

SYSMAC CJ-series CJ1M CPU Units (with Ethernet function)

CJ1M-CPU1□-ETN

CSM_CJ1M-CPU-ETN_DS_E1_1

A Micro CJ1M CPU Unit with Built-in Ethernet Newly Released!

- SYSMAC CJ-series CPU Unit with the functionality of an Ethernet Unit.



CJ1M-CPU11-ETN


Features

- Compact 90 × 65 mm (H × D) dimensions are first class in the industry.
- SYSMAC CJ-series CPU Unit with the functionality of an Ethernet Unit.
- The CPU functional element has the same functionality as a CJ1M-CPU11/12/13. This enables effective usage of legacy applications.
- High-capacity Memory Cards up to 128 MB can be installed, and used to backup the program and system settings, or log customer data.
- The large instruction set can support diverse applications. Four types of programming are supported (ladder, structured text, sequential function charts, and instruction lists), with approximately 400 instructions and 800 instruction variations.
- These CJ-series CPU Units support structured programming using function blocks, which can improve the customer's program development resources.
- The various protection functions provide improved security to protect valuable software resources and property.
- The CPU Units are compatible with the CX-One Integrated Tool Package. Information for each component can be linked, and the system's data can be integrated into one database. The software can provide total support from PLC settings to network startup.

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.

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 function	5 V	24 V		
CJ1M CPU Units	 Ethernet function	640 points/ 20 Units (1 Expansion Racks max.)	20K steps	32K words (DM: 32K words, EM: None)	0.1 μs	YES (See note 1.)	0.95 (See note 2.)	—	CJ1M-CPU13-ETN	UC1, N, L, CE
		320points/ 10 Units (No Expansion Rack)	10K steps				0.95 (See note 2.)	—	CJ1M-CPU12-ETN	
		160 points/ 10 Units (No Expansion Rack)	5K steps				0.95 (See note 2.)	—	CJ1M-CPU11-ETN (See notes 3.)	

Note: 1. Ethernet function

The Ethernet functional element provides the main functions of the CJ1W-ETN21 Ethernet Unit.

Physical layer	Maximum number of nodes in FINS network	Communications service
100BASE-TX, 10BASE-T	254	<ul style="list-style-type: none"> • FINS communications service • FTP server • Automatically adjusted clock information. • Web functions

Socket services and sending/receiving mail are not supported.

- Current consumptions include current for a Programming Console. Add 0.15 A per Adapter when using NT-AL001 RS-232C/RS-232A Adapters.
Add 0.04 A per Adapter when using CJ1W-CIF11 RS-422A Adapters.
- The CJ1M low-end models (CJ1M-CPU11(-ETN)/CPU21) have different specifications for the overhead processing time, number of subroutines, number of jumps, and number of scheduled interrupts than the other CJ1M models (CJ1M-CPU12(-ETN)/CPU13(-ETN)/CPU22/CPU23).
For details, refer to the SYSMAC CJ-series Operation Manual (Cat. No. W474).

Accessories

The following accessories come with CPU Unit:

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

Common Specifications

Item		Specifications											
Control method		Stored program											
I/O control method		Cyclic scan and immediate processing are both possible.											
Programming Languages		Ladder Logic (LD), Sequential Function Charts (SFC), Structured Text (ST), and Mnemonic.											
CPU processing mode		Normal Mode or Peripheral Servicing Priority Mode											
Instruction length		1 to 7 steps per instruction											
Ladder instructions		Approx. 400 (3-digit function codes)											
Execution time	Basic instructions	0.10 μs min.											
	Special instructions	0.15 μs min.											
Overhead time		CJ1M-CPU12-ETN/CPU13-ETN : 0.5 ms min. CJ1M-CPU11-ETN : 0.7 ms min.											
Unit connection method		No Backplane: Units connected directly to each other.											
Mounting method		DIN Track (screw mounting not possible)											
Maximum number of connectable Units		Total of 19 Units, including 9 Units on CPU Rack and 10 Units on one Expansion Rack. (The built-in Ethernet port on the CPU Unit must be allocated to a slots 0, and is counted as one Unit.											
Maximum number of Expansion Racks		<ul style="list-style-type: none"> • CJ1M-CPU13-ETN: 1 max. (An I/O Control Unit is required on the CPU Rack and an I/O Interface Unit is required on the Expansion Rack.) • CJ1M-CPU11-ETN/12-ETN: Expansion is not possible. 											
Number of tasks		288 (cyclic tasks: 32, interrupt tasks: 256) With CJ1-H or CJ1M CPU Units, interrupt tasks can be defined as cyclic tasks called extra cyclic tasks. Including these, up to 288 cyclic tasks can be used. 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 Units built-in timer. I/O Interrupts: Interrupts from Interrupt Input Units. Power OFF Interrupts (See note): Interrupts executed when the CPU Units power is turned OFF. External I/O Interrupts: Interrupts from the Special I/O Units or CPU Bus Units. Note: Not supported when the CJ1W-PD022 Power Supply Unit is mounted.											
Calling subroutines from more than one task		Supported (called global subroutines).											
CIO (Core I/O) Area	I/O Area	2,560 (CIO 000000 to CIO 015915 (160 words from CIO 0000 to CIO 0159) 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.											
	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.											
	CPU Bus Unit Area	6,400 (400 words): CIO 150000 to CIO 189915 (words CIO 1500 to CIO 1899) CPU Bus Unit bits store the operating status of 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 Special I/O Units. (10 words per Unit, 96 Units max.)											
	Serial PLC Link Area (CJ1M CPU Units only)	1,440 (90 words): CIO 310000 to CIO 318915 (words CIO 3100 to CIO 3189)											
	DeviceNet Area	9,600 (600 words): CIO 320000 to CIO 379915 (words CIO 3200 to CIO 3799) DeviceNet bits are allocated to Slaves for DeviceNet Unit remote I/O communications when the Master function is used with fixed allocations. <table border="1" data-bbox="523 1662 1129 1832"> <tbody> <tr> <td>Fixed allocation setting 1</td> <td>Outputs: CIO 3200 to CIO 3263 Inputs: CIO 3300 to CIO 3363</td> </tr> <tr> <td>Fixed allocation setting 2</td> <td>Outputs: CIO 3400 to CIO 3463 Inputs: CIO 3500 to CIO 3563</td> </tr> <tr> <td>Fixed allocation setting 3</td> <td>Outputs: CIO 3600 to CIO 3663 Inputs: CIO 3700 to CIO 3763</td> </tr> </tbody> </table> <p>The following words are allocated to the Master function even when the DeviceNet Unit is used as a Slave.</p> <table border="1" data-bbox="523 1892 1129 2063"> <tbody> <tr> <td>Fixed allocation setting 1</td> <td>Outputs: CIO 3370 (Slave to Master) Inputs: CIO 3270 (Master to Slave)</td> </tr> <tr> <td>Fixed allocation setting 2</td> <td>Outputs: CIO 3570 (Slave to Master) Inputs: CIO 3470 (Master to Slave)</td> </tr> <tr> <td>Fixed allocation setting 3</td> <td>Outputs: CIO 3770 (Slave to Master) Inputs: CIO 3670 (Master to Slave)</td> </tr> </tbody> </table>	Fixed allocation setting 1	Outputs: CIO 3200 to CIO 3263 Inputs: CIO 3300 to CIO 3363	Fixed allocation setting 2	Outputs: CIO 3400 to CIO 3463 Inputs: CIO 3500 to CIO 3563	Fixed allocation setting 3	Outputs: CIO 3600 to CIO 3663 Inputs: CIO 3700 to CIO 3763	Fixed allocation setting 1	Outputs: CIO 3370 (Slave to Master) Inputs: CIO 3270 (Master to Slave)	Fixed allocation setting 2	Outputs: CIO 3570 (Slave to Master) Inputs: CIO 3470 (Master to Slave)	Fixed allocation setting 3
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The CIO Area can be used as work bits if the bits are not used as shown here.

