

Since 2001, CJ1M-series PLCs are in control of a wide variety of applications worldwide.

The accumulated experience and advancements in technology now result in CJ2M; fully compatible, yet fully new.

- Increased performance, and increased memory capacity
- Up to 40 I/O units on any CPU
- USB for plug-and-play access to the PLC
- All models available with or without Ethernet port
- Choice of serial port plug-in modules
- User-friendly programming, faster debugging



CJ2M-CPU3□



CJ2M-CPU1□

## Features


- Five variations in program capacity from 5K steps to 60K steps; scale the CPU to your application needs.
- Faster processors; LD instruction execution time is reduced to 40 ns, floating point trigonometrics in less than 1  $\mu$ s.
- Faster Function Block calls and execution, faster interrupt handling, less overhead time.
- Added execution memory for Function Blocks allows structured, object-oriented programming even in entry-level CPUs.
- General-purpose Ethernet port supports EtherNet/IP tag-based data links, connection to Support Software, communications between PLCs, FTP data transfers, and more (CJ2M-CPU3□).
- Standard USB port on all models allows Support Software to connect directly through standard USB cable.
- A Serial Option Module can be mounted to add RS-232C or RS-422A/485 communications ports (CJ2M-CPU3□).
- Compatible with all existing CJ1 power supply-, I/O-, control- and communication units.

## Ordering Information

### International Standards

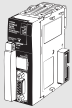
- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details and applicable conditions for these standards.

## CJ2M CPU Units (Built-in EtherNet/IP)

Product name	Specifications						Current consumption (A)		Model	Standards
	I/O capacity/ Mountable Units (Expansion Racks)	Program capacity	Data memory capacity	LD instruction execution time	EtherNet/IP function	Option board slot	5 V	24 V		
<b>CJ2M (Built-in EtherNet/IP) CPU Units</b>  	2,560 points/ 40 Units (3 Expansion Racks max.)	60K steps	160K words (DM: 32K words, EM: 32K words × 4 banks)	0.04 μs	YES	YES	0.7 (See note.)	-	CJ2M-CPU35	UC1, N, L, CE
		30K steps							CJ2M-CPU34	
		20K steps	64K words (DM: 32K words, EM: 32K words × 1 bank)						CJ2M-CPU33	
		10K steps							CJ2M-CPU32	
		5K steps							CJ2M-CPU31	

**Note:** Add 0.005A, 0.030A and 0.075A when using Serial Communications Option Boards (CP1W-CIF01/11/12), respectively.

## CJ2M CPU Units




Product name	Specifications						Current consumption (A)		Model	Standards
	I/O capacity/ Mountable Units (Expansion Racks)	Program capacity	Data memory capacity	LD instruction execution time	EtherNet/IP function	Option board slot	5 V	24 V		
<b>CJ2M CPU Units</b>  	2,560 points/ 40 Units (3 Expansion Racks max.)	60K steps	160K words (DM: 32K words, EM: 32K words × 4 banks)	0.04 μs	-	-	0.5 (See note.)	-	CJ2M-CPU15	UC1, N, L, CE
		30K steps							CJ2M-CPU14	
		20K steps	64K words (DM: 32K words, EM: 32K words × 1 bank)						CJ2M-CPU13	
		10K steps							CJ2M-CPU12	
		5K steps							CJ2M-CPU11	

**Note:** Add 0.15A when using NT-AL001 RS-232C/RS-422A Adapters.

Add 0.04 A when using CJ1W-CIF11 RS-422A Adapters.

## Serial Communications Option Boards (Only CJ2M-CPU3□)

The serial communications port can be equipped by installing the serial communications option board to the option board slot in front of CPU unit.

Product name	Specifications	Model	Standards
<b>RS-232C Option Board</b>  	One RS-232C port Connector: D-Sub, 9 pin, female Maximum transmission distance: 15m One RS-232C connector (D-Sub, 9 pin, male) is included. (Plug: XM2A-0901, Hood: XM2S-0911-E)	CP1W-CIF01	UC1, N, L, CE
<b>RS-422A/485 Option Board</b>  	One RS-422A/485 port Terminal block: using ferrules Maximum transmission distance: 50m	CP1W-CIF11	
<b>RS-422A/485 Isolated-type Option Board</b>  	One RS-422A/485 port (Isolated) Terminal block: using ferrules Maximum transmission distance: 500m	CP1W-CIF12	N, L, CE

**Note:** It is not possible to use a CP-series Ethernet Option Board (CP1W-CIF41), LCD Option Board (CP1W-DAM01) with a CJ2M CPU Unit.

## Accessories

The following accessories come with CPU Unit:

Item	Specification
Battery	CJ1W-BAT01
End Cover	CJ1W-TER01 (necessary to be mounted at the right end of CPU Rack)
End Plate	PFP-M (2 pcs)
Serial Port (RS-232C) Connector (see note)	Connector set for serial port connection (D-SUB 9-pin male connector)

**Note:** Connector is not provided with CJ2M-CPU3□.

## General Specifications

Item	CJ2M-	
	CPU1□	CPU3□
Enclosure	Mounted in a panel	
Grounding	Less than 100 Ω	
CPU Rack Dimensions	90 mm × 75 mm × 31 mm	90 mm × 75 mm × 62 mm
Weight	130 g or less	190 g or less (see note)
Current Consumption	5 VDC, 0.5 A	5 VDC, 0.7 A
Use Environment	Ambient Operating Temperature	0 to 55°C
	Ambient Operating Humidity	10% to 90%
	Atmosphere	Must be free from corrosive gases.
	Ambient Storage Temperature	-20 to 70°C (excluding battery)
	Altitude	2,000 m or less
	Pollution Degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4.)
	Overvoltage Category	Category II: Conforms to JIS B3502 and IEC 61131-2.
	EMC Immunity Level	Zone B
Vibration Resistance	Conforms to IEC60068-2-6 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz Acceleration of 9.8 m/s <sup>2</sup> for 100 min in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)	
	Shock Resistance	Conforms to IEC60068-2-27 147 m/s <sup>2</sup> , 3 times in X, Y, and Z directions (100 m/s <sup>2</sup> for Relay Output Units)
Battery		Life
	Model	CJ1W-BAT01
Applicable Standards	Conforms to cULus and EC Directives.	

