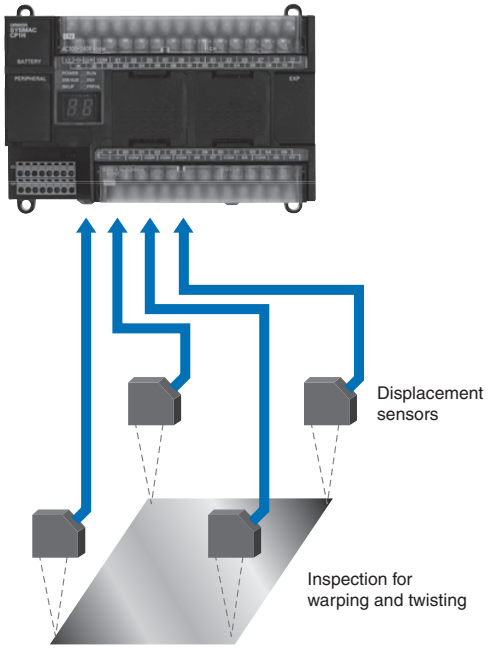


CP1H-XA

• Oil Pressure Control

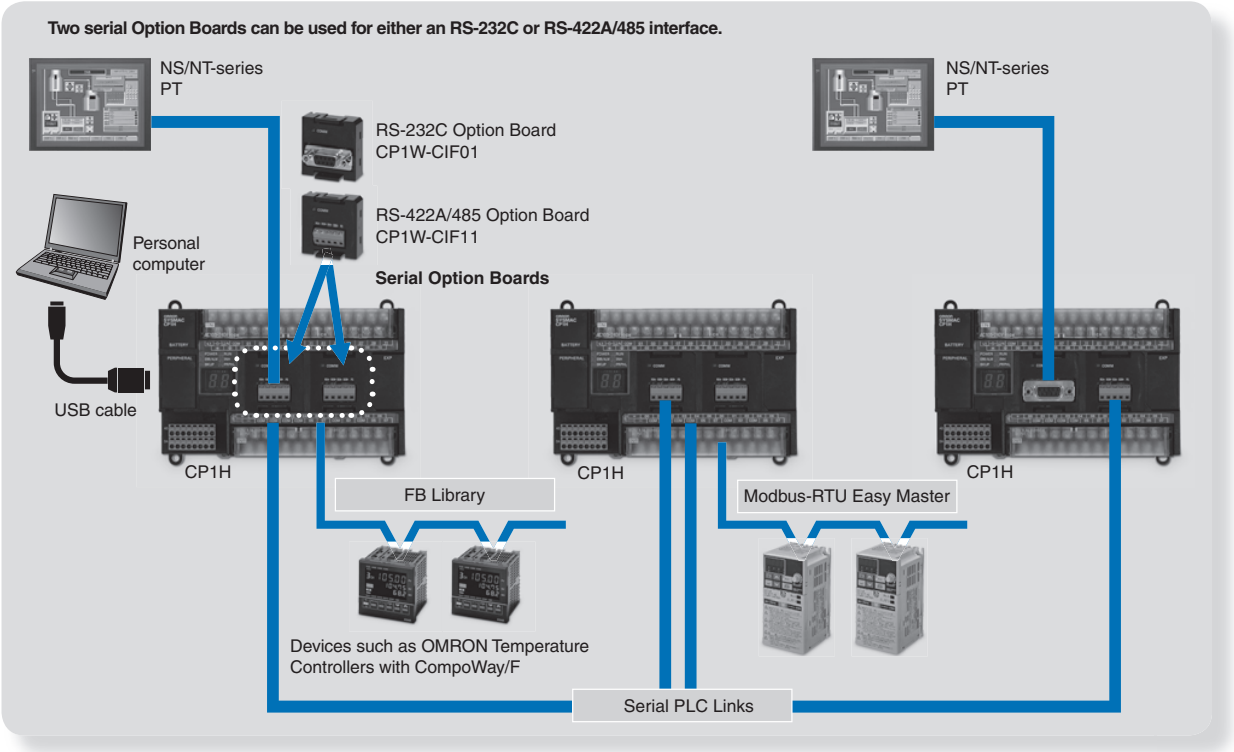


• Inspection Devices



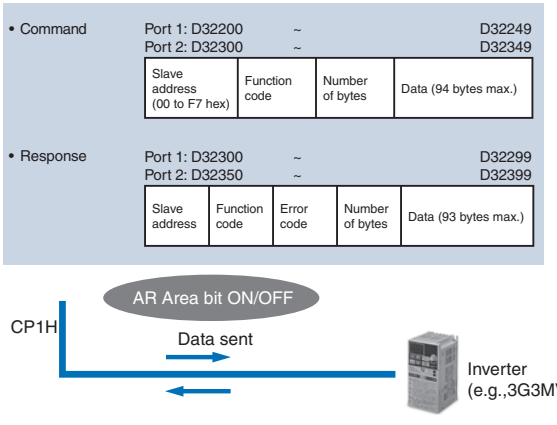
Serial communications

Two Option Boards can be mounted for RS-232C or RS-422A/485 communications making it easy to simultaneously connect to a PT, and other devices such as Inverters, Temperature controllers, Smart Sensors or Serial PLC link. The standard USB port is used for connection to a personal computer.



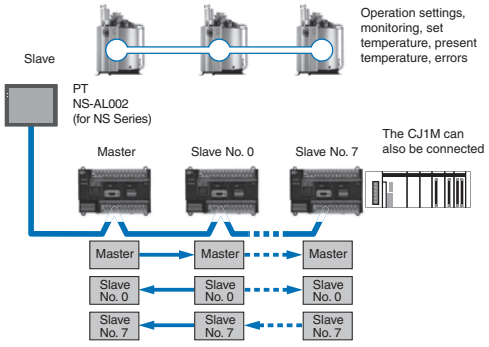
Modbus-RTU Easy Master

The Modbus-RTU Easy Master makes it easy to control Modbus slaves (such as Inverters). Serial communications can be executed independently of the program simply by setting a Modbus command in a fixed memory area and turning ON software switches.



Serial PLC Links

Up to 10 Words/Unit of data can be exchanged between up to nine CP1H (or CJ1M) CPU units.

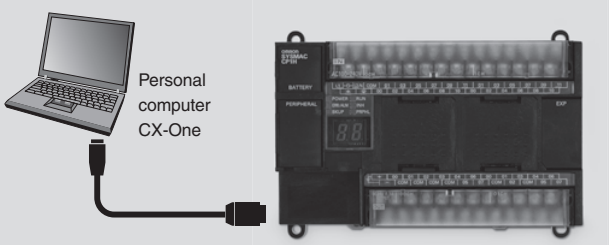


NS/NT-series PTs can also be incorporated as slaves (1:N NT Link connections) to exchange data using the NT Links with only the master CP1H. Each is treated as one slave node.