Item		Specifications
CIO (Core I/O) Area	Internal I/O Area	4,800 bits (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 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): W00000 to W51115 (W000 to W511) Controls the programs only. (I/O from external I/O terminals is not possible.) Note: 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 (used for timers only)
Counter Area		4,096: C0000 to C4095 (used for counters only)
DM Area		32 Kwords: D00000 to D32767 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. Internal Special I/O Unit DM Area: D20000 to D29599 (100 words × 96 Units) Used to set parameters for Special I/O Units. CPU Bus Unit DM Area: D30000 to D31599 (100 words × 16 Units) Used to set parameters for CPU Bus Units.
EM Area		None
Index Registers		IR0 to IR15 Store PLC memory addresses for indirect addressing. Index registers can be used independently in each task. One register is 32 bits (2 words). Setting to use index registers either independently in each task or to share them between tasks.
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 (trace data: 31 bits, 6 words)
File Memory		<ul style="list-style-type: none"> Memory Cards: Compact flash memory cards can be used (MS-DOS format). OMRON Memory Cards can be used.
Function Specifications	Constant cycle time	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 by IORF(097). Note: ORF(097) refreshes I/O bits allocated to Basic I/O Units and Special I/O Units.
	Timing of special refreshing for CPU Bus Units	Data links for Controller Link Units remote I/O for DeviceNet Units, and other special refreshing for CPU Bus Units is performed at the following times: I/O refresh period and when the CPU BUS UNIT I/O REFRESH (DLNK(226)) instruction is executed.
	I/O memory holding when changing operating modes	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 when the CPU Unit is operating in RUN, MONITOR, or PROGRAM mode.
	Timer/Counter PV refresh method	BCD or binary (CX-Programmer Ver. 3.0 or higher).
	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.
	Mode setting at power-up	Possible. Note: By default, the CPU Unit will start in RUN mode if a Programming Console is not connected.
Flash memory (CJ1-H and CJ1M CPU Units only)	<ul style="list-style-type: none"> The user program and parameter area data (e.g., PLC Setup) are always backed up automatically in flash memory. (automatic backup and restore.) CPU Units with unit version 3.0 or later only: When downloading projects from CX-Programmer Ver. 5.0 or higher, symbol table files (including CX-Programmer symbol names, I/O comments), comment files (CX-Programmer rung comments, other comments), and program index files (CX-Programmer section names, section comments, or program comments) are stored in comment memory within the flash memory. 	