**Note:** Without a Serial Option Board.

# Performance Specifications

Items		CJ2M-					
		CPU11/31	CPU12/32	CPU13/33	CPU14/34	CPU15/35	
User Memory		5K steps	10K steps	20K steps	30K steps	60K steps	
I/O Bits		2,560 bits					
Processing Speed	Overhead Processing Time	Normal Mode: CJ2M-CPU3□: 270 μs (If tag data links are used with EtherNet/IP, add the following to the above time: 100 μs + Number of transferred words × 1.8 μs) CJ2M-CPU1□: 160 μs					
	Execution Time	Basic Instructions : 0.04 μs min. Special Instructions : 0.06 μs min.					
	Interrupts	I/O Interrupts and External Interrupts	Interrupt task startup time: 31 μs Return time to cyclic task : 10 μs				
		Scheduled Interrupts	Minimum time interval : 0.4 ms (set in 0.1 ms increments) Interrupt task startup time: 30 μs Return time to cyclic task : 11 μs				
Maximum Number of Connectable Units		Total per CPU Rack or Expansion Rack: 10 Units max.; Total per PLC: 40 Units max.					
	Basic I/O Units	No limit However, a maximum of two CJ1W-INT01 Interrupt Input Units can be mounted.					
	Special I/O Units	Units for up to 96 unit numbers can be mounted. (Unit numbers run from 0 to 95. Units are allocated between 1 and 8 unit numbers.)					
	CPU Bus Units	CJ2M-CPU3□: 15 Units max. CJ2M-CPU1□: 16 Units max.					
	Slots for which interrupts can be used	Slots 0 to 4 on CPU Rack					
Maximum Number of Expansion Racks		3 max.					
CIO Area	I/O Area	2,560 bits (160 words) : Words CIO 0000 to CIO 0159					
	Link Area	3,200 bits (200 words) : Words CIO 1000 to CIO 1199					
	Synchronous Data Refresh Area	-					
	CPU Bus Unit Area	6,400 bits (400 words) : Words CIO 1500 to CIO 1899					
	Special I/O Unit Area	15,360 bits (960 words): Words CIO 2000 to CIO 2959					
	Serial PLC Link Words	1,440 bits (90 words) : Words CIO 3100 to CIO 3189					
	DeviceNet Area	9,600 bits (600 words) : Words CIO 3200 to CIO 3799					
Work Area	Internal I/O Area	3,200 bits (200 words) : Words CIO 1300 to CIO 1499 37,504 bits (2,344 words): Words CIO 3800 to CIO 6143 Cannot be used for external I/O.					
	Work Area	8,192 bits (512 words): Words W000 to W511 Cannot be used for external I/O.					
Holding Area		8,192 bits (512 words): Words H000 to H511 Bits in this area maintain their ON/OFF status when PLC is turned OFF or operating mode is changed. Words H512 to H1535: These words can be used only for function blocks. They can be used only for function block instances (i.e., they are allocated only for internal variables in function blocks).					
Auxiliary Area		Read-only: 31,744 bits (1,984 words) • 7,168 bits (448 words): Words A0 to A447 • 24,576 bits (1,536 words): Words A10000 to A11535 * Read/write: 16,384 bits (1,024 words) in words A448 to A1471 * * A960 to A1471 and A10000 to A11535 cannot be accessed by CPU Bus Units, Special I/O Units, PTs, and Support Software that do not specifically support the CJ2 CPU Units.					
Temporary Area		16 bits: TR0 to TR15					
Timer Area		4,096 timer numbers (T0000 to T4095 (separate from counters))					
Counter Area		4,096 counter numbers (C0000 to C4095 (separate from timers))					
DM Area		32k words * • DM Area words for Special I/O Units: D20000 to D29599 (100 words × 96 Units) • DM Area words for CPU Bus Units: D30000 to D31599 (100 words × 16 Units) * Bits in the EM Area can be addressed either by bit or by word. These bits cannot be addressed by CPU Bus Units, Special I/O Units, PTs, and Support Software that do not specifically support the CJ2 CPU Units.					
EM Area		32k words/bank × 4 banks max.: E00_00000 to E3_32767 max. * * Bits in the EM Area can be addressed either by bit or by word. These bits cannot be addressed by CPU Bus Units, Special I/O Units, PTs, and Support Software that do not specifically support the CJ2 CPU Units.					
Force-S/R Enabled Banks *1		32K words × 1 bank			32K words × 4 banks		
		Bank 0 hex			Bank 0 to 3 hex		
Index Registers		IR0 to IR15 These are special registers for storing PLC memory addresses for indirect addressing. (Index Registers can be set so that they are unique in each task or so that they are shared by all tasks.)					
Cyclic Task Flag Area		128 flags					
Memory Card		128 MB, 256 MB, or 512 MB					
Operating Modes		PROGRAM Mode: Programs are not executed. Preparations can be executed prior to program execution in this mode. MONITOR Mode: Programs are executed, and some operations, such as online editing, and changes to present values in I/O memory, are enabled in this mode. RUN Mode: Programs are executed. This is the normal operating mode.					

\*1. Force-setting/resetting bits in the EM Area is possible only for banks specified for the EM Area force-set/reset function.

