SYSMAC CJ-series CJ2M CPU Units

CJ2M-CPU3□/-CPU1□

CSM_CJ2M-CPU3__-CPU1_DS_E_1_2

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 μs.
- 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

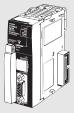
- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details 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		
CJ2M (Built-in EtherNet/IP) CPU Units 	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		
CJ2M CPU Units 	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
RS-232C Option Board 	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
RS-422A/485 Option Board 	One RS-422A/485 port Terminal block: using ferrules Maximum transmission distance: 50m	**CP1W-CIF11**	
RS-422A/485 Isolated-type Option Board 	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^2 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^2, 3 times in X, Y, and Z directions (100 m/s^2 for Relay Output Units)	
Battery	**Life**	5 years at 25°C	
	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				
	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.				
			32K words × 1 bank			32K words × 4 banks	
	Force-S/R Enabled Banks ✻1		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
Execution Mode		Normal Mode				
Programming Languages		Ladder Logic (LD), Sequential Function Charts (SFC), Structured Text (ST), and Instruction Lists (IL)				
Function Blocks	**Maximum number of definitions**	256			2,048	
	Maximum number of instances	256			2,048	
FB Program Area		20K steps				
Tasks	**Type of Tasks**	Cyclic tasks Interrupt tasks (Power OFF interrupt tasks, scheduled interrupt tasks, I/O interrupt tasks, and external interrupt tasks)				
	Number of Tasks	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.)				
Symbols (Variables)	**Type of Symbols**	• Local symbols: Can be used only within a single task in the PLC. • Global symbols: Can be used in all tasks in the PLC. • Network symbols (tags)✻: I/O memory in the CPU Unit can be externally accessed using symbols, depending on parameter settings. ✻ Supported only by the CJ2M-CPU3□.				
	Data Type of Symbols	• BOOL (bit) • UINT (one-word unsigned binary) • UDINT (two-word unsigned binary) • ULINT (four-word unsigned binary) • INT (one-word signed binary) • DINT (two-word signed binary) • LINT (four-word signed binary) • UINT BCD (one-word unsigned BCD) ✻2 • UDINT BCD (two-word unsigned BCD) ✻2 • ULINT BCD (four-word unsigned BCD) ✻2 • REAL (two-word floating-point) • LREAL (four-word floating-point) • CHANNEL (word) ✻2 • NUMBER (constant or number) ✻2 • WORD (one-word hexadecimal) • DWORD (two-word hexadecimal) • LWORD (four-word hexadecimal) • STRING (1 to 255 ASCII characters) • TIMER (timer) ✻3 • COUNTER (counter) ✻3 • User defined data types (data structures)				
	Maximum Size of Symbol	32k words				
	Array Symbols (Array Variables)	One-dimensional arrays				
	Number of Array Elements	32,000 elements max.				
	Number of Registrable Network Symbols (Tags) ✻4	2,000 max.				
	Length of Network Symbol (Tag) Name ✻4	255 bytes max.				
	Encoding of Network Symbols (Tags) ✻4	UTF-8				
Data Tracing	**Memory Capacity**	8,000 words (Up to 32k words × 4 banks when EM is specified in CX-Programmer)				
	Number of Samplings	Bits = 31, one-word data =16, two-word data = 8, four-word data = 4				
	Sampling Cycle	1 to 2,550 ms (Unit: 1 ms)				
	Trigger Conditions	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 (≠)				
	Delay Value	−32,768 to +32,767 ms				
File Memory		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.)				
Source/ Comment Memory	**Function block program memory, comment file, program indey file, symbol tables**	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			• CJ2M-CPU1□ interface: Conforms to EIA RS-232C. • CJ2M-CPU3□: No serial ports with default system One of the following Serial Option Boards can be mounted. • CP1W-CIF01 RS-232C Option Board • CP1W-CIF11 RS-422A/485 Option Board (not isolated, max. transmission distance: 50 m) • CP1W-CIF12 RS-422A/485 Option Board (isolated, max. transmission distance: 500 m)				
		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 symboles				
			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		Conforms to A5.				
		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 words can be automatically allocated to the Basic I/O Units that are connected in the PLC to start operation automatically without registering Units into I/O tables.
		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
Communications				–