Item	Specifications																
Memory Card functions	Automatically reading programs (autoboot) from the Memory Card when the power is turned ON. Possible.																
	Program replacement during PLC operation Possible.																
	Format in which data is stored in Memory Card User program: Program file format PLC Setup and other parameters: Data file 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 CX-Programmer and Programming Consoles), Host Link computers, AR Area control bits, easy backup operation																
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), instruction error tracing, 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. With the CX-Programmer, more than one program block can be edited at the same time.																
Program protection	Overwrite protection: Set using DIP switch. Copy protection: Password set using CX-Programmer or Programming Consoles.																
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. Note: FAL and FALS instructions can be used with the CJ1-H and CJ1M CPU Units to simulate errors.																
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. Note: CJ1M CPU Unit can be set so that user-defined FAL errors are not stored in the error log.																
Serial communications	Built-in peripheral port: Programming Device (including Programming Console) connections, Host Links, NT Links, Serial Gateway (CompoWay/F master)																
	Built-in RS-232C port: Programming Device (excluding Programming Console) connections, Host Links, no-protocol communications, NT Links, Modbus-RTU Slave, Serial Gateway (CompoWay/F master or Modbus master) Serial Communications Unit (sold separately): Protocol macros, Host Links, NT Links																
Clock	Provided on all models. <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 40%;">Accuracy:</td> <td style="width: 20%;">Ambient temperature</td> <td style="width: 25%;">Monthly error</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">55°C</td> <td style="text-align: center;">-3.5 min to +0.5 min</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">25°C</td> <td style="text-align: center;">-1.5 min to +1.5 min</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">0°C</td> <td style="text-align: center;">-3 min to +1 min</td> </tr> </table> Note: Used to store the time when power is turned ON and when errors occur.		Accuracy:	Ambient temperature	Monthly error			55°C	-3.5 min to +0.5 min			25°C	-1.5 min to +1.5 min			0°C	-3 min to +1 min
	Accuracy:	Ambient temperature	Monthly error														
		55°C	-3.5 min to +0.5 min														
		25°C	-1.5 min to +1.5 min														
		0°C	-3 min to +1 min														
Power OFF detection time	AC Power Supply Unit: 10 to 25 ms (not fixed) DC Power Supply Unit PD025: 2 to 5 ms; PD022: 2 to 10 ms																
Power OFF detection delay time	0 to 10 ms (user-defined, default: 0 ms) Note: Not supported when the CJ1W-PD022 Power Supply Unit is mounted.																
Memory protection	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 Flag and PVs, Index Registers, and the Data Registers will be saved for up to 20 days.																
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.																
Communicating across network levels	Remote programming and monitoring from Support Software and FINS message communications can be performed across different network levels, even for different types of network. Pre-Ver. 2.0 : Three levels Version 2.0 or later : Eight levels for Controller Link and Ethernet networks (See note.), three levels for other networks. Note: To communicate across eight levels, the CX-Integrator or the CX-Net in Programmer version 4.0 or higher must be used to set the routing tables.																
Storing comments in CPU Unit	I/O comments can be stored as symbol table files in the Memory Card, EM file memory, or comment memory (see note). Note: Comment memory is supported for CX-Programmer version 5.0 or higher and CS/CJ-series CPU Units with unit version 3.0 or later only.																
Program check	Program checks are performed at the beginning of operation for items such as no END instruction and instruction errors. CX-Programmer can also be used to check programs.																
Control output signals	RUN output: The internal contacts will turn ON (close) while the CPU Unit is operating (CJ1W-PA205R).																
Battery life	Battery Set for CJ1M CPU Units: CJ1W-BAT01																
Self-diagnostics	CPU errors (watchdog timer), I/O bus errors, memory errors, and battery errors.																
Other functions	Storage of number of times power has been interrupted. (Stored in A514.)																

Function Specifications

Ethernet Functional Element Transfer Specifications

Item		Specifications		
		CJ1M-CPU11-ETN	CJ1M-CPU12-ETN	CJ1M-CPU13-ETN
Media access method		CSMA/CD		
Modulation method		Baseband		
Transmission paths		Star form		
Baud rate		100 Mbit/s (100Base-TX), 10 Mbit/s (10Base-T)		
Transmission media	100 Mbit/s	Unshielded twisted-pair (UDP) cable Categories: 5, 5e Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e		
	10 Mbit/s	Unshielded twisted-pair (UDP) cable Categories: 3, 4, 5, 5e Shielded twisted-pair (STP) cable Categories: 100 Ω at 3, 4, 5, 5e		
Transmission distance		100 m (distance between hub and node)		
Number of cascade connections		There are no restrictions with the use of switching hubs.		
CPU Bus Unit System Setup Area capacity		994 bytes		

Note: The system settings for Ethernet are in the CPU Bus Unit System Setup Area in the CPU Unit.