Items		CJ2M-				
		CPU11/31	CPU12/32	CPU13/33	CPU14/34	CPU15/35
<b>Execution Mode</b>		Normal Mode				
<b>Programming Languages</b>		Ladder Logic (LD), Sequential Function Charts (SFC), Structured Text (ST), and Instruction Lists (IL)				
<b>Function Blocks</b>	<b>Maximum number of definitions</b>	256			2,048	
	<b>Maximum number of instances</b>	256			2,048	
<b>FB Program Area</b>		20K steps				
<b>Tasks</b>	<b>Type of Tasks</b>	Cyclic tasks Interrupt tasks (Power OFF interrupt tasks, scheduled interrupt tasks, I/O interrupt tasks, and external interrupt tasks)				
	<b>Number of Tasks</b>	Cyclic tasks: 128 Interrupt tasks: 256 (Interrupt tasks can be defined as cyclic tasks to create extra cyclic tasks. Therefore, the total number of cyclic tasks is actually 384 max.)				
<b>Symbols (Variables)</b>	<b>Type of Symbols</b>	<ul style="list-style-type: none"> <li>Local symbols: Can be used only within a single task in the PLC.</li> <li>Global symbols: Can be used in all tasks in the PLC.</li> <li>Network symbols (tags)*: I/O memory in the CPU Unit can be externally accessed using symbols, depending on parameter settings.</li> </ul> * Supported only by the CJ2M-CPU3□.				
	<b>Data Type of Symbols</b>	<ul style="list-style-type: none"> <li>BOOL (bit)</li> <li>UINT (one-word unsigned binary)</li> <li>UDINT (two-word unsigned binary)</li> <li>ULINT (four-word unsigned binary)</li> <li>INT (one-word signed binary)</li> <li>DINT (two-word signed binary)</li> <li>LINT (four-word signed binary)</li> <li>UINT BCD (one-word unsigned BCD) *2</li> <li>UDINT BCD (two-word unsigned BCD) *2</li> <li>ULINT BCD (four-word unsigned BCD) *2</li> <li>REAL (two-word floating-point)</li> <li>LREAL (four-word floating-point)</li> <li>CHANNEL (word) *2</li> <li>NUMBER (constant or number) *2</li> <li>WORD (one-word hexadecimal)</li> <li>DWORD (two-word hexadecimal)</li> <li>LWORD (four-word hexadecimal)</li> <li>STRING (1 to 255 ASCII characters)</li> <li>TIMER (timer) *3</li> <li>COUNTER (counter) *3</li> <li>User defined data types (data structures)</li> </ul>				
	<b>Maximum Size of Symbol</b>	32k words				
	<b>Array Symbols (Array Variables)</b>	One-dimensional arrays				
	<b>Number of Array Elements</b>	32,000 elements max.				
	<b>Number of Registrable Network Symbols (Tags) *4</b>	2,000 max.				
	<b>Length of Network Symbol (Tag) Name *4</b>	255 bytes max.				
	<b>Encoding of Network Symbols (Tags) *4</b>	UTF-8				
<b>Data Tracing</b>	<b>Memory Capacity</b>	8,000 words (Up to 32k words × 4 banks when EM is specified in CX-Programmer)				
	<b>Number of Samplings</b>	Bits = 31, one-word data = 16, two-word data = 8, four-word data = 4				
	<b>Sampling Cycle</b>	1 to 2,550 ms (Unit: 1 ms)				
	<b>Trigger Conditions</b>	ON/OFF of specified bit Data comparison of specified word Data size: 1 word, 2 words, 4 words Comparison Method: Equals (=), Greater Than (>), Greater Than or Equals (≥), Less Than (<), Less Than or Equals (≤), Not Equal (≠)				
	<b>Delay Value</b>	-32,768 to +32,767 ms				
<b>File Memory</b>		Memory Card (128, 256, or 512 Mbytes) (Use the Memory Cards provided by OMRON.) EM file memory (Part of the EM Area can be converted for use as file memory.)				
<b>Source/Comment Memory</b>	<b>Function block program memory, comment file, program index file, symbol tables</b>	Capacity: 1 Mbytes				

\*2. Cannot be used in Function blocks.

\*3. Can be used only in Function blocks.

\*4. Supported only by the CJ2M-CPU3□.

Item		CJ2M-					
		CPU11/31	CPU12/32	CPU13/33	CPU14/34	CPU15/35	
Communications	Logical Ports for Communications	Logical Ports	8 ports (Used for SEND, RECV, CMND, PMCR, TXDU, and RXDU instructions.)				
		Extended Logical Ports	64 ports (Used for SEND2, RECV2, CMND2, and PMCR2 instructions.)				
	CIP Communications Specification	Class 3 (Connection Type)	Number of connections: 64				
		UCMM (Non-connection Type)	Maximum number of clients that can communicate at the same time: 32 Maximum number of servers that can communicate at the same time: 40				
	Peripheral (USB) Port		USB 2.0-compliant B-type connector				
	Baud Rate		12 Mbps max.				
	Transmission Distance		5 m max.				
	Serial Port		<ul style="list-style-type: none"> <li>CJ2M-CPU1□ interface: Conforms to EIA RS-232C.</li> <li>CJ2M-CPU3□: No serial ports with default system</li> <li>One of the following Serial Option Boards can be mounted. <ul style="list-style-type: none"> <li>CP1W-CIF01 RS-232C Option Board</li> <li>CP1W-CIF11 RS-422A/485 Option Board (not isolated, max. transmission distance: 50 m)</li> <li>CP1W-CIF12 RS-422A/485 Option Board (isolated, max. transmission distance: 500 m)</li> </ul> </li> </ul>				
	Communications Method		Half-duplex				
	Synchronization Method		Start-stop				
	Baud Rate		0.3, 0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, or 115.2 (kbps)				
	Transmission Distance		15 m max.				
	EtherNet/IP Port		-				
	Transmission Specifications	Media Access Method	CSMA/CD				
		Modulation	Baseband				
		Transmission Paths	Star				
		Baud Rate	100 Mbps (100Base-TX)				
		Transmission Media	Shielded twisted-pair (STP) cable; Categories: 5, 5e				
		Transmission Distance	100 m (between hub and node)				
		Number of Cascade Connections	No restrictions if switching hub is used.				
	Communications Specifications	CIP Communications: Tag Data Links					
		Number of Connections	32				
		Packet Interval (Refresh period)	1 to 10,000 ms (Unit: 0.5 ms) Can be set for each connection. (Data will be refreshed at the set interval, regardless of the number of nodes.)				
		Permissible Communications Band	3,000 pps *5				
		Number of Registerable Tag	32				
		Type of Tags	CIO, DM, EM, HR, WR, and Network symbols				
		Number of Tags per Connection	8 (Seven tags if PLC status is included in the segment.)				
		Maximum Link Data Size per Node	640 words				
Maximum Data Size per Connection		20 words (Data is synchronized within each connection.)					
Number of Registrable Tag Set		32 (1 connection = 1 segment)					
Maximum Tag Set Size		20 words (One word is used when PLC status is included in the segment.)					
Maximum Number of Tags Refreshable in a Single Cycle of CPU Unit *6		Output/send (CPU Unit to EtherNet/IP): 32 Input/receive (EtherNet/IP to CPU Unit): 32					
Data Size Refreshable in a Single Cycle of CPU Unit *6		Output/send (CPU to EtherNet/IP) : 640 words Input/receive (EtherNet/IP to CPU) : 640 words					
Change of Tag Data Link Parameter Settings during Operation		OK *7					
Multi-cast Packet Filter *8		OK					
CIP Communications: Explicit Messages							
Class 3 (Connection Type)		Number of connections: 128					
UCMM (Non-connection Type)	Maximum number of clients that can communicate at the same time : 16 Maximum number of servers that can communicate at the same time: 16						
CIP Routing	OK (CIP routing is enabled for the following remote Units: CJ1W-EIP21, CJ2H-CPU6□-EIP, CJ2M-CPU3□, and CS1W-EIP21.)						
FINS Communications							
FINS/UDP	OK						
FINS/TCP	16 connections max.						
EtherNet/IP Conformance Test							
EtherNet/IP Interface							
		10Base-T/100Base-TX Auto Negotiation/Fixed Setting					