Reduce development time with efficient tools

• Plug-and-play USB Connection

Just install the CX-Programmer (Ver. 6.1 or higher) and connect the USB cable to the CP1H. The driver will be installed automatically.



• A Built-in USB Port (USB 1.1, Type B) Enables a Personal Computer to Be Connected using a standard USB cable.

Standard A-type male to B-type male USB cables can be used.

Note: Programming Consoles (e.g., CQM1H-PRO01 and C200H-PRO27) cannot be used with the CP1H.

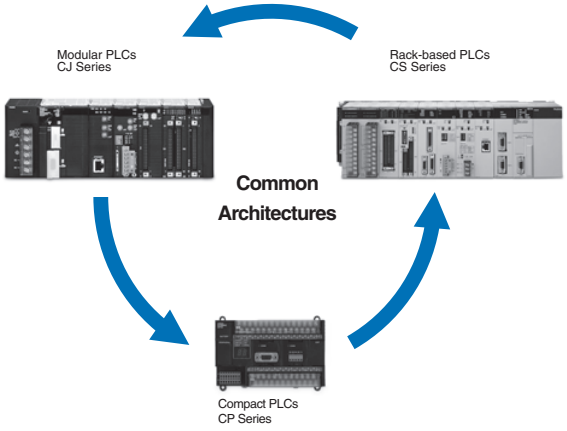
A Wealth of Instructions

• PID Instruction with Autotuning

PID constants can be automatically tuned for the PID instruction. The limit cycle method is used for tuning, allowing tuning to be completed quickly

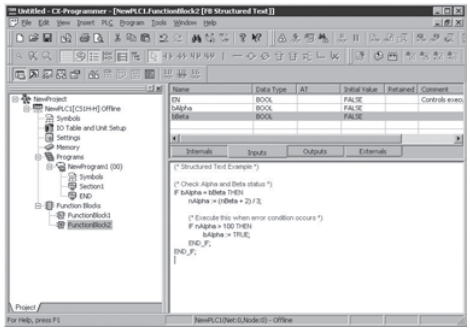
• Floating-point Decimal Instructions, Trigonometric Instructions, and More.

Just like the CS/CJ-series PLCs, the CP1H has approximately 400 instructions for ladder programming.



The Structured Text (ST) language makes arithmetic operations even easier.

In addition to ladder programming, function block logic can be written in ST language, which conforms to IEC 61131-3. Arithmetic processing is also possible with ST, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing that is difficult to write in ladder programming becomes easy using structured text.

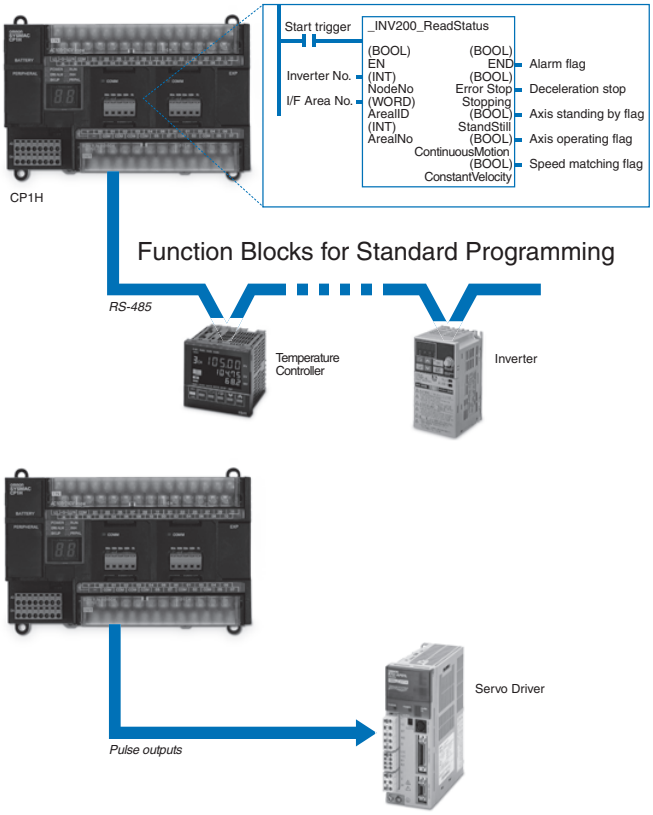


Communications programs are provided by the Function Block library.

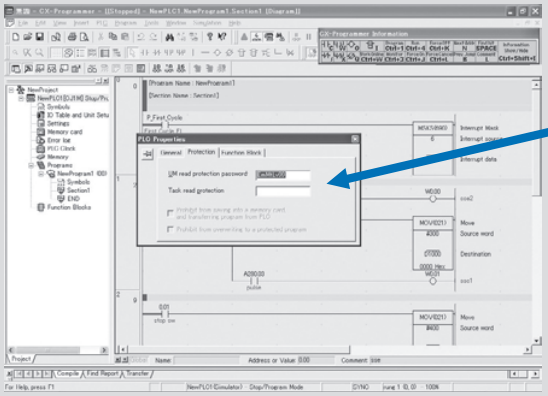
OMRONs Function Block Libraries drastically reduce the amount of programming needed to communicate with field devices. Just drag and drop a pre-tested function block in your program and set the parameters. You'll be up and running within one minute.

• A FB Library for Pulse Outputs.

Function blocks are also provided for pulse outputs to make it easy to write programs for positioning in addition to communications function blocks. These function blocks will reduce the time required for developing programs for applications such as for OMRON's Smartstep Servo System.



Security



Programs can be protected by setting a password from the CX-Programmer (with the PLC online).

Password setting: Up to 8 alphanumeric characters (A-Z, a–z, 0-9)

One software, one connection, one minute

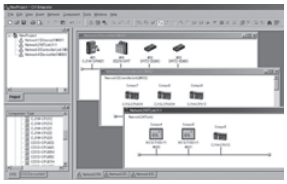
CX-One

CX-One is a single programming and configuration environment that enables the user to build, configure and program networks, PLCs, HMIs, Motion Control systems, Drives, Temperature Controllers and Sensors. The result of a single software is to reduce complexity of the configuration, allowing automation systems to be programmed or configured with minimal training.