CJ1-H-R, CJ1-H, CJ1M, and CJ1 CPU Unit Comparison

Item			CJ1-H-R CPU Unit	CJ1-H CPU Unit		CJ1M CPU Unit	CJ1M CPU Unit (with Ethernet function)		
			CJ1H-CPU6□H-R	CJ1H-CPU6□H	CJ1G-CPU4□H	CJ1M-CPU2□/1□	CJ1M-CPU1□-ETN		
Instruction executions times	Basic instructions	LD	0.016 μs	0.02 μs	0.04 μs	0.10 μs			
		OUT	0.016 μs	0.02 μs	0.04 μs	0.35 μs			
	Special instructions	Examples							
		XFER	240.1 μs (for 1,000 words)	300.1 μs (for 1,000 words)	380.1 μs (for 1,000 words)	650.2 μs (for 1,000 words)			
		BSET	140.2 μs (for 1,000 words)	200.1 μs (for 1,000 words)	220.1 μs (for 1,000 words)	400.2 μs (for 1,000 words)			
		BCD arithmetic	7.6 μs min.	8.2 μs min.	8.4 μs min.	<ul style="list-style-type: none"> • CPU11/21 21.5 μs min. • Other CPU Units 18.9 μs min. 			
		Binary arithmetic	0.18 μs min.	0.18 μs min.	0.20 μs min.	0.30 μs min.			
		Floatingpoint math	0.24 μs min.	8.0 μs min.	9.2 μs min.	<ul style="list-style-type: none"> • CPU11/21 15.7 μs min. • Other CPU Units 13.3 μs min. 			
SBS/RET	1.33 μs	2.12 μs	3.56 μs	3.84 μs					
Overhead time			Normal mode: 0.13 ms Parallel mode: 0.28 ms	Normal mode: 0.3 ms Parallel mode: 0.3 ms	0.5 ms	<ul style="list-style-type: none"> • CPU11/21 0.7 ms • Other CPU Units 0.5 ms 			
Execution timing	CPU execution processing modes		Any of the following four modes: 1. Normal (instructions and peripheral servicing performed consecutively) 2. Peripheral Servicing Priority Mode (instruction execution interrupted to service peripherals at a specific cycle and time; consecutive refreshing also performed) 3. Parallel Processing Mode with Synchronous Memory Access (instruction executed and peripheral services in parallel while synchronizing access to I/O memory) 4. Parallel Processing Mode with Asynchronous Memory Access (instruction executed and peripheral services in parallel without synchronizing access to I/O memory)				Either of following two modes: 1. Either of following two modes: Normal (instructions and peripheral servicing performed consecutively) 2. Peripheral Servicing Priority Mode (instruction execution interrupted to service peripherals at a specific cycle and time; consecutive refreshing also performed)		
	CPU Bus Unit special refreshing	Data links	During I/O refresh period or via special CPU BUS UNIT I/O REFRESH instruction (DLNK(226))						
		DeviceNet remote I/O							
		Protocol macro send/ receive data							
Refreshing of CIO and DM Areas words allocated to CPU Bus Unit									