- \*5. "Packets per second" is the number of communications packets that can be processed per second.
- \*6. If the maximum number is exceeded, refreshing will require more than one CPU Unit cycle.
- \*7. When changing parameters, however, the EtherNet/IP port where the change is made will be restarted. In addition, a timeout will temporarily occur at the other node that was communicating with that port, and it will then recover automatically.
- \*8. The EtherNet/IP port supports an IGMP client, so unnecessary multicast packets are filtered by using a switching hub that supports IGMP snooping.

## Function Specifications

Functions			Description	
Cycle Time Management	Minimum Cycle Time		A minimum cycle time can be set. (0.2 to 32,000 ms; Unit: 0.1 ms) The minimum cycle time setting can be changed in MONITOR mode.	
	Cycle Time Monitoring		The cycle time is monitored. (0.01 to 40,000 ms; Unit: 0.01 ms)	
	Background Processing		Instructions with long execution times can be executed over multiple cycles to prevent fluctuations in the cycle time.	
Unit (I/O) Management	Basic I/O Units, Special I/O Units, and CPU Bus Units	I/O Refreshing	Cyclic Refreshing	Cyclic refreshing of Basic I/O Units, Special I/O Units, and CPU Bus Units
			Immediate Refreshing	I/O refreshing by immediate refreshing instructions
			Refreshing by IORF	I/O refreshing by IORF instruction
		Unit Recognition at Startup		The number of units recognized when the power is turned ON is displayed.
	Basic I/O Units	Input Response Time Setting		The input response times can be set for Basic I/O Units. The response time can be increased to reduce the effects of chattering and noise at input contacts. The response time can be decreased to enable detecting shorter input pulses.
		Load OFF Function		All of the outputs on Basic I/O Units can be turned OFF when an error occurs in RUN or MONITOR mode.
		Basic I/O Unit Status Monitoring		Alarm information can be read from Basic I/O Units and the number of Units recognized can be read.
		Reading/writing data using instructions for specific Units		Special instructions can be used to read/write required data for specific Units at high speed.
	Special I/O Units and CPU Bus Units	Unit Restart Bits to Restart Units		A Special I/O Unit or CPU Bus Unit can be restarted.
		Configuration Management	Automatic I/O Allocation at Startup	
I/O Table Creation			The current unit configuration can be registered in I/O tables to prevent it from being changed, to reserve words, and to set words.	
Rack/Slot First Word Settings			The first words allocated to a Units on the Racks can be set.	
Memory Management	Holding I/O Memory when Changing Operating Modes		The status of I/O memory can be held when the operating mode is changed or power is turned ON. The forced-set/reset status can be held when the operating mode is changed or power is turned ON.	
	File Memory		Files (such as program files, data files, and symbol table files) can be stored in Memory Card, EM File Memory, or Comment Memory.	
	Built-in Flash Memory		The user program and Parameter Area can be backed up to an internal flash memory when they are transferred to the CPU Unit.	
	EM File Function		Parts of the EM Area can be treated as file memory.	
	Storing Comments		I/O comments can be stored as symbol table files in a Memory Card, EM file memory, or comment memory.	
	EM Configuration		EM Area can be set as trace memory or EM file memory.	
Memory Cards	Automatic File Transfer at Startup		A program file and parameter files can be read from a Memory Card when the power is turned ON.	
	Program Replacement during PLC Operation		The whole user program can be read from a Memory Card to CPU Unit during operation.	
	Function for Reading and Writing Data from a Memory Card		Data in I/O memory in the CPU Unit can be written to a Memory Card in CSV/TXT format. Data in CSV/TXT format in the Memory Card can be read to I/O memory in the CPU Unit.	

Function		Description
<b>Communications</b>		–
<b>Communications</b>	Peripheral (USB) Port	Peripheral Bus
	Serial Port (Option) *9	
	Host Link (SYSWAY) Communications	
	No-protocol Communications	
	NT Link Communications	
	Peripheral Bus	
	Serial Gateway	
	Serial PLC Links	
	EtherNet/IP Port *10	
	CIP Communications Service	Tag Data Links
FINS Communications Service	Message Communications	
Scheduled Interrupts		
<b>Interrupt</b>	Resetting and restarting with MSKS(690)	
	Reading present value of internal timer with MSKS(690)	
	Power OFF Interrupts	
	I/O Interrupt Tasks	
	External Interrupt Tasks	
<b>Clock</b>	Clock Function	
	Operation Start Time Storage	
	Operation Stop Time Storage	
	Startup Time Storage	
	Power Interruption Time Storage	
	Total Power ON Time Calculation	
	Power ON Clock Data Storage	
	User Program Overwritten Time Storage	
Parameter Date Storage		
<b>Power Supply Management</b>	Memory Protection	
	Power OFF Detection Time Setting	
	Power OFF Detection Delay Time	
	Number of Power Interruptions Counter	

\*9.A Serial Option Board is required to use a serial port for the CJ2M-CPU3□ CJ2M CPU Unit.

\*10.Supported only by the CJ2M-CPU3□.