	Peripheral (USB) Port		Peripheral Bus	Bus for communications with various kinds of Support Software running on a personal computer. High-speed communications are supported.
	Serial Port (Option) ✻9			Application is possible when a Serial Communications Option Board is mounted.
		Host Link (SYSWAY) Communications		Host Link commands or FINS commands placed between Host Link headers and terminators can be sent from a host computer or PT to read/write I/O memory, read/control the operating mode, and perform other operations for PLC.
		No-protocol Communications		I/O instructions for communications ports (such as TXD/RXD instructions) can be used for data transfer with peripheral devices such as bar code readers and printers.
		NT Link Communications		I/O memory in the PLC can be allocated and directly linked to various PT functions, including status control areas, status notification areas, touch switches, lamps, memory tables, and other objects.
		Peripheral Bus		Bus for communications with various kinds of Support Software running on a personal computer. High-speed communications are supported.
		Serial Gateway		This gateway enables receiving and automatically converting FINS to the CompoWay/F.
		Serial PLC Links		Data is exchanged between CPU Units using serial ports without communications programming. PTs set to the 1:N NT Link protocol can be included in the network.
	EtherNet/IP Port ✻10			100Base-TX/10Base-T Protocols: TCP/IP, UDP, ARP, ICMP (ping only), BOOTP Applications: FINS, CIP, SNTP, DNS (Client), FTP (Server)
		CIP Communications Service	Tag Data Links	Programless cyclic data exchanges with the devices on the EtherNet/IP network.
			Message Communications	Any CIP commands can be received from the devices on the EtherNet/IP network.
		FINS Communications Service	Message Communications	Any FINS commands can be transferred with the devices on the EtherNet/IP network.
Interrupt	Scheduled Interrupts			Tasks can be executed at a specified interval (minimum of 0.2 ms, Unit: 0.1 ms).
		Resetting and restarting with MSKS(690)		When MSKS(690) is executed, the internal timer is restarted and the time to first interrupt is set to a fixed value.
		Reading present value of internal timer with MSKS(690)		MSKS(690) can be used to read the time that has elapsed until the schedule interrupt is started or since the previous scheduled interrupt.
	Power OFF Interrupts			A task can be executed when CPU Unit's power turns OFF.
	I/O Interrupt Tasks			A task can be executed when an input signal is input to an Interrupt Input Unit.
	External Interrupt Tasks			A task can be executed when interrupts are requested from a Special I/O Unit or a CPU Bus Unit.
Clock	Clock Function			Clock data is stored in memory. Accuracy (Accuracy depends on the temperature.) Ambient temperature of 55°C : –3.5 to +0.5 min error per month Ambient temperature of 25°C : –1.5 to +1.5 min error per month Ambient temperature of 0°C : –3 to +1 min error per month
	Operation Start Time Storage			The time when operating mode was last changed to RUN mode or MONITOR mode is stored.
	Operation Stop Time Storage			The last time a fatal error occurred or the last time the operating mode was changed to PROGRAM mode is stored.
	Startup Time Storage			The time when the power was turned ON is stored.
	Power Interruption Time Storage			The time when the power is turned OFF is stored.
	Total Power ON Time Calculation			The total time that the PLC has been ON is stored in increments of 10 hours.
	Power ON Clock Data Storage			A history of the times when the power was turned ON is stored.
	User Program Overwritten Time Storage			The time that the user program was last overwritten is stored.
	Parameter Date Storage			The time when the Parameter Area was overwritten is stored.
Power Supply Management	Memory Protection			Holding Area data, DM Area data, EM Area data, Counter Completion Flags, and counter present values are held even when power is turned OFF. CIO Area, Work Area, some Auxiliary Area data, and Timer Completion Flags, timer present values, index registers, and data registers can be protected by turning ON the IOM Hold Bit in the Auxiliary Area, and by also setting the IOM Hold Bit to "Hold" in the PLC Setup.
	Power OFF Detection Time Setting			The detection time for power interruptions can be set. AC power supply: 10 to 25 ms (variable) DC power supply: 2 to 5 ms (CJ1W-PD022) or 2 to 20 ms (CJ1W-PD025)
	Power OFF Detection Delay Time			The detection of power interruptions can be delayed: 0 to 10 ms (Not supported by the CJ1W-PD022.)
	Number of Power Interruptions Counter			The number of times power has been interrupted is counted.

