OMRON

Programmable Controllers

CS1

Multiple-application Controllers with a Wide Range of Functions

» High Performance

» Human Efficiency

» Heritage

realizing

General Specifications

Power Supply Unit model Item	Specifications						
	C200HW-PA204	**C200HW-PA204C**	**C200HW-PA204R**	**C200HW-PA204S**	**C200HW-PA209R**	**C200HW-PD024**	**C200HW-PD025**
Power supply voltage	100 to 240 VAC (wide range), 50/60 Hz ∗1			100 to 120 VAC/200 to 240 V, 50/60 Hz		24 VDC	
Operating voltage range	85 to 264 VAC			85 to 132 VAC/170 to 264 V		19.2 to 28.8 VDC	
Power consumption	120 VA max.	100 VA max.	120 VA max.		180 VA max.	50 W max.	60 W max.
Inrush current	100 to 120 VAC input 15 A/8 ms max. (cold start at room temperature) 200 to 240 VAC input 30 A/8 ms max. (cold start at room temperature)			100 to 120 VAC input 20 A/8 ms max. (cold start at room temperature) 200 to 240 VAC input 30 A/8 ms max. (cold start at room temperature)	100 to 120 VAC: 30 A max. 200 to 240 VAC: 40 A max.	30 A max.	
Insulation resistance	20 MΩ min. (at 500 VDC) between AC external and GR terminals ∗2	• 20 MΩ min. (at 500 VDC) between all AC external terminals and GR terminal and between all alarm output terminals. • 20 MΩ min. (at 250 VDC) between all alarm output terminals and GR terminal.	20 MΩ min. (at 500 VDC) between all AC external and GR terminals ∗2			20 MΩ min. (at 500 VDC) between all DC external and GR terminals ∗2	
Dielectric strength	2,300 VAC 50/60 Hz for 1 min between AC external and GR terminals ∗2 Leakage current: 10 mA max.	• 2,300 VAC, 50/60 Hz for 1 minute between all AC external terminals and GR terminal and between all alarm output terminals. Leakage current: 10 mA max. • 1,000 VAC, 50/60 Hz for 1 minute between all alarm output terminals and GR terminal. Leakage current: 10 mA max.	2,300 VAC 50/60 Hz for 1 min between all AC external and GR terminals ∗2 Leakage current: 10 mA max.			1,000 VAC 50/60 Hz for 1 min between all DC external and GR terminals ∗2 Leakage current: 10 mA max.	
	1,000 VAC 50/60 Hz for 1 min between all DC external and GR terminals ∗2 Leakage current: 10 mA max.						
Noise immunity	2 kV on power supply line (conforming to IEC61000-4-4)						
Vibration resistance	Conforms to JIS 0040, 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 (Time coefficient: 8 minutes x coefficient factor 10 = total time 80 min.) (CPU Unit mounted to a DIN track: 2 to 55 Hz, 2.9 m/s² in X, Y, and Z directions for 20 minutes)						
Shock resistance	Conforms to JIS 0041, 147 m/s² 3 times each in X, Y, and Z directions						
Ambient operating temperature	0 to 55°C						
Ambient operating humidity	10% to 90% (with no condensation)	10% to 90% (with no condensation) ∗4	10% to 90% (with no condensation)				
Ambient operating atmosphere	No corrosive gases						
Ambient storage temperature	-20 to 75°C (excluding battery)						
Grounding	Less than 100 Ω						
Enclosure	Mounted in a panel.						
Weight	Each Rack: 6 kg max.						
CPU Rack dimensions (mm)	2 slots: 198.5 x 157 x 123 (W x H x D) ∗3 3 slots: 260 x 130 x 123 (W x H x D) ∗3 5 slots: 330 x 130 x 123 (W x H x D) ∗3 8 slots: 435 x 130 x 123 (W x H x D) ∗3 10 slots: 505 x 130 x 123 (W x H x D) ∗3						
Standards	Conforms to UL, CSA, cULus, NK, Lloyds, and EC Directives.						

∗1. C200HW-PA204/PA204R Power Supply Units shipped before March 2010 have power supply voltage specifications of 100 to 120 VAC/200 to 240 VAC, 50/60 Hz.

∗2. Disconnect the Power Supply Unit's LG terminal from the GR terminal when testing insulation and dielectric strength.
Testing the insulation and dielectric strength with the LG terminal and the GR terminals connected will damage internal circuits in the CPU Unit.