Function		Description	
<b>Function Blocks</b>		Standard programming can be encapsulated as function blocks.	
	<b>Languages in Function Block Definitions</b>	Ladder programming or structured text	
<b>Debugging</b>	<b>Online Editing</b>	The program can be changed during operation (in MONITOR or PROGRAM mode), except for block programming areas.	
	<b>Force-Set/Reset</b>	Specified bits can be set or reset. Force-set/reset to the EM Area is enabled by specifying a start bank in parameter setting.	
	<b>Differentiate Monitoring</b>	ON/OFF changes in specified bits can be monitored.	
	<b>Data Tracing</b>	The specified I/O memory data can be stored in the trace memory in the CPU Unit. The triggers can be set.	
	<b>Continuous Tracing</b>	The trace data can be uploaded during data tracing using CX-Programmer, which enables continuously logging the data by constantly uploading the trace data.	
	<b>Automatically starting tracing when operation starts</b>	Data tracing can be automatically started when operation is started (i.e., when the operating mode is changed from PROGRAM mode to MONITOR or RUN mode).	
	<b>Storing Location of Error when an Error Occurs</b>	The location and task number where execution stopped for a program error is recorded.	
	<b>Program Check</b>	The programs can be checked for items such as no END instruction and FALS/FAL errors at startup.	
<b>Self-diagnosis and Restoration</b>	<b>Error Log</b>	A function is provided to store predefined error codes in CPU Unit, error information, and time at which the error occurred.	
	<b>CPU Error Detection</b>	CPU Unit WDT errors are detected.	
	<b>User-defined Failure Diagnosis</b>	Errors can be generated for user-specified conditions: Non-fatal errors (FAL) and fatal errors (FALS). Program section time diagnosis and program section logic diagnosis are supported (FPD instruction).	
	<b>Load OFF Function</b>	This function turns OFF all outputs from Output Units when an error occurs.	
	<b>RUN Output</b>	The RUN output from the CJ1W-PA205R turns ON while CPU Unit is in RUN mode or MONITOR mode.	
	<b>Basic I/O Load Short-circuit Detection</b>	This function provides alarm information from Basic I/O Units that have load short-circuit protection.	
	<b>Failure Point Detection</b>	The time and logic of an instruction block can be analyzes using the FPD instruction.	
	<b>CPU Standby Detection</b>	This function indicates when the CPU Unit is on standby because all Special I/O Units and CPU Bus Units have not been recognized at the startup in RUN or MONITOR mode.	
	<b>Non-fatal Error Detection</b>	<b>System FAL Error Detection (User-defined non-fatal error)</b>	This function generates a non-fatal (FAL) error when the user-defined conditions are met in program.
		<b>Duplicate Refreshing Error Detection</b>	This function detects an error when an immediate refreshing Instruction in an interrupt task is competing with I/O refreshing of a cyclic task.
		<b>Basic I/O Unit Error Detection</b>	This function detects the errors in Basic I/O Units.
		<b>Backup Memory Error Detection</b>	This function detects errors in the memory backup of the user programs and parameter area (backup memory).
		<b>PLC Setup Error Detection</b>	This function detects settings errors in the PLC Setup.
		<b>CPU Bus Unit Error Detection</b>	This function detects an error when there is an error in data exchange between the CPU Unit and a CPU Bus Unit.
		<b>Special I/O Unit Error Detection</b>	This function detects an error when there is an error in data exchange between the CPU Unit and a Special I/O Unit.
		<b>Tag Memory Error Detection *11</b>	This function detects errors in tag memory.
		<b>Battery Error Detection</b>	This function detects an error when a battery is not connected to the CPU Unit or when the battery voltage drops.
		<b>CPU Bus Unit Setting Error Detection</b>	This function detects an error when the model of a CPU Bus Unit in the registered I/O tables does not agree with the model that is actually mounted in the PLC.
		<b>Special I/O Unit Setting Error Detection</b>	This function detects an error when the model of a Special I/O Unit in the registered I/O tables does not agree with the model of Unit that is actually mounted.
	<b>Option Board Error Detection *11</b>	This function detects the errors in Serial Option Board mounting status.	
<b>Fatal Error Detection</b>	<b>Memory Error Detection</b>	This function detects errors that occur in memory of the CPU Unit.	
	<b>I/O Bus Error Detection</b>	This function detects when an error occurs in data transfers between the Units mounted in Rack slots and the CPU Unit and detects when the End Cover is not connected to the CPU Rack or an Expansion Rack.	
	<b>Unit/Rack Number Duplication Error</b>	This function detects an error when the same unit number is set for two or more Units, the same word is allocated to two or more Basic I/O Units, or the same rack number is set for two or more Racks.	
	<b>Too Many I/O Points Error Detection</b>	This function detects an error when the total number of I/O points set in the I/O tables or the number of Units per Rack exceeds the specified range.	
	<b>I/O Setting Error Detection</b>	This function detects an error when the number of Units in the registered I/O tables does not agree with the actual number of Units that is mounted, or an Interrupt Unit has been connected in the wrong position, i.e., not in slot 0 to 4.	

\*11.Supported only by the CJ2M-CPU3□.