✻**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
Function Blocks			Standard programming can be encapsulated as function blocks.
	Languages in Function Block Definitions		Ladder programming or structured text
Debugging	**Online Editing**		The program can be changed during operation (in MONITOR or PROGRAM mode), except for block programming areas.
	Force-Set/Reset		Specified bits can be set or reset. Force-set/reset to the EM Area is enabled by specifying a start bank in parameter setting.
	Differentiate Monitoring		ON/OFF changes in specified bits can be monitored.
	Data Tracing		The specified I/O memory data can be stored in the trace memory in the CPU Unit. The triggers can be set.
		Continuous Tracing	The trace data can be uploaded during data tracing using CX-Programmer, which enables continuously logging the data by constantly uploading the trace data.
		Automatically starting tracing when operation starts	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).
	Storing Location of Error when an Error Occurs		The location and task number where execution stopped for a program error is recorded.
	Program Check		The programs can be checked for items such as no END instruction and FALS/FAL errors at startup.
Self-diagnosis and Restoration	**Error Log**		A function is provided to store predefined error codes in CPU Unit, error information, and time at which the error occurred.
	CPU Error Detection		CPU Unit WDT errors are detected.
	User-defined Failure Diagnosis		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).
	Load OFF Function		This function turns OFF all outputs from Output Units when an error occurs.
	RUN Output		The RUN output from the CJ1W-PA205R turns ON while CPU Unit is in RUN mode or MONITOR mode.
	Basic I/O Load Short-circuit Detection		This function provides alarm information from Basic I/O Units that have load short-circuit protection.
	Failure Point Detection		The time and logic of an instruction block can be analyzes using the FPD instruction.
	CPU Standby Detection		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.
	Non-fatal Error Detection	**System FAL Error Detection (User-defined non-fatal error)**	This function generates a non-fatal (FAL) error when the user-defined conditions are met in program.
		Duplicate Refreshing Error Detection	This function detects an error when an immediate refreshing Instruction in an interrupt task is competing with I/O refreshing of a cyclic task.
		Basic I/O Unit Error Detection	This function detects the errors in Basic I/O Units.
		Backup Memory Error Detection	This function detects errors in the memory backup of the user programs and parameter area (backup memory).
		PLC Setup Error Detection	This function detects setting errors in the PLC Setup.
		CPU Bus Unit Error Detection	This function detects an error when there is an error in data exchange between the CPU Unit and a CPU Bus Unit.
		Special I/O Unit Error Detection	This function detects an error when there is an error in data exchange between the CPU Unit and a Special I/O Unit.
		Tag Memory Error Detection ✻11	This function detects errors in tag memory.
		Battery Error Detection	This function detects an error when a battery is not connected to the CPU Unit or when the battery voltage drops.
		CPU Bus Unit Setting Error Detection	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.
		Special I/O Unit Setting Error Detection	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.
		Option Board Error Detection ✻11	This function detects the errors in Serial Option Board mounting status.
	Fatal Error Detection	**Memory Error Detection**	This function detects errors that occur in memory of the CPU Unit.
		I/O Bus Error Detection	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.
		Unit/Rack Number Duplication Error	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.
		Too Many I/O Points Error Detection	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.
		I/O Setting Error Detection	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	Program Error Detection		This function detects errors in programs.
			Instruction Processing Error Detection	This function detects an error when the given data value is invalid when executing an instruction, or execution of instruction between tasks was attempted.
			Indirect DM/EM BCD Error Detection	This function detects an error when an indirect DM/EM address in BCD mode is not BCD.
			Illegal Area Access Error Detection	This function detects an error when an attempt is made to access an illegal area with an instruction operand.
			No END Error Detection	This function detects an error when there is no END instruction at the end of the program.
			Task Error Detection	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.
			Differentiation Overflow Error Detection	This function detects an error when too many differentiated instructions are entered or deleted during online editing (131,072 times or more).
			Invalid Instruction Error Detection	This function detects an error when an attempt is made to execute an instruction that is not defined in the system.
			User Program Area Overflow Error Detection	This function detects an error when instruction data is stored after the last address in user program area.
		Cycle Time Exceeded Error Detection		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)	System FALS Error Detection (User-defined Fatal Error)		This function generates a fatal (FALS) error when the user-defined conditions are met in program.
		Version Error Detection		This function detects an error when a user program includes a function that is not supported by the current unit version.
		Memory Card Transfer Error Detection		This function detects an error when the automatic file transfer from Memory Card fails at startup.
Maintenance	Simple Backup Function			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.
	Unsolicited Communications			A function that allows the PLC to use Network Communications Instruction to send required FINS commands to a computer connected via a Host Link
	Remote Programming and Monitoring			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
	Automatic Online Connection via Network		Direct Serial Connection	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).
			Via Networks	This function enables connecting the CX-Programmer online to a PLC that is connected via an EtherNet/IP network.
Security	Read Protection using Password			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.
	FINS Write Protection			This function prohibits writing by using FINS commands sent over the network.
	Unit Name Function			This function allows the users to give any names to the Units. Names are verified at online connection to prevent wrong connection
	Hardware ID Using Lot Numbers			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