∗3. The depth is 153 mm for the C200HW-PA209R/PD025 Power Supply Unit. The depth is 111 mm for the C200HW-PA204C Power Supply Unit.

∗4. Maintain an ambient storage temperature of -25 to 30°C and relative humidity of 25% to 70% when storing the C200HW-PA204C for longer than 3 months to keep the replacement notification function in optimum working condition.

Common Specifications for CPU Units

Item		Specifications	
Control method		Stored program	
I/O control method		Cyclic scan and immediate processing are both possible.	
Programming		•Ladder diagrams •SFC (sequential function charts) •ST (structured text) •Mnemonics	
Instruction length		1 to 7 steps per instruction	
Ladder instructions		Approx. 400 (3-digit function codes)	
Execution time	Basic instructions	0.02 μs min.	
	Special instructions	0.04 μs min.	
Number of tasks		288 (cyclic tasks: 32, interrupt tasks: 256) **Note 1:** Cyclic tasks are executed each cycle and are controlled with TKON(820) and TKOF(821) instructions. **2:** The following 4 types of interrupt tasks are supported. Power OFF interrupt tasks: 1 max. Scheduled interrupt tasks: 2 max. I/O interrupt tasks: 32 max. External interrupt tasks: 256 max.	
Interrupt types		Scheduled Interrupts: Interrupts generated at a time scheduled by the CPU Unit's built-in timer. I/O Interrupts: Interrupts from Interrupt Input Units. Power OFF Interrupts: Interrupts executed when the CPU Unit's power is turned OFF. External I/O Interrupts: Interrupts from the Special I/O Units, CS-series CPU Bus Units, or the Inner Board.	
Function blocks *1		Languages in function block definitions: ladder programming, structured text	
CIO (Core I/O) Area	I/O Area	5,120: CIO 000000 to CIO 031915 (320 words from CIO 0000 to CIO 0319) The setting of the first word can be changed from the default (CIO 0000) so that CIO 0000 to CIO 0999 can be used. I/O bits are allocated to Basic I/O Units, such as CS-series Basic I/O Units, C200H Basic I/O Units, and C200H Group-2 High-density I/O Units.	The CIO Area can be used as work bits if the bits are not used as shown here.
	Link Area	3,200 (200 words): CIO 10000 to CIO 119915 (words CIO 1000 to CIO 1199) Link bits are used for data links and are allocated to Units in Controller Link Systems and PLC Link Systems.	
	CPU Bus Unit Area	6,400 (400 words): CIO 150000 to CIO 189915 (words CIO 1500 to CIO 1899) CS-series CPU Bus Unit bits store the operating status of CS-series CPU Bus Units. (25 words per Unit, 16 Units max.)	
	Special I/O Unit Area	15,360 (960 words): CIO 200000 to CIO 295915 (words CIO 2000 to CIO 2959) Special I/O Unit bits are allocated to CS-series Special I/O Units and C200H Special I/O Units. (See Note.) (10 words per Unit, 96 Units max. The maximum total number of slots, however, is limited to 80 including expansion slots, so the maximum number of Units is actually 80. **Note:** A maximum of 16 C200H Special I/O Units can be mounted. Also, depending on the Units, the maximum may be 10. Some I/O Units are classified as Special I/O Units.	
	Inner Board Area	1,600 (100 words): CIO 190000 to CIO 199915 (words CIO 1900 to CIO 1999) Inner Board bits are allocated to Inner Boards. (100 I/O words max.)	