Function		Description	
Self-diagnosis and Restoration	Fatal Error Detection	<b>Program Error Detection</b>	This function detects errors in programs.
		<b>Instruction Processing Error Detection</b>	This function detects an error when the given data value is invalid when executing an instruction, or execution of instruction between tasks was attempted.
		<b>Indirect DM/EM BCD Error Detection</b>	This function detects an error when an indirect DM/EM address in BCD mode is not BCD.
		<b>Illegal Area Access Error Detection</b>	This function detects an error when an attempt is made to access an illegal area with an instruction operand.
		<b>No END Error Detection</b>	This function detects an error when there is no END instruction at the end of the program.
		<b>Task Error Detection</b>	This function detects an error when there are no tasks that can be executed in a cycle, there is no program for a task, or the execution condition for an interrupt task was met but there is no interrupt task with the specified number.
		<b>Differentiation Overflow Error Detection</b>	This function detects an error when too many differentiated instructions are entered or deleted during online editing (131,072 times or more).
		<b>Invalid Instruction Error Detection</b>	This function detects an error when an attempt is made to execute an instruction that is not defined in the system.
	<b>User Program Area Overflow Error Detection</b>	This function detects an error when instruction data is stored after the last address in user program area.	
		<b>Cycle Time Exceeded Error Detection</b>	This function monitors the cycle time (10 to 40,000 ms) and stops the operation when the set value is exceeded.
Fatal Error Detection (Continued from previous page)	<b>System FALS Error Detection (User-defined Fatal Error)</b>	This function generates a fatal (FALS) error when the user-defined conditions are met in program.	
	<b>Version Error Detection</b>	This function detects an error when a user program includes a function that is not supported by the current unit version.	
	<b>Memory Card Transfer Error Detection</b>	This function detects an error when the automatic file transfer from Memory Card fails at startup.	
Maintenance	<b>Simple Backup Function</b>		This function collectively backs up the data in CPU Unit (user programs, parameters, and I/O memory) and internal backup data in the I/O Units.
	<b>Unsolicited Communications</b>		A function that allows the PLC to use Network Communications Instruction to send required FINS commands to a computer connected via a Host Link
	<b>Remote Programming and Monitoring</b>		Host Link communications can be used for remote programming and remote monitoring through a Controller Link, Ethernet, DeviceNet, or SYSMAC LINK Network. Communications across network layers can be performed. Controller Link or Ethernet : 8 layers DeviceNet or SYSMAC LINK : 3 layers
	<b>Automatic Online Connection via Network</b>	<b>Direct Serial Connection</b>	This function enables automatically connecting to the PLC online when the CX-Programmer is directly connected by a serial connection (peripheral (USB) port or serial port).
		<b>Via Networks</b>	This function enables connecting the CX-Programmer online to a PLC that is connected via an EtherNet/IP network.
Security	<b>Read Protection using Password</b>		This function protects reading and displaying programs and tasks using passwords. Write protection: Set using the DIP switch. Read protection: Set a password using the CX-Programmer.
	<b>FINS Write Protection</b>		This function prohibits writing by using FINS commands sent over the network.
	<b>Unit Name Function</b>		This function allows the users to give any names to the Units. Names are verified at online connection to prevent wrong connection
	<b>Hardware ID Using Lot Numbers</b>		This function sets operation protection by identifying hardware using the user programs according to lot numbers stored in the Auxiliary Area.

## Unit Versions

Units	Models	Unit version
CJ2M CPU Units	CJ2M-CPU3□	CPU: Unit version 1.0 EIP : Unit version 2.0
	CJ2M-CPU1□	CPU: Unit version 1.0

## Unit Versions and Programming Devices

The following tables show the relationship between unit versions and CX-Programmer versions.

### Unit Versions and Programming Devices

CPU Unit	Functions	Required Programming Device		
		CX-Programmer		Programming Console
		Ver. 9.0 or lower	Ver. 9.1 or higher	
CJ2M-CPU□□ Unit version 1.0	Functions for unit version 1.0	–	OK *1	– *2

\*1.CX-Programmer version 9.1 or higher is required to use CJ2M CPU Units.

\*2.A Programming Console cannot be used with a CJ2M CPU Unit.

### Device Type Setting

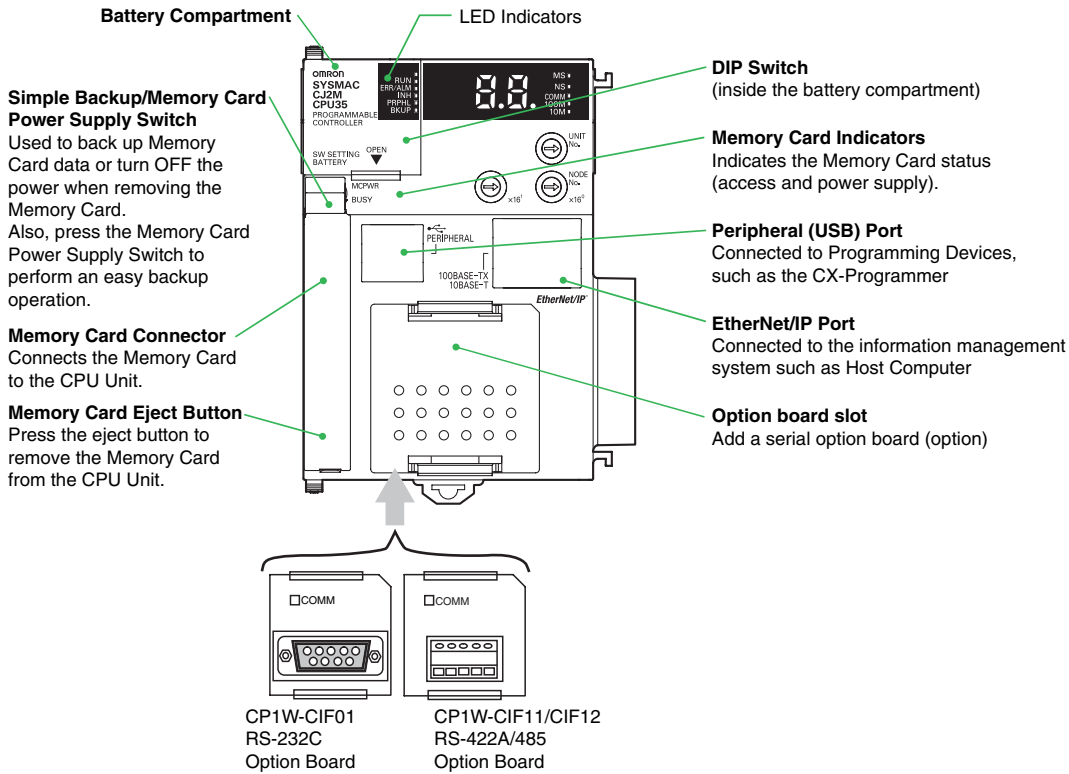
The unit version does not affect the setting made for the device type on the CX-Programmer. Select the device type as shown in the following table regardless of the unit version of the CPU Unit.