❶ Network Software	CX-Integrator CX-Protocol CX-FLnet
❷ PLC Software	CX-Programmer CX-Simulator SwitchBox
❸ HMI Software	CX-Designer
❹ Motion Controller Software	CX-Motion CX-Motion-NCF CX-Motion-MCH CX-Position CX-Drive
❺ PLC-based Process Control Software	CX-Process Tool NS-series Face Plate Auto-Builder
❻ Component Software	CX-Thermo

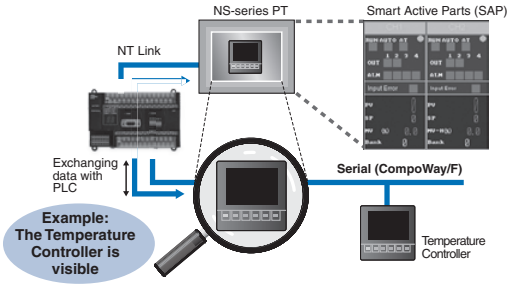
• CX-Integrator

Settings and configurations for devices can be made from any PLC in the network.



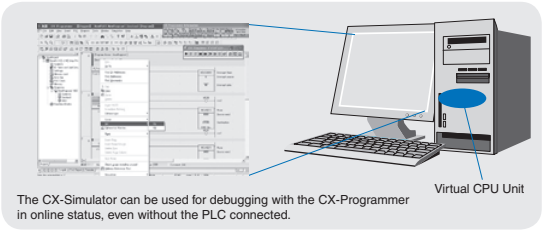
• CX-Designer

The CX-Designer can be started from the CX-Integrator. Settings such as the PLC and Unit information are passed to the CXDesigner, so you can start developing screens immediately after CX-Designer starts.



• CX-Simulator

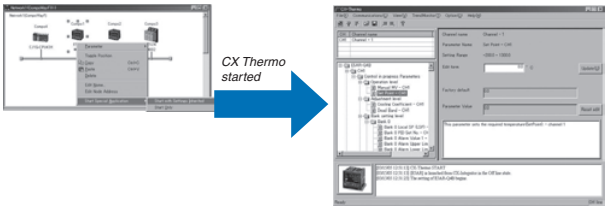
Online CPU Unit operations, such as program monitoring, I/O memory manipulation, PV monitoring, forced setting/resetting memory bits, differential monitoring, data tracing, and online editing, can be executed without the actual PLC.



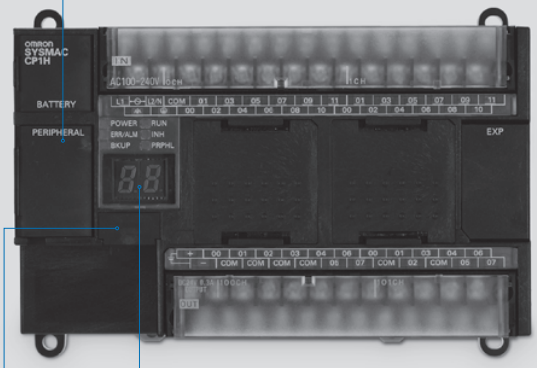
The CX-Simulator can be used for debugging with the CX-Programmer in online status, even without the PLC connected.

• CX-Thermo

The Support Software for Temperature Controllers (CX-Thermo) can be started from the CX-Integrator's Serial Communications (CompoWay/F) network.
Parameters can be created, edited, and transferred at the computer. The time required to make settings can be reduced when setting the same parameters in multiple devices.

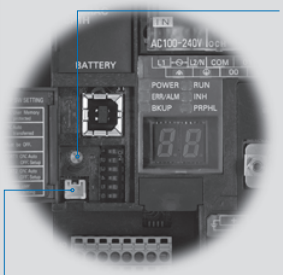


Handy built-in functions make maintenance easier



❶ Analogue Inputs Are Made Simple

An analogue control setting and an analogue input are provided.



Analogue setting

The analogue control setting has a resolution of 256 steps.
When the value is changed it is displayed (hexadecimal) for three seconds on the 7-segment display.

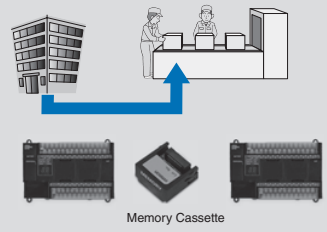
Analogue Input

This input has a resolution of 256 steps and is used for an analogue input set of 0 to 10 V. Each CP1H CPU Unit has one of these connectors built in. (The built-in analogue I/O for CP1HXA CPU Units is separate.) A device, such as a potentiometer, can be connected to enable direct manual operation and control from a control panel. The maximum cable length is 3 meters. A connecting cable (1 m) is included with the CPU Unit.

❷ Memory Cassette

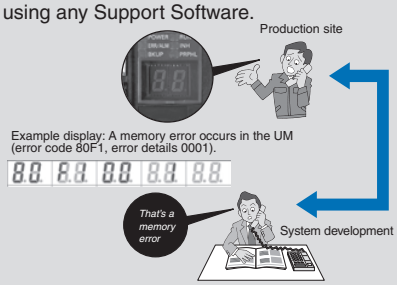
- Data, such as programs and initial memory values, can be stored on a Memory Cassette (optional) and copied to other systems.
- The Memory Cassette can also be used when installing new versions of application programs.

CP1W-ME05M
Memory Cassette



❸ 7-segment Status Display

- The 7-segment Display provides two display digits.
- In addition to displaying error codes for errors detected by the PLC, codes can be displayed on the display from the ladder program.
- The 7-segment display is useful for maintenance as well, allowing problems that arise during system operation to be grasped without using any Support Software.