	SYSMAC BUS Area	800 (50 words): CIO 300000 to CIO 304915 (words CIO 3000 to CIO 3049) SYSMAC BUS bits are allocated to Slave Racks connected to SYSMAC BUS Remote I/O Master Units. (10 words per Rack, 5 Racks max.)	
	I/O Terminal Area	512 (32 words): CIO 310000 to CIO 313115 (words CIO 3100 to CIO 3131) I/O Terminal bits are allocated to I/O Terminal Units (but not to Slave Racks) connected to SYSMAC BUS Remote I/O Master Units. (1 word per Terminal, 32 Terminals max.)	
	C200H Special I/O Unit Area	8,192 bits (512 words): W00000 to W51115 (W000 to W511) C200H Special I/O Unit bits are allocated to C200H Special I/O Units, and accessed separately from I/O refreshing.	
	DeviceNet Area	1,600 (100 words): Outputs: CIO 005000 to CIO 009915 (words CIO 0050 to CIO 0099) Inputs: CIO 035000 to CIO 039915 (words CIO 0350 to CIO 0399) DeviceNet bits are allocated to Slaves according to DeviceNet remote I/O communications.	
	PLC Link Area	64 bits (4 words): CIO 024700 to CIO 025015 (words CIO 0247 to CIO 0250) When a PLC Link Unit is used in a PLC Link, use these bits to monitor PLC Link errors and the operating status of other CPU Units in the PLC Link.	
Internal I/O Area		4,800 (300 words): CIO 120000 to CIO 149915 (words CIO 1200 to CIO 1499) 37,504 (2,344 words): CIO 380000 to CIO 614315 (words CIO 3800 to CIO 6143) These bits in the CIO Area are used as work bits in programming to control program execution. (They cannot be used for external I/O.)	
Work Area		8,192 bits (512 words): H00000 to H51115 (H000 to H511) These bits in the CIO Area are used as work bits in programming to control program execution. (They cannot be used for external I/O.) When using work bits in programming, use the bits in the Work Area first before using bits from other areas.	
Holding Area		8,192 bits (512 words): H00000 to H51115 (H000 to H511) Holding bits are used to control the execution of the program, and maintain their ON/OFF status when the PLC is turned OFF or the operating mode is changed. **Note:** The Function Block Holding Area words are allocated from H512 to H1535. These words can be used only for the function block instance area (internally allocated variable area).	
Auxiliary Area		Read only: 7,168 bits (448 words): A00000 to A44715 (words A000 to A447) Read/write: 8,192 bits (512 words): A44800 to A95915 (words A448 to A959) Auxiliary bits are allocated specific functions.	
Temporary Area		16 bits (TR0 to TR15) Temporary bits are used to temporarily store the ON/OFF execution conditions at program branches.	
Timer Area		4,096: T0000 to T4095 (separate from counters) **Note:** The time units for timer settings are 0.1 s, 0.01 s, and 0.001 s (depending on the timer instruction that is used).	
Counter Area		C0000 to C4095 (separate from timers)	
DM Area		32K words: D00000 to D32767 Internal Special I/O Unit DM Area: D20000 to D29599 (100 words x 96 Units) Used to set parameters for Special I/O Units. CPU Bus Unit DM Area: D30000 to D31599 (100 words x 16 Units) Used to set parameters for CPU Bus Units. Inner Board DM Area: D32000 to D32099 Used to set parameters for Inner Boards. Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in the DM Area maintain their status when the PLC is turned OFF or the operating mode is changed.	