Series	CPU Unit group	CPU Unit model	Device type setting on CX-Programmer Ver. 9.1 or higher
CJ Series	CJ2M CPU Units	CJ2M-CPU3□ CJ2M-CPU1□	CJ2M

## External Interface

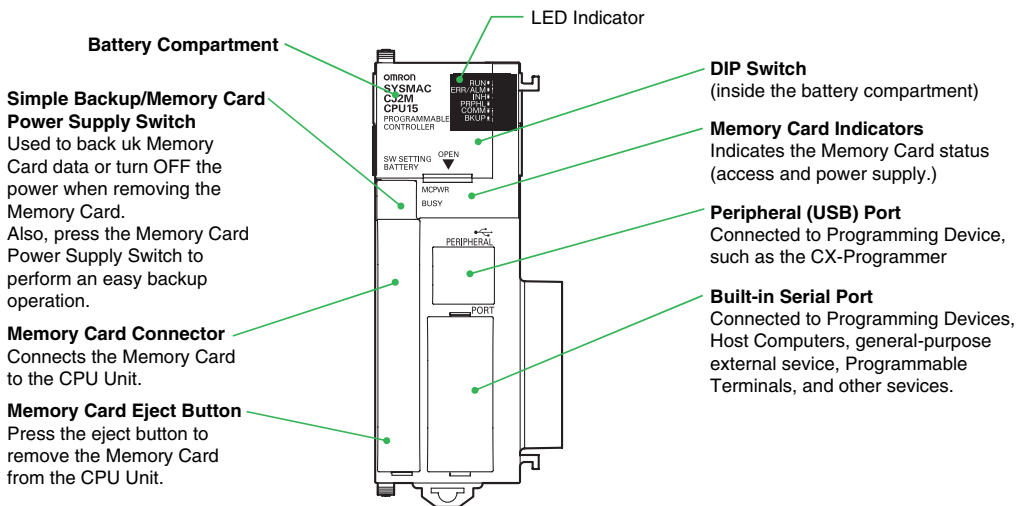
### CJ2M-CPU3□ (CJ2M with Built-in EtherNet/IP)

A CJ2M-CPU3□ provides two communications ports for external interfaces: a peripheral (USB) port and an EtherNet/IP port. Serial ports can be added by mounting a Serial Communications Option Board (sold separately) in an option slot.



### CJ2M-CPU1□

A CJ2M-CPU1□ provides two communications ports for external interfaces: a peripheral (USB) port and a serial port.



**Peripheral (USB) Port**

Item	Specification
Baud Rate	12 Mbps max.
Transmission Distance	5 m max.
Interface	USB 2.0-compliant B-type connector
Protocol	Peripheral Bus

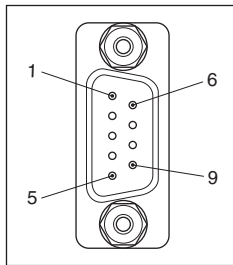
**EtherNet/IP Port**

Item	Specification
Media Access Method	CSMA/CD
Modulation	Baseband
Transmission Paths	Star
Baud Rate	100 Mbps (100Base-TX)
Transmission Media	Shielded twisted-pair (STP) cable; Categories: 5, 5e
Transmission Distance	100 m (between hub and node)
Number of Cascade Connections	No restrictions if switching hub is used.
Communications	CIP Communications (tag data links, Explicit Messages). FINS communications

**Built-in Serial Port (Only CJ2M-CPU1□)**

Item	Specification
Communications method	Half duplex
Synchronization	Start-stop
Baud rate	0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 kbps *
Transmission distance	15 m max.
Interface	EIA RS-232C
Protocol	Host Link, NT Link, 1:N, No-protocol, or Peripheral Bus

\* Baud rates for the RS-232C are specified only up to 19.2 kbps. The CJ Series supports serial communications from 38.4 kbps to 115.2 kbps, but some computers cannot support these speeds. Lower the baud rate if necessary.



Pin No.	Signal	Name	Direction
1	FG	Protection earth	-
2	SD (TXD)	Send data	Output
3	RD (RXD)	Receive data	Input
4	RS (RTS)	Request to send	Output
5	CS (CTS)	Clear to send	Input
6	5 V	Power supply	-
7	DR (DSR)	Data set ready	Input
8	ER (DTR)	Data terminal ready	Output
9	SG (0 V)	Signal ground	-
Connector hood	FG	Protection earth	-

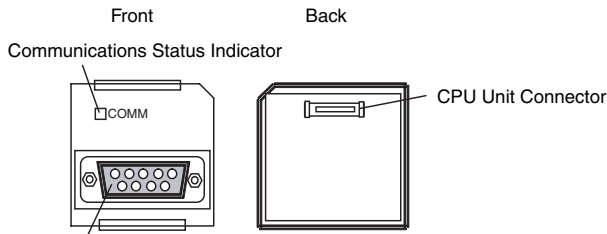
**Note:** Do not use the 5-V power from pin 6 of the RS-232C port for anything but CJ1W-CIF11 RS-422A Conversion Adapter, NT-AL001 RS-232C/RS-422A Conversion Adapter and NV3W-M\_20L Programmable Terminal. The external device or the CPU Unit may be damaged.

**Serial Option Board (Only CJ2M-CPU3□)**

A Serial Option Board can be used with a CJ2M-CPU3□ CJ2M CPU Unit.

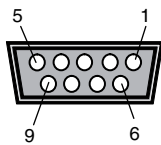
Model	Port	Maximum transmission distance	Connection method
CP1W-CIF01	One RS-232C port	15 m	Connector: D-sub, 9-pin female
CP1W-CIF11	One RS-422A/485 port (not isolated)	50 m	Terminal block: Using ferrules
CP1W-CIF12	One RS-422A/485 port (isolated)	500 m	Terminal block: Using ferrules

**CP1W-CIF01 RS-232C Option Board**



RS-232 Connector

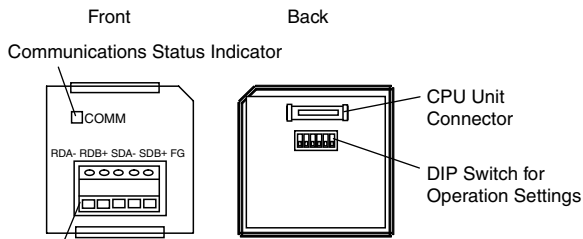
**●RS-232C Connector**



Pin No.	Signal	Name	Direction
1	FG	Protection earth	-
2	SD (TXD)	Send data	Output
3	RD (RXD)	Receive data	Input
4	RS (RTS)	Request to send	Output
5	CS (CTS)	Clear to send	Input
6	5 V	Power supply	-
7	DR (DSR)	Data set ready	Input
8	ER (DTR)	Data terminal ready	Output
9	SG (0 V)	Signal ground	-
Connector hood	FG	Protection earth	-