❹ Battery-free Operation

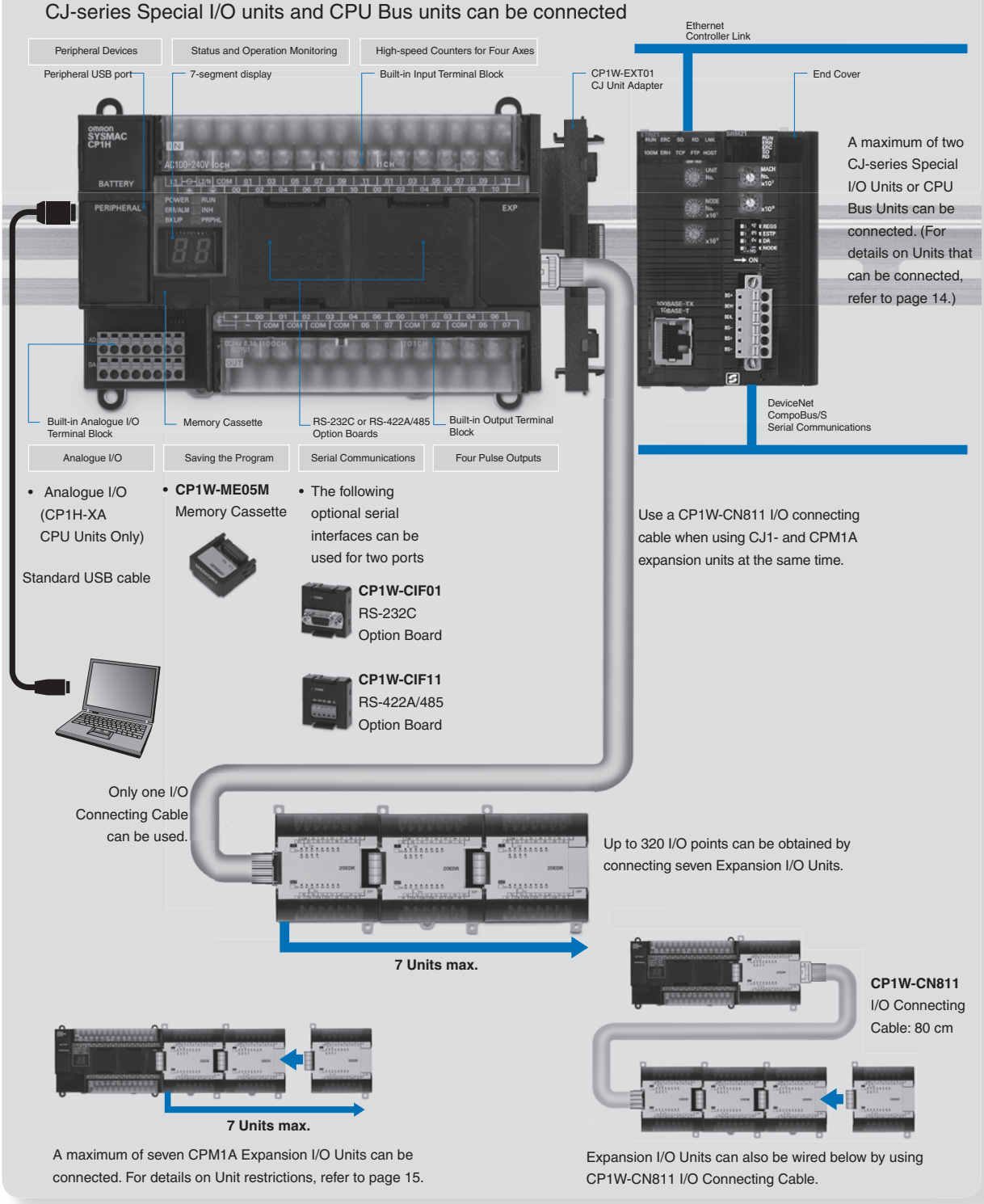
- The values in the DM Area (32 Kwords) are saved in the CPU Unit's built-in flash memory as initial values, and can be read at startup.
- Battery-free operation is also possible when saving production data and machine parameters in the DM Area, turning OFF the power, and using the same data again for the next production run.

Note:
- A battery is required for the clock function and to retain the status of HR
- Area bits and counter values.A battery is provided as a standard feature with the CPU Unit.
- The user program (ladder program) is stored in built-in flash memory, so no battery is required to back it up.

Expansion I/O units

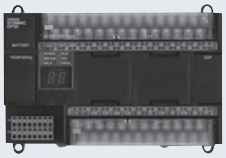
Expand as needed

CJ-series Special I/O units and CPU Bus units can be connected

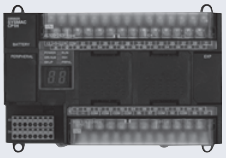


CPU unit overview

CP1H-XA40D□-□
Built-in Analogue I/O



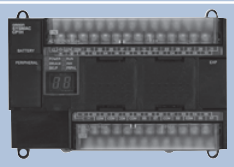
CP1H-XA40DR-A
AC power supply, 24 DC inputs,
16 relay outputs, 4 analogue inputs,
2 analogue outputs



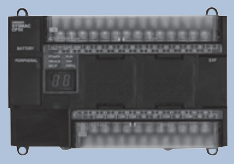
CP1H-XA40DT-D
DC power supply, 24 DC inputs,
16 transistor (sinking) outputs,
4 analogue inputs, 2 analogue outputs

CP1H-XA40DT1-D
DC power supply, 24 DC inputs,
16 transistor (sourcing) outputs,
4 analogue inputs, 2 analogue outputs

CP1H-X40D□-□
Basic Model



CP1H-X40DR-A
AC power supply, 24 DC inputs,
16 relay outputs



CP1H-X40DT-D
DC power supply, 24 DC inputs,
16 transistor (sinking) outputs

CP1H-X40DT1-D
DC power supply, 24 DC inputs,
16 transistor (sourcing) outputs

CP1H-Y20D□-□
High-speed Positioning
(To be released soon)

CP1H-Y20DT-D
DC power supply, 12 DC inputs,
8 transistor (sinking) outputs

Two 1-MHz line-driver inputs (phases A, B, and Z) and two 1-MHz line-driver outputs (CW and CCW) are provided separately.

	CP1H-XA CPU Units	CP1H-X CPU Units	CP1H-Y CPU Unit
I/O capacity	24 inputs, 16 outputs		12 inputs, 8 outputs Line-driver inputs: Phases A, B, and Z for 2 axes Line-driver outputs: CW and CCW for 2 axes
High-speed counter	100 kHz (single phase), 50 kHz (differential phases), 4 axes		1 MHz (single phase), 500 kHz (differential phases) for 2 axes (line-driver input), 100 kHz (single phase), 50 kHz (differential phases) for 2 axes (4 axes total)
Pulse output function (Models with Transistor Outputs only)	100 kHz for 2 axes and 30 kHz for 2 axes (4 axes total)		1 MHz for 2 axes (line-driver output), 100 kHz for 2 axes (4 axes total)
Serial communications	USB port (peripheral port) and 2 optional serial ports (either RS-232C or RS-422A/485 Option Boards)		
Analogue I/O	4 analogue inputs and 2 analogue outputs	-	-
Interrupt inputs Quick-response inputs (50-ms width min.)	8 inputs		6 inputs
User program capacity	20 kstep		
DM capacity	32 kwords		
Maximum number of CPM1A Expansion I/O Units	7 (Refer to page16 for Unit restrictions.)		
Maximum number of CJ-series Units	2 (CJ-series Special I/O Units and CPU Bus Units only. Refer to page 14 for information on Units that can be used.)		