Item		Specifications
EM Area		32K words per bank, 13 banks max.: E0_00000 to EC_32767 max. (Varies by CPU Unit model.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in the EM Area maintain their status when the PLC is turned OFF or the operating mode is changed. The EM Area is divided into banks, and the addresses can be set by either of the following methods. Changing the current bank using the EMBC(281) instruction and setting addresses for the current bank. Setting bank numbers and addresses directly. EM data can be stored in files by specifying the number of the first bank.
Data Registers		DR0 to DR15: Store offset values for indirect addressing. One register is 16 bits (1 word).
Index Registers		IR0 to IR15: Store PLC memory addresses for indirect addressing. One register is 32 bits (2 words).
Task Flag Area		32 (TK0000 to TK0031): Task Flags are read-only flags that are ON when the corresponding cyclic task is executable and OFF when the corresponding task is not executable or in standby status.
Trace Memory		4,000 words (The maximum amount of data that can be traced in a data trace is 500 samples for 31 bits and 6 words.
File Memory		Memory Cards: Compact flash memory cards can be used (MS-DOS format). EM file memory: Part of the EM Area can be converted to file memory (MS-DOS format).
Functions	Parallel Processing Modes	Program execution and peripheral servicing can be performed simultaneously.
	Battery-free operation	The user program and the system's parameters are backed up automatically in flash memory, which is standard equipment.
	Constant cycle time	Possible (1 to 32,000 ms) (Unit: 1 ms)
	Cycle time monitoring	Possible (Unit stops operating if the cycle is too long): 10 to 40,000 ms (Unit: 10 ms)
	I/O refreshing	Cyclic refreshing, immediate refreshing, refreshing with I/O REFRESH instruction
	I/O memory holding when changing operating modes	Possible (Depends on the ON/OFF status of the IOM Hold Bit in the Auxiliary Area.)
	Load OFF	All outputs on Output Units can be turned OFF.
	Input response time setting	Time constants can be set for inputs from Basic I/O Units. The time constant can be increased to reduce the influence of noise and chattering or it can be decreased to detect shorter pulses on the inputs (CS1 Basic I/O Units only).
	Startup mode setting	Supported.
	Memory Card functions	Automatically reading programs (autoboot) from the Memory Card when the power is turned ON.
		Format in which data is stored in Memory Card — User program: Program file format / PLC Setup and other parameters: Data file format (binary format) / I/O memory: Data file format (binary format), text format, or CSV format
		Functions for which Memory Card read/write is supported — User program instructions, Programming Devices (including Programming Consoles), Host Link computers
	Filing	Memory Card data and the EM (Extended Data Memory) Area can be handled as files.
	Debugging	Control set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed), storing location generating error when a program error occurs
	Online editing	User programs can be overwritten in program-block units when the CPU Unit is in MONITOR or PROGRAM mode. (This function is not available for block programming areas.)
	Program protection	Overwrite protection: Set using DIP switch. Copy protection: Password set using Programming Device.
	Error check	User-defined errors (i.e., user can define fatal errors and non-fatal errors) The FPD(269) instruction can be used to check the execution time and logic of each programming block.
	Error log	Up to 20 errors are stored in the error log. Information includes the error code, error details, and the time the error occurred.
	Serial communications	Built-in peripheral port: Programming Device (including Programming Console) connections, Host Links, NT Links Built-in RS-232C port: Programming Device (excluding Programming Console) connections, Host Links, no-protocol communications, NT Links, and Serial Gateway ∗3
		Serial communications board (order separately): protocol macros, Host Links, no-protocol communications ∗3, NT Links, Serial Gateway ∗3, and Modbus-RTU Slave ∗5
	Clock	Provided on all models. **Note:** Used to store the time when power is turned ON and when errors occur.
	Power OFF detection time	10 to 25 ms (not fixed)
	Power OFF detection delay time	0 to 10 ms (user-defined, default: 0 ms)
	Memory retention during power interruptions	Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of the counter Completion Flags and present values. **Note:** If the IOM Hold Bit in the Auxiliary Area is turned ON, and the PLC Setup is set to maintain the IOM Hold Bit status when power to the PLC is turned ON, the contents of the CIO Area, the Work Area, part of the Auxiliary Area, timer Completion Flags and PVs, Index Registers, and the Data Registers will be saved.
	Sending commands to a Host Link computer	FINS commands can be sent to a computer connected via the Host Link System by executing Network Communications Instructions from the PLC.
	Remote programming and monitoring	Host Link communications can be used for remote programming and remote monitoring through a Controller Link System or Ethernet network.
	8-level communications ∗2	Remote programming and monitoring across up to eight network layers (Controller Link or Ethernet) by using Host Link. (They are possible between different types of networks.)
	Storing comments in CPU Unit	I/O comments can be stored in the CPU Unit in Memory Cards ∗1 or EM file memory.
	Program check	Program checks are performed at the beginning of operation for items such as no END instruction and instruction errors. Programming Devices (except for the Programming Consoles) can also be used to check programs.
	Control output signals	RUN output: The internal contacts will be ON (closed) while the CPU Unit is operating in RUN mode or MONITOR mode. These terminals are provided only on C200HW-PA204R, C200HW-PA209R, and CS1D-PA207R Power Supply Units.
	Battery service life	The battery life is 5 years at an ambient temperature of 25°C, although the lifetime can be as short as 1.1 years under adverse temperature and power conditions. (Battery Set: CS1W-BAT01) ∗3 ∗4
	Self-diagnostics	CPU errors (watchdog timer), I/O verification errors, I/O bus errors, memory errors, and battery errors.
	Other functions	Words in the Auxiliary Area store the number of power interruptions, time of the last power interruption, and total power ON time.