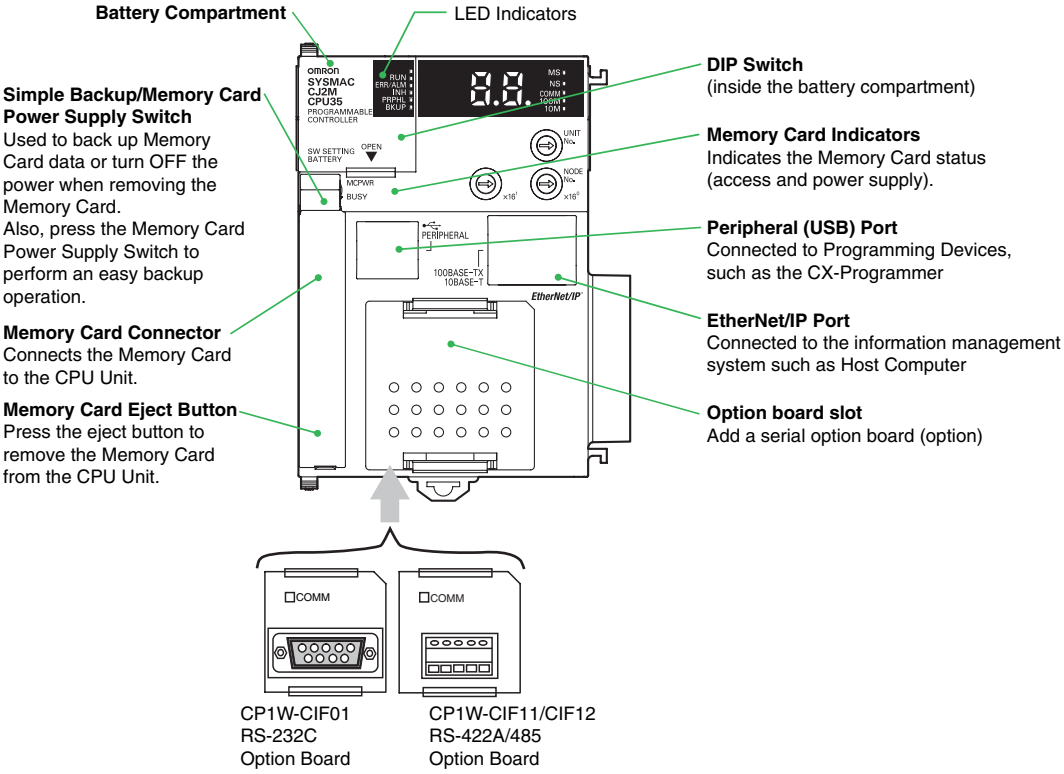
The unit version does not affect the setting made for the device type on the CX-Programmer. Select the device type as shown in the following table regardless of the unit version of the CPU Unit.