• Options

CP1W-ME05M
Memory Cassette

CP1W-CIF01
RS-232C Option Board

CP1W-CIF11
RS-422A/485
Option Board

CP-series expansion units

• Expansion I/O Units

CPM1A-8ED
Input points: 8 DC input
CPM1A-8ER
Output points:
8 Relay output
CPM1A-8ET
Output points: 8 Transistor output (sinking)
CPM1A-8ET1
Output points: 8 Transistor output (sourcing)

CPM1A-20EDR1
Input points: 12 DC inputs
Output points: 8 relay outputs
CPM1A-20EDT
Input points: 12 DC inputs
Output points: 8, transistor outputs (sinking)
CPM1A-20EDT1
Input points: 12 DC inputs
Output points: 8, transistor outputs (sourcing)

CPM1A-40EDR
Input points: 24 DC inputs
Output points: 16 relay outputs
CPM1A-40EDT
Input points: 24 DC inputs
Output points: 16 transistor outputs (sinking)
CPM1A-40EDT1
Input points: 24 DC inputs
Output points: 16 transistor outputs (sourcing)

• Analogue Units

Analogue Input Unit
CPM1A-AD041
Analogue inputs: 4
(resolution: 6,000)

Analogue Output Unit
CPM1A-DA041
Analogue outputs: 4
(resolution: 6,000)

Analogue I/O Unit
CPM1A- MAD11
Analogue inputs: 2 (resolution: 6,000)
Analogue outputs: 1 (resolution: 6,000)

Analogue I/O Unit
CPM1A- MAD01
Analogue inputs: 2 (resolution: 256)
Analogue outputs: 1 (resolution: 256)

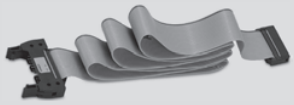
• Temperature Sensor Units

CPM1A-TS001
Thermocouple inputs: 2
CPM1A-TS002
Thermocouple inputs: 4

CPM1A-TS101
Platinum resistance
thermometer inputs: 2
CPM1A-TS102
Platinum resistance
thermometer inputs: 4

CPM1A-TS101-DA
Platinum resistance
thermometer inputs: 2
Analogue output: 1
(resolution: 256)

• I/O Connecting



CP1W-CN811
80 cm

• CompoBus/S - I/O Link Unit

CPM1A-SRT21
Input points: 8
Output points: 8

• DeviceNet I/O Link Unit

CPM1A-DRT21
Input points: 32
Output points: 32

• PROFIBUS-DP I/O Link Unit

CPM1A-PRT21
Input points: 16
Output points: 16

• CJ-series Special I/O Units and CPU Bus Units

Two CJ-series Special I/O Units or CPU Bus Units can be connected by using a CJ Unit Adapter.

CJ Unit Adapter
CP1W-EXT01

CJ-series Special I/O Units

Analogue Input Unit
CJ1W-AD□□□-V1
Analogue Output Unit
CJ1W-DA□□□
Analogue I/O Unit
CJ1W-MAD42

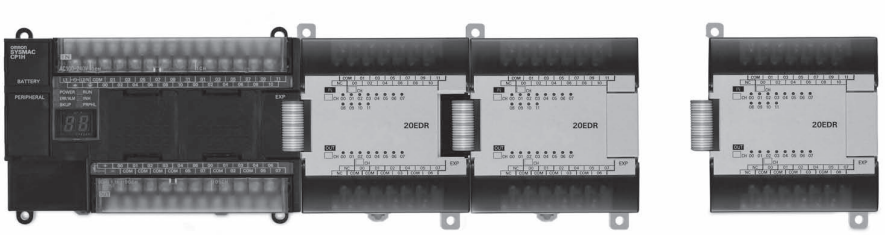
Process Input Unit
CJ1W-PTS□□
CJ1W-PDC15
Temperature Control Unit
CJ1W-TC□□□
CompoBus/S Master Unit
CJ1W-SRM21
PROFIBUS-DP Slave Unit
CJ1W-PRT21

CJ-series CPU Bus Units

Ethernet Unit
CJ1W-ETN21
Controller Link Unit
CJ1W-CLK21-V1
Serial Communications Unit
CJ1W-SCU□□-V1
DeviceNet Unit
CJ1W-DRM21
PROFIBUS-DP Master Unit
CJ1W-PRM21
CAN unit
CJ1W-CORT21

System configuration

A maximum of seven CPM1A Expansion I/O Units can be connected.



Group A

Unit type		Model
Expansion I/O Units	40 I/O points	CPM1A-40EDR
		CPM1A-40EDT
		CPM1A-40EDT1
	20 I/O points	CPM1A-20EDR1
		CPM1A-20EDT
		CPM1A-20EDT1
	8 inputs	CPM1A-8ED
	8 outputs	CPM1A-8ER
		CPM1A-8ET
		CPM1A-8ET1
Analogue Unit	2 analogue inputs, 1 analogue output	CPM1A-MAD01
		CPM1A-MAD11
Temperature Sensor Units	2 thermocouple inputs	CPM1A-TS001
	2 platinum resistance thermometer inputs	CPM1A-TS101
	2 platinum resistance thermometer inputs, 1 analogue output	CPM1A-TS101-DA
CompoBus/S I/O Link Unit	8 inputs, 8 outputs	CPM1A-SRT21
DeviceNet I/O Link Unit	32 inputs, 32 outputs	CPM1A-DRT21
PROFIBUS-DP I/O Link Unit	16 inputs, 16 outputs	CPM1A-PRT21

Group B Units that each count as two units

Unit type		Model
Analogue Units	4 analogue inputs	CPM1A-AD041
	4 analogue outputs	CPM1A-DA041
Temperature Sensor Units	4 thermocouple inputs	CPM1A-TS002
	4 platinum resistance thermometer inputs	CPM1A-TS102

CJ-series Special I/O Units and CPU Bus Units

A maximum of two CJ-series Special I/O Units or CPU Bus Units can be connected by using a CP1W-EXT01 CJ Unit Adapter.

CJ-series Special I/O Units				CJ-series CPU Bus Units	
Unit name	Model	Unit name	Model	Unit name	Model
Analogue Input Units	CJ1W-AD081-V1	Process Input Units	CJ1W-PDC15	Serial Communications Units	CJ1W-SCU41-V1
	CJ1W-AD041-V1	Temperature Control Units	CJ1W-TC001		CJ1W-SCU21-V1
Analogue Output Units	CJ1W-DA08V		CJ1W-TC002	Ethernet Unit	CJ1W-ETN21
	CJ1W-DA08C		CJ1W-TC003	DeviceNet Unit	CJ1W-DRM21
	CJ1W-DA041		CJ1W-TC004	Controller Link Unit	CJ1W-CLK21-V1
	CJ1W-DA021		CJ1W-TC101	PROFIBUS-DP Master Unit	CJ1W-PRM21
Analogue I/O Unit	CJ1W-MAD42		CJ1W-TC102	CAN Unit	CJ1W-CORT21
Process Input Units	CJ1W-PTS51		CJ1W-TC103		
	CJ1W-PTS52		CJ1W-TC104		
	CJ1W-PTS15	CompoBus/S Master Unit	CJ1W-SRM21		
	CJ1W-PTS16	PROFIBUS-DP Slave Unit	CJ1W-PRT21		