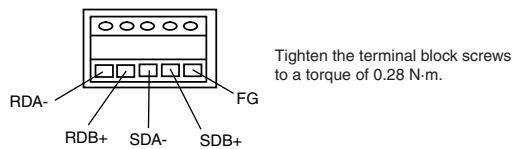
**Note:** Do not use the 5-V power from pin 6 of the RS-232C port for anything but CJ1W-CIF11 RS-422A Conversion Adapter, NT-AL001 RS-232C/RS-422A Conversion Adapter and NV3W-M\_20L Programmable Terminal. The external device or the CPU Unit may be damaged.

**CP1W-CIF11/CIF12 RS-422A/485 Option Board**



RS-422A/485 Connector

**●RS-422A/485 Terminal Block**





## Related Manuals

Cat. No.	Model	Manual	Application	Description
W472	CJ2H-CPU6□-EIP CJ2H-CPU6□ CJ2M-CPU□□	CJ-series CJ2 CPU Unit Hardware User's Manual	Hardware specifications for CJ2 CPU Units	Describes the following for CJ2 CPU Units: <ul style="list-style-type: none"> <li>• Overview and features</li> <li>• Basic system configuration</li> <li>• Part nomenclature and functions</li> <li>• Mounting and setting procedure</li> <li>• Remedies for errors</li> <li>• Also refer to the <i>Software User's Manual (W473)</i>.</li> </ul>
W473	CJ2H-CPU6□-EIP CJ2H-CPU6□ CJ2M-CPU□□	CJ-series CJ2 CPU Unit Software User's Manual	Software specifications for CJ2 CPU Units	Describes the following for CJ2 CPU Units: <ul style="list-style-type: none"> <li>• CPU Unit operation</li> <li>• Internal memory</li> <li>• Programming</li> <li>• Settings</li> <li>• Functions built into the CPU Unit</li> </ul> Also refer to the <i>Hardware User's Manual (W472)</i>
W474	CJ2H-CPU6□-EIP CJ2H-CPU6□ CJ2M-CPU3□ CJ2M-CPU1□ CS1G/H-CPU□□□H CS1G/H-CPU□□-V1 CJ1G/H-CPU□□H CJ1G-CPU□□ CJ1M-CPU□□ NSJ□-□□□□(□)-□□□□	CS/CJ/NSJ-series Instructions Reference Manual	Information on instructions	Describes each programming instruction in detail. Also refer to the <i>Software User's Manual (W473)</i> when you do programming.
W342	CJ2H-CPU6□-EIP CJ2H-CPU6□ CJ2M-CPU□□ CS1G/H-CPU□□□H CS1G/H-CPU□□-V1 CS1D-CPU□□□H CS1D-CPU□□□S CS1W-SCU□□-V1 CS1W-SCB□□-V1 CJ1H-CPU□□□H-R CJ1G/H-CPU□□□H CJ1G-CPU□□□P CJ1M-CPU□□ CJ1G-CPU□□ CJ1W-SCU□□-V1 CP1H-X□□□□-□ CP1H-XA□□□□-□ CP1H-Y□□□□-□ NSJ□-□□□□(□)-□□□□	CS/CJ/CP/NSJ-series Communications Command Reference Manual	Information on communications for CS/CJ/CP-series CPU Units and NSJ-series Controllers	Describes C-mode commands and FINS commands Refer to this manual for a detailed description of commands for communications with the CPU Unit using C mode commands or FINS commands. <b>Note:</b> This manual describes the communications commands that are addressed to CPU Units. The communications path that is used is not relevant and can include any of the following: serial ports on CPU Units, communications ports on Serial Communications Units/Boards, and Communications Units. For communications commands addressed to Special I/O Units or CPU Bus Units, refer to the operation manual for the related Unit.
W465	CJ2H-CPU6□-EIP CJ2M-CPU3□ CS1W-EIP21 CJ1W-EIP21	CS and CJ Series EtherNet/IP Units CS1W-EIP21, CJ1W- EIP21, CJ2H-CPU6□- EIP, CJ2M-CPU3□ Operation Manual	Information for EtherNet/IP function of CJ2M built-in Ethernet port	Describes EtherNet/IP port/units. A basic setting, a tag data link, FINS communication, and other function are described.
W463	CXONE-AL□□C-V□/ AL□□D-V□	CX-One Setup Manual	Installing software from the CX- One	Provides an overview of the CX-One FA Integrated Tool Package and describes the installation procedure.
W446		CX-Programmer Operation Manual		
W447	WS02-CXPC□-V□	CX-Programmer Operation Manual Functions Blocks/ Structured Text	Support Software for Windows computers	Describes operating procedures for the CX-Programmer. Also refer to the <i>Software User's Manual (W473)</i> and <i>Instructions Reference Manual (W474)</i> when you do programming.
W469		CX-Programmer Operation Manual SFC Programming	CX-Programmer operating procedure	
W366	WS02-SIMC1-E	CS/CJ/CP/NSJ-series CX-Simulator Operation Manual	Operating procedures for CX- Simulator Simulation Support Software for Windows computers Using simulation in the CX- Programmer with CX- Programmer version 6.1 or higher	Describes the operating procedures for the CX-Simulator. When you do simulation, also refer to the <i>CX-Programmer Operation Manual (W446)</i> , <i>Software User's Manual (W473)</i> , and <i>CS/CJ/NSJ series Instructions Reference Manual (W474)</i> .
W464	CXONE-AL□□C-V□/ CXONE-AL□□D-V□	CS/CJ/CP/NSJ-series CX-Integrator Network Configuration Software Operation Manual	Network setup and monitoring	Describes the operating procedures for the CX-Integrator.



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2010.5

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