∗1. CPU Units with unit version 3.0 or later only.
∗2. CPU Units with unit version 2.0 or later only. (Communications across three network layers is supported for Pre-Ver. 2.0 CPU Units.)
∗3. CPU Units with unit version 3.0 or later only or Serial Communications Board/Unit with unit version 1.2 or later only.
∗4. Use a replacement battery that was manufactured within the last two years.
∗5. Serial Communications Board/Unit with unit version 1.3 or later only.

■ Functions Added by Unit Version

The following functions have been added for the unit versions of CS1G/H CPU Units.
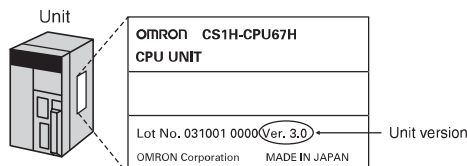
OK: Supported, ---: Not supported

Function / Unit version	Model CS1□-CPU□□H			
	No unit version	Unit version 2.0	Unit version 3.0	Unit version 4.0
Downloading and Uploading Individual Tasks	---	OK	OK	OK
Improved Read Protection Using Passwords	---	OK	OK	OK
Write Protection from FINS Commands Sent to CPU Units via Networks	---	OK	OK	OK
Online Network Connections without I/O Tables	---	OK	OK	OK
Communications through a Maximum of 8 Network Levels	---	OK	OK	OK
Connecting Online to PLCs via NS-series PTs	OK (from lot number 030201)	OK	OK	OK
Setting First Slot Words	OK (for up to 8 group)	OK (for up to 64 group)	OK (for up to 64 group)	OK
Automatic Transfers at Power ON without a Parameter File (.STD)	---	OK	OK	OK
Automatic Detection of I/O Allocation Method for Automatic Transfer at Power ON	---	---	---	OK
Operation Start/End Times	---	OK	OK	OK
Support of new instructions — MILH, MILR, MILC	---	OK	OK	OK
Support of new instructions — = DT, <>DT, <DT, < = DT, >DT, > = DT	---	OK	OK	OK
Support of new instructions — BCMP2	---	OK	OK	OK
Support of new instructions — GRY	OK (from lot number 030201)	OK	OK	OK
Support of new instructions — TPO	---	OK	OK	OK
Support of new instructions — DSW, TKY, HKY, MTR, 7SEG	---	OK	OK	OK
Support of new instructions — EXPLT, EGATR, ESATR, ECHRD, ECHWR	---	OK	OK	OK
Support of new instructions — IORD/IOWR reading/writing to CPU Bus Units	OK (from lot number 030418)	OK	OK	OK
Support of new instructions — PRV2	---	---	---	OK
Function blocks (CX-Programmer Ver.5.0 or later)	---	---	OK	OK
Serial Gateway (converting FINS commands to CompoWay/ F commands at the built-in serial port)	---	---	OK	OK
Comment memory (in internal flash memory)	---	---	OK	OK
Expanded simple backup data	---	---	OK	OK
TXDU(256), RXDU(255) (support no-protocol communications with Serial Communications Units with unit version 1.2 or later)	---	---	OK	OK
Model conversion instructions: XFERC(565), DISTC(566), COLLC(567), MOVBC(568), BCNTC(621)	---	---	OK	OK
Special function block instructions: GETID(286)	---	---	OK	OK
Additional instruction functions — TXD(236), RXD(235) (support no-protocol communications with Serial Communications Units with unit version 1.2 or later)	---	---	OK	OK
Use of new special instructions — Conversion instructions from numbers to ASCII and ASCII to numbers	---	---	---	OK
Use of new special instructions — Flowchart conversion instructions (one type of block programming instructions) to convert flowchart programs from C-series Flowchart PLCs to ladder programs for CS/CJ-series PLCs	---	---	---	OK
Function block (FB) functional upgrades — Online editing of function blocks	---	---	---	OK
Function block (FB) functional upgrades — Support for I/O variables (including array variables for I/O variables)	---	---	---	OK
Function block (FB) functional upgrades — Support for STRING data type and processing functions for ST language.	---	---	---	OK

● Unit Versions

Unit versions have been introduced to control differences in functions featured by CPU Units that are the result of version upgrades.

The unit version is marked on the nameplates of products subject to version control, as shown in the diagram.

Unit

OMRON   CS1H-CPU67H
CPU UNIT

Lot No. 031001 0000 (Ver. 3.0) ◄—— Unit version
OMRON Corporation   MADE IN JAPAN

■ Unit Versions and Programming Devices

Applicable PLCs		Name	CX-Programmer
CS1G/H-series	CS1H-CPU67H/66H/65H/64H/63H CS1G-CPU45H/44H/43H/42H	No unit version	Version 2.1 or later
		Unit version 2.0	Version 4.0 or later
		Unit version 3.0	Version 5.0 or later
		Unit version 4.0	Version 7.0 or later