Specifications

CPU Unit Specifications

Item	AC power supply models: CP1H-□□□-A	DC power supply models: CP1H-□□□-D
Power Supply	100 to 240 VAC 50/60 Hz	24 VDC
Operating voltage range	85 to 264 VAC	20.4 to 26.4 VDC (21.6 to 26.4 VDC with four or more Expansion Units.)
Power consumption	Can be used for backing up programs or auto-booting.	50 W max.
Inrush current	100 to 120 VAC inputs: 20 A max. 8 ms max./200 to 240 VAC inputs: 40 A max. 8 ms max.	30 A max. 20 ms max.
External power supply	300 mA at 24 VDC	None
Insulation resistance	20 MΩmin. (at 500 VDC) between the external AC terminals and GR terminals	20 MΩmin. (at 500 VDC) between the external DC terminals and GR terminals
Dielectric strength	2,300 VAC at 50/60 Hz for 1 min between the external AC and GR terminals, leakage current: 5 mA max.	1,000 VAC at 50/60 Hz for 1 min between the external DC and GR terminals, leakage current: 5 mA max.
Noise immunity	Conforming to IEC 61000-4-4. 2 kV (power supply line)	
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s2 in X, Y, and Z directions for 80 minutes each (Sweep time: 8 minutes x 10 sweeps = total time 80 minutes)	
Shock resistance	147 m/s2, three times each in X, Y, and Z directions	
Ambient operating temperature	0 to 55°C	
Ambient humidity	10% to 90% (with no condensation)	
Ambient operating environment	No corrosive gas	
Ambient storage temperature	-20 to 75°C (Excluding battery.)	
Power holding time	10 ms min.	2 ms min.
Dimensions	150 x 90 x 85 mm (W x H x D)	
Weight	740 g max.	590 g max.

Item		XA CPU Units: CP1H-XA□□□-□	X CPU Units: CP1H-X□□□-□	Y CPU Units: CP1H-Y□□□-□
Control method		Stored program method		
I/O control method		Cyclic scan with immediate refreshing		
Program language		Ladder diagram		
Function blocks		Maximum number of function block defi nitions: 128 Maximum number of instances: 256 Languages usable in function block defi nitions: Ladder diagrams, structured text (ST)		
Instruction length		1 to 7 steps per instruction		
Instructions		Approx. 400 (function codes: 3 digits)		
Instruction execution time		Basic instructions: 0.10 ìs min. Special instructions: 0.15 ìs min.		
Common processing time		0.7 ms		
Program capacity		20 Ksteps		
Number of tasks		288 (32 cyclic tasks and 256 interrupt tasks) Scheduled interrupt tasks: 1 (interrupt task No. 2, fi xed) Input interrupt tasks: 8 (interrupt task No. 140 to 147, fi xed), 6 for Y CPU Units High-speed counter interrupt tasks: 256 (interrupt task No. 0 to 255)		
Maximum subroutine number		256		
Maximum jump number		256		
I/O areas	Input bits	1,600 bits (100 words): CIO 0.00 to CIO 99.15 (The 24 built-in inputs are allocated in CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11.)		
	Output bits	1,600 bits (100 words): CIO 100.00 to CIO 199.15 (The 16 built-in outputs are allocated in CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07.)		
	Built-in Analog Inputs	CIO 200 to CIO 203		
	Built-in Analog Outputs	CIO 210 to CIO 211		
	Serial PLC Link Area	1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189)		
Work bits		8,192 bits (512 words): W000.00 to W511.15 (W0 to W511) 37,504 bits (2,344 words): CIO 3800.00 to CIO 6143.15 (CIO 3800 to CIO 6143)		
TR Area		16 bits: TR0 to TR15		
Holding Area		8,192 bits (512 words): H0.00 to H511.15 (H0 to H511)		
AR Area		Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447) Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959)		
Timers		4,096 bits: T0 to T4095		
Counters		4,096 bits: C0 to C4095		
DM Area (See note.)		32 Kwords: D0 to D32767		
Data Register Area		16 registers (16 bits): DR0 to DR15		
Index Register Area		6 registers (16 bits): IR0 to IR15		
Task Flag Area		32 flags (32 bits): TK0000 to TK0031		
Trace Memory		4,000 words (500 samples for the trace data maximum of 31 bits and 6 words.)		
Memory Cassette		A special Memory Cassette (CP1W-ME05M) can be mounted. Note: Can be used for program backups and auto-booting.		
Clock function		Supported. Accuracy (monthly deviation): -3.5 min to -0.5 min (ambient temperature: 55°C), -1.5 min to +1.5 min (ambient temperature: 25°C), -3 min to +1 min (ambient temperature: 0°C)		
Communications functions		One built-in peripheral port (USB1.1): For connecting Support Software only. A maximum of two Serial Communications Option Boards can be mounted.		
Memory backup		Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to fl ash memory as initial values. Battery backup: The Holding Area, DM Area, and counter values (fl ags, PV) are backed up by a battery.		
Battery service life		5 years at 25 °C. (Use the replacement battery within two years of manufacture.)		
Built-in input terminals		40 (24 inputs, 16 outputs)		20 (12 inputs, 8 outputs) Line-driver inputs: Two axes for phases A, B, and Z Line-driver outputs: Two axes for CW and CCW
Number of connectable Expansion (I/O) Units		CPM1A Expansion I/O Units: 7 max.; CJ-series Special I/O Units or CPU Bus Units: 2 max.		
Max. number of I/O points		320 (40 built in + 40 per Expansion (I/O) Unit x 7 Units)		300 (20 built in + 40 per Expansion (I/O) Unit x 7 Units)

Item	XA CPU Units: CP1H-XA□□□-□	X CPU Units: CP1H-X□□□-□	Y CPU Units: CP1H-Y□□□-□
Interrupt inputs	8 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)		6 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)
Interrupt inputs counter mode	8 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits		6 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits
Quick-response inputs	8 points (Min. input pulse width: 50 ìs max.)		6 points (Min. input pulse width: 50 ìs max.)
Scheduled interrupts	1		
High-speed counters	4 inputs: Differential phases (4x), 50 kHz or single phase (pulse plus direction, up/down, increment), Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison		2 inputs: Differential phases (4x), 500 kHz or single phase, 1 MHz and 2 inputs: Differential phases (4x), 50 kHz or single phase (pulse plus direction, up/down, increment), 100 kHz Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison
Pulse outputs (models with transistor outputs only)	Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fi xed) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction) 2 outputs, 1 Hz to 30 kHz (CCW/CW or pulse plus direction) PWM outputs :(Duty ratio: 0.0% to 100.0% (Unit: 0.1%)) 2 outputs, 0.1 to 1 kHz (Accuracy: ±5% at 1 kHz)		Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fi xed) 2 outputs, 1 Hz to 1 MHz (CCW/CW or pulse plus direction) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction) PWM outputs :(Duty ratio: 0.0% to 100.0% (Unit: 0.1%)) 2 outputs, 0.1 to 1 kHz (Accuracy: ±5% at 1 kHz)
Built-in analog I/O terminals	4 analogue inputs and 2 analogue outputs (Refer to separate detailed specifi cations.)	None	
Analogue control	1 (Setting range: 0 to 255)		
External analogue input	1 input (Resolution: 1/256, Input range: 0 to 10 V)		