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

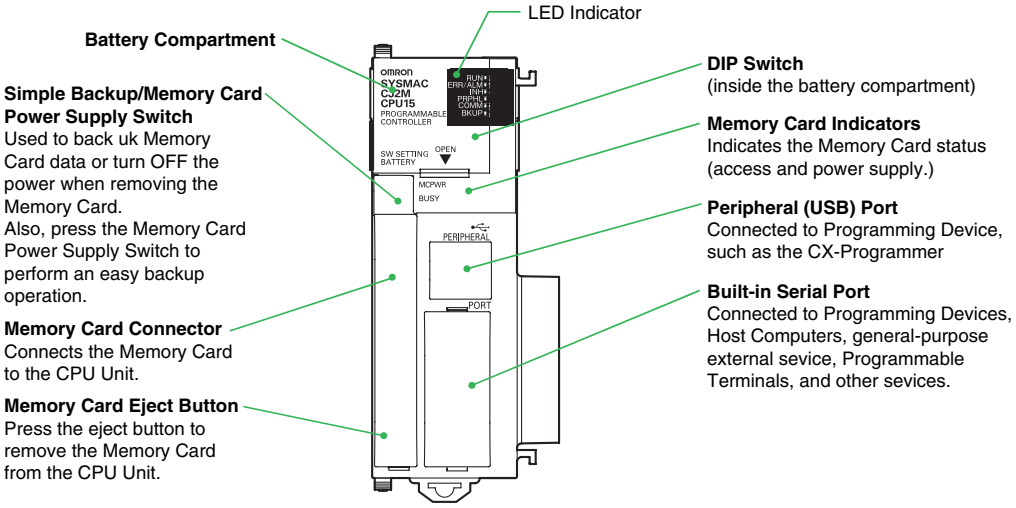
CJ2M-CPU3□ (CJ2M with Built-in EtherNet/IP)

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

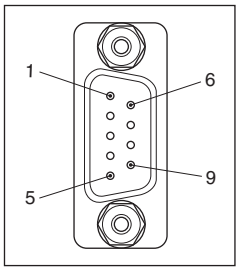
EtherNet/IP Port

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	–

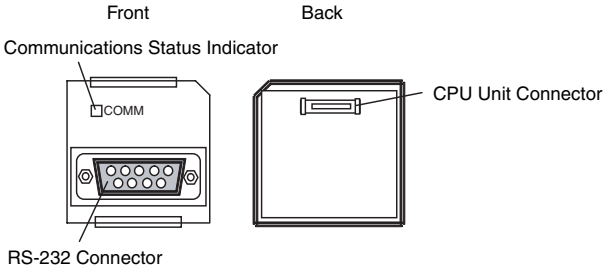
Note: Do not use the 5-V power from pin 6 of the RS-232C port for anything but CJ1W-CIF11 RS-422A Conversion Adapter, NT-AL001 RS-232C/RS-422A Conversion Adapter and NV3W-M_20L Programmable Terminal. The external device or the CPU Unit may be damaged.

Serial Option Board (Only CJ2M-CPU3□)

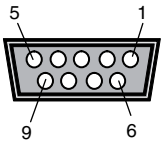
A Serial Option Board can be used with a CJ2M-CPU3□ CJ2M CPU Unit.