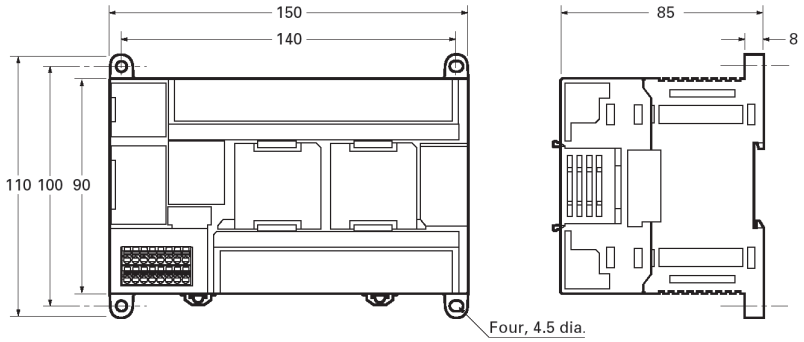
Serial Communications Specifications

Item	Function	Interface
Peripheral USB port	For connecting Peripheral Device.	Conforms to USB 1.1, B-type connector
Serial port 1	Host Link, No-protocol, NT Link (1: N), Serial PLC Link (See note.), Serial Gateway (CompoWay/F master, Modbus-RTU master), Modbus-RTU easy master function	The CP1W-CIF01 RS-232C Option Board  or the CP1W-CIF11 RS-422A/485 Option Board  can be used with either port.
Serial port 2	Host Link, No-protocol, NT Link (1: N), Serial PLC Link (See note.), Serial Gateway (CompoWay/F master, Modbus-RTU master), Modbus-RTU easy master function	

Analogue I/O Specifications (CP1H-XA CPU Units Only)

Item		Voltage I/O	Current I/O
Analogue Input Section	Number of analog inputs	4	
	Input signal range	0 to 5 V, 1 to 5 V, 0 to 10 V, or -10 to 10 V	0 to 20 mA or 4 to 20 mA
	Max. rated input	±15 V	±30 mA
	External input impedance	1 MΩ min.	Approx. 250
	Resolution	1/6,000 or 1/12,000 (full scale)	
	Overall accuracy	25 °C: ±0.3% full scale/0 to 55 °C: ±0.6% full scale	25°C: ±0.4% full scale/0 to 55°C: ±0.8% full scale
	A/D conversion data	Full scale for -10 to 10 V: F448 (E890) to 0BB8 (1770) Hex Full scale for other ranges: 0000 to 1770 (2EE0) Hex	
	Averaging	Supported (Set for individual inputs in the PLC Setup.)	
	Open-circuit detection	Supported (Value when disconnected: 8000 Hex)	
Analogue Output Section	Number of outputs	2 outputs	
	Output signal range	0 to 5 V, 1 to 5 V, 0 to 10 V, or -10 to 10 V	0 to 20 mA or 4 to 20 mA
	Allowable external output load resistance	1 kΩ min.	600 Ω max.
	External output impedance	0.5 max.	
	Resolution	1/6,000 or 1/12,000 (full scale)	
	Overall accuracy	25 °C: ±0.4% full scale/0 to 55 °C: ±0.8% full scale	
	D/A conversion data	Full scale for -10 to 10 V: F448 (E890) to 0BB8 (1770) hex Full scale for other ranges: 0000 to 1770 (2EE0) hex	
Conversion time		1 ms/point	
Isolation method		Photocoupler isolation between analogue I/O terminals and internal circuits. No isolation between analogue I/O signals.	

Dimensions CP1H CPU Units



Ordering Information

CPU Units

CPU Unit	Specifications				Model	Standards
	Power Supply	Output method	Inputs	Outputs		
CP1H-X CPU Units Memory capacity: 20 Ksteps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes 30 kHz, 2 axes	AC	Relay	24	16	CP1H-X40DR-A	CE, N
	DC	Transistor (sinking)			CP1H-X40DT-D	CE, N
		Transistor (sourcing)			CP1H-X40DT1-D	CE, N
CP1H-XA CPU Units Memory capacity: 20 Ksteps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 Hz, 2 axes 30 kHz, 2 axes Analogue inputs: 4 Analogue outputs: 2	AC	Relay	24	16	CP1H-XA40DR-A	CE, N
	DC	Transistor (sinking)			CP1H-XA40DT-D	CE, N
		Transistor(sourcing)			CP1H-XA40DT1-D	CE, N
CP1H-Y CPU Units Memory capacity: 20 Ksteps High-speed counters:1 MHz, 2 axes 100 kHz, 2 axes Pulse outputs: 1 MHz, 2 axes 30 kHz, 2 axes	DC	Transistor (sinking)	12+line-driver input, 2 axes	8 +line-driver input, 2 axes	CP1H-Y20DT-D (To be released soon.)	-

Options (for CPU Units)

Name	Specifications	Model	Standards
RS-232C Option Board	For CPU Unit option port.	CP1W-CIF01	CE, N
RS-422A/485 Option Board	For CPU Unit option port.	CP1W-CIF11	CE, N
Memory Cassette	Can be used for backing up programs or auto-booting.	CP1W-ME05M	CE, N

Maintenance Products

Name	Specifications	Model	Standards
Battery Set	For CP1H CPU Units (Use batteries within two years of manufacture.)	CJ1W-BAT01	CE
DIN Track	Length: 0.5 m; Height: 7.3 mm	PFP-50N	
	Length: 1 m; Height: 7.3 mm	PFP-100N	
	Length: 1 m; Height: 16 mm	PFP-100N2	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.	PFP-M	

I/O Connecting Cable

Name	Specifications	Model	Standards
I/O Connecting Cable	80 cm (for CPM1A Expansion Units)	CP1W-CN811	CE, N

Programming Devices

Name	Specifications		Model	Standards
CX-One FA Integrated Tool Package	CX-One is a package that integrates the Support Software for OMRON PLCs and components. CX-One runson the following OS. OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP CX-One Includes CX-Programmer Ver.6.® and CX-Simulator Ver.1.®.For details, refer to the CX-One catalog (Cat. No. R134). For CPU Unit option port. Can be used for backing up programs or auto-booting.	One license	CXONE-AL01C-E	-
		Three licenses	CXONE-AL03C-E	-
		Ten licenses	CXONE-AL10C-E	-
Computer Connecting Cable for CP1W-CIF01 RS-232C Option Board (See note.)	D-Sub 9-pin (Length: 2.0 m)	For anti-static connectors	XW2Z-200S-CV	-
	D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-CV	-
	D-Sub 9-pin (Length: 2.0 m)		XW2Z-200S-V	-
	D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-V	-
USB-Serial Conversion Cable *1	USB-RS-232C Conversion Cable (Length: 0.5 m) and PC Complies with USB Specifi cation 1.1 On personal computer side: USB (A plug connector, male) On PLC side: RS-232C (D-sub 9-pin, male) Driver: Supported by Windows 98, Me, 2000, and XP		CS1W-CIF31	-

*1 Cannot be used with a peripheral USB port. To connect to a personal computer via a peripheral USB port, use commercially-available USB cable (A to B type, male).