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



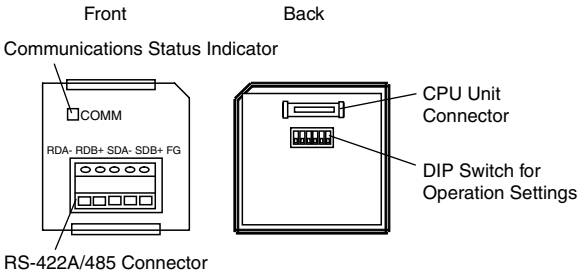
●RS-232C Connector



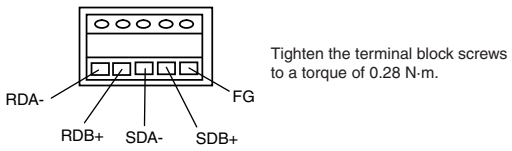
Pin No.	Signal	Name	Direction
1	FG	Protection earth	–
2	SD (TXD)	Send data	Output
3	RD (RXD)	Receive data	Input
4	RS (RTS)	Request to send	Output
5	CS (CTS)	Clear to send	Input
6	5 V	Power supply	–
7	DR (DSR)	Data set ready	Input
8	ER (DTR)	Data terminal ready	Output
9	SG (0 V)	Signal ground	–
Connector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



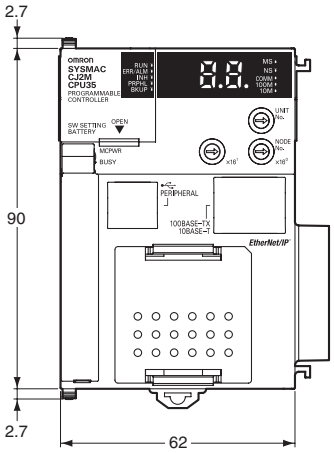
●RS-422A/485 Terminal Block

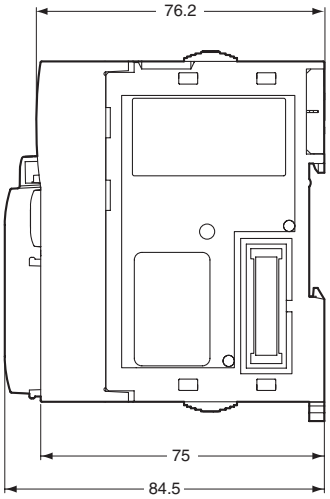


Dimensions

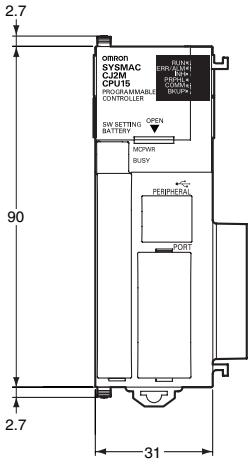
(Unit: mm)

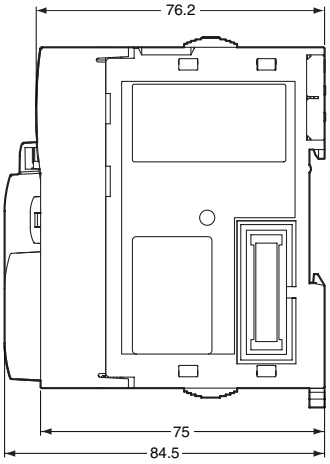
CJ2M-CPU3□





CJ2M-CPU1□





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: • Overview and features • Basic system configuration • Part nomenclature and functions • Mounting and setting procedure • Remedies for errors • Also refer to the *Software User's Manual* (W473).
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: • CPU Unit operation • Internal memory • Programming • Settings • Functions built into the CPU Unit Also refer to the *Hardware User's Manual* (W472)
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 *Software User's Manual* (W473) 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. **Note:** 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	WS02-CXPC□-V□	CX-Programmer Operation Manual	Support Software for Windows computers CX-Programmer operating procedure	Describes operating procedures for the CX-Programmer. Also refer to the *Software User's Manual* (W473) and *Instructions Reference Manual* (W474) when you do programming.
W447		CX-Programmer Operation Manual Functions Blocks/ Structured Text		
W469		CX-Programmer Operation Manual SFC Programming		
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 *CX-Programmer Operation Manual* (W446), *Software User's Manual* (W473), and *CS/CJ/NSJ series Instructions Reference Manual* (W474).
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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- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear 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.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

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2010.5

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OMRON Corporation
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