Technical Documentation

Name	Standards
CP1H CPU Unit Operation Manual	W450-E1
CP1H CPU Unit Programming Manual	W451-E1

Expansion Units

Name	Output method	Input	Output	Model	Standard
Expansion I/O Units	Relay	24	16	CPM1A-40EDR	CE, N
	Transistor (sinking)			CPM1A-40EDT	CE, N
	Transistor output (sourcing)			CPM1A-40EDT1	CE, N
	elay	12	8	CPM1A-20EDR1	U, C, CE
	Transistor (sinking)			CPM1A-20EDT	U, C, N, CE
	Transistor output (sourcing)			CPM1A-20EDT1	U, C, N, CE
	-	8	-	CPM1A-8ED	U, C, N, CE
	Relay	-	8	CPM1A-8ER	U, C, N, CE
	Transistor (sinking)	-	8	CPM1A-8ET	U, C, N, CE
	Transistor output (sourcing)			CPM1A-8ET1	U, C, N, CE
Analogue Input Unit	Analogue (resolution: 1/6000)	4	-	CPM1A-AD041	U, C, N, CE
Analogue Output Unit	Analogue (resolution: 1/6000)	-	4	CPM1A-DA041	UC1, CE
Analogue I/O Units	Analogue (resolution: 1/256)	2	1	CPM1A-MAD01	UC1, CE
	Analogue (resolution: 1/6000)	2	1	CPM1A-MAD11	U, C, N, CE
DeviceNet I/O Link Unit	-	32 (I/O link bits)	32 (I/O link bits)	CPM1A-DRT21	U, C, CE
CompoBus/S I/O Link Unit	-	8 (I/O link bits)	8 (I/O link bits)	CPM1A-SRT21	U, C, N, CE
PROFIBUS-DP I/O Link Unit		16 (I/O link bits)	16 (I/O link bits)	CPM1A-PRT21	CE
Temperature Sensor Units	2 thermocouple inputs			CPM1A-TS001	U, C, N, CE
	4 thermocouple inputs			CPM1A-TS002	U, C, N, CE
	2 platinum resistance thermometer inputs			CPM1A-TS101	U, C, N, CE
	4 platinum resistance thermometer inputs			CPM1A-TS102	U, C, N, CE
	2 platinum resistance thermometer inputs, 1 Analogue output (resolution: 256)			CPM1A-TS101-DA	U, C, L, CE

CJ-series Special I/O Units and CPU Bus Units

Category	Name	Specifications	Model	Standard
CP1H CPU Unit options	CJ Unit Adapter	Adapter for connecting CJ-series Special I/O Units and CPU Bus Units (includes CJ-series End Cover)	CP1W-EXT01	UC1, CE, N, L
CJ-series Special I/O Units	Analogue Input Units	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000; Conversion speed: 250 ìs/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD081-V1	
		4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000; Conversion speed: 250 ìs/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD041-V1	
	Analogue Output Units	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8000, 250 ìs/output)	CJ1W-DA08V	
		8 outputs (4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8,000, 250 ìs/ output)	CJ1W-DA08C	UC1, CE, N
		4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000, Conversion speed: 1 ms/point max.	CJ1W-DA041	UC1, CE, N, L
		2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max.	CJ1W-DA021	
	Analogue I/O Unit	4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4000; Conversion speed: 1 ms/point max. (Can be set to 1/8,000, 250 ìs/point)	CJ1W-MAD42	
	Process Input Units	4 inputs, B, J, K, L, R, S, T; Conversion speed: 250 ms/4 inputs	CJ1W-PTS51	UC1, CE
		4 inputs, Pt100 Ù (JIS, IEC), JPt100 Ù, Conversion speed: 250 ms/4 inputs	CJ1W-PTS52	
		2 inputs, B, E, J, K, L, N, R, S, T, U, W, Re5-26, PL ±100 mV, Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS15	
		2 inputs, Pt100, JPt100, Pt50, Ni508.4; Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS16	
		2 inputs, 0 to 1.25 V, -1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, -5 to 5 V, 0 to 10 V, -10 to 10V, ±10 V selectable range, 0 to 20 mA, 4 to 20 mA	CJ1W-PDC15	
	Temperature Control Units	4 loops, thermocouple input, NPN output	CJ1W-TC001	UC1, CE, N, L
		4 loops, thermocouple input, PNP output	CJ1W-TC002	
		2 loops, thermocouple input, NPN output, heater burnout detection function	CJ1W-TC003	
		2 loops, thermocouple input, PNP output, heater burnout detection function	CJ1W-TC004	
		4 loops, platinum resistance thermometer input, NPN output	CJ1W-TC101	
		4 loops, platinum resistance thermometer input, PNP output	CJ1W-TC102	
		22 loops, platinum resistance thermometer input, NPN output, heater burnout detection function	CJ1W-TC103	
		2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function	CJ1W-TC104	
	CompoBus/S Master Unit	CompoBus/S remote I/O, 256 points max.	CJ1W-SRM21	
	PROFIBUS-DP Slave Unit	Exchanges up to 180 words in any memory area with a PROFIBUS-DP Master Unit	CJ1W-PRT21	UC, CE
CJ-series CPU Bus Units	Controller Link Units	Wired (Shielded twisted-pair cable)	CJ1W-CLK21-V1	UC1, CE, N, L
	Serial Communications Units	1 RS-232C port and 1 RS-422A/485 port	CJ1W-SCU41-V1	
		2 RS-232C ports	CJ1W-SCU21-V1	
	Ethernet Unit	100Base-TX	CJ1W-ETN21	
	DeviceNet Unit	Functions as master and/or slave; allows control of 32,000 points max. per master.	CJ1W-DRM21	
	PROFIBUS-DP Master Unit	Controls up to 7000 words of remote I/O data over PROFIBUS-DP	CJ1W-PRM21	UC, CE
	CAN Unit	Can send and/or receive any CAN-Message	CJ1W-CORT21	CE

Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
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11. Shipping; Delivery. Unless otherwise expressly agreed in writing by Omron:
    a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
    b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. Claims. Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
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   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
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ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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