Item		CJ1-H-R CPU Unit	CJ1-H CPU Unit		CJ1M CPU Unit	CJ1M CPU Unit (with Ethernet function)
		CJ1H-CPU6□H-R	CJ1H-CPU6□H	CJ1G-CPU4□H	CJ1M-CPU2□/1□	CJ1M-CPU1□-ETN
Tasks	Cyclic execution of interrupt tasks via TKON instruction (called "extra cyclic tasks")		Supported. (Up to 256 extra cyclic tasks, increasing the total number of cyclic tasks to 288 max.)			
	Independent/shared specifications for index and data registers		Supported. The time to switch between tasks can be reduced if shared registers are used.			
	Initialization when tasks are started		Supported. Task Startup Flags supported.			
	Starting subroutines from multiple tasks		Global subroutines can be defined that can be called from more than one task.			
	Scheduled interrupt interval for scheduled interrupt tasks		0.2 ms to 999.9 ms (in increments of 0.1 ms), 1 ms to 9,999 ms (in increments of 1 ms), or 10 ms to 99,990 ms (in increments of 10 ms)	1 ms to 9,999 ms (in increments of 1 ms) or 10 ms to 99,990 ms (in increments of 10 ms)	0.5 ms to 999.9 ms (in increments of 0.1 ms), 1 ms to 9,999 ms (in increments of 1 ms), or 10 ms to 99,990 ms (in increments of 10 ms)	
Interrupt task execution timing during instruction execution	For instructions Other than the following ones		Any instruction that is being executed is interrupted when interrupt task conditions are met to start the interrupt task. If the cyclic task (including extra cyclic tasks) accesses the same data area words as the instruction that was interrupted, data may not be concurrent. To ensure data concurrency, the DI and EI instructions must be used to disable and enable interrupts during a specific part of the program.			
	For BIT COUNTER (BCNT) or BLOCK TRANSFER (XFER) instructions		Interrupt tasks are started only after execution of the instruction has been completed, ensuring data concurrency even when the same data area words are accessed from the instruction and the interrupt task.			
Backup	Backup to Memory Cards (simple backup function)		In addition to the data listed at the right, data from Units mounted to the CPU Rack or Expansion Racks can also be backed up to the Memory Card (via pushbutton on front panel). This is very effective when replacing Units. Backup data includes scan lists for DeviceNet Units, protocol macros for Serial Communications Units, etc.			
	Automatic user program and parameter area backup to flash memory		Supported (enabling battery-free operation without a Memory Card) The user program and parameter area data are automatically backed up to the flash memory whenever they are transferred to the CPU Unit from the CX-Programmer, file memory, etc.			
I/O tables	Detailed information on I/O table creation errors		Detailed I/O table error information is stored in A261 whenever the I/O tables cannot be created for any reason.			
	Displaying presence of first rack word setting on Programming Console		It's possible to confirm if the first rack word has been specified for the system on the Programming Console display. The first rack word is specified from the CX-Programmer, making it previously impossible to confirm the setting from the Programming Console.			
Built-in I/O		Not supported.			CJ1M-CPU2□	Not supported.
Serial PLC Link		Not supported.			Supported.	
Scheduled interrupts set in increments of 0.1 ms		Supported.	Not supported.		Supported.	
Battery		CPM2A-BAT01			CJ1W-BAT01	
Operation when Unit doesn't complete startup process	CPU Unit startup		Starting or not starting (standby) the CPU Unit in MONITOR or RUN mode even if a Unit has not completed startup processing can be specified in the PLC Setup.			
Sequence instructions	Differentiated LD NOT, AND NOT, and OR NOT instructions		Supported.			
	OUTB, SETB, and RSTB instructions to manipulate individual bits in DM and EM Area words		Supported.			
Timer/counter instructions	TIMU (0.1-ms, BCD), TIMUX (0.1-ms, binary), TMUH (0.01-ms, BCD), TMUHX (0.01-ms, binary)		Supported. Either BCD or binary can be selected (with CX-Programmer Ver.7.1 or higher).	Not supported.		
	Format for updating PVs for TIM, TIMH, TMHH, TTIM, TIML, MTIM, CNT, CNTR, CNR, TIMW, TMHW, CNTW instructions		Supported. Either BCD or binary can be selected (with CX-Programmer Ver. 3.0 or higher).			
Special math instructions	32-bit signed data line coordinates and X axis starting point specification for APR instruction		Supported.			

Item		CJ1-H-R CPU Unit	CJ1-H CPU Unit		CJ1M CPU Unit	CJ1M CPU Unit (with Ethernet function)
		CJ1H-CPU6□H-R	CJ1H-CPU6□H	CJ1G-CPU4□H	CJ1M-CPU2□/1□	CJ1M-CPU1□-ETN
Floating-point decimal instructions	High-speed trigonometric functions: SINQ, COSQ, and TANQ instructions	Supported (with CX-Programmer Ver. 7.1 or higher).	Not supported.			
	Single-precision calculations and conversions	Supported (enabling standard deviation calculations).				
	Conversions between single-precision floating point and ASCII	Supported. Floating point can be converted to ASCII for display on PTs. ASCII text strings from measurement devices can be converted to floating-point decimal for use in calculations.				
	Double-precision calculations and conversions	Supported (enabling high-precision positioning).				
Text string, table data, and data shift instructions	Text string and table data processing instruction execution	Data processing can be performed normally or in the background (specified for each instruction). (Using time slices to process instruction over several cycles reduces the effect of these instructions on the cycle time.)				
	Stack insertions/deletions/replacements and stack counts with table processing instructions	Supported. Effective for tracking workpieces on conveyor lines.				
Data control instructions	PID with autotuning	Supported (eliminating the need to adjust PID constants).				
Subroutine instructions	Global subroutines	Supported (GSBS, GSBN, and GRET instructions) Enables easier structuring of subroutines.				
Failure diagnosis instructions	Error log storage for FAL	Supported. FAL can be executed without placing an entry in the error log. (Only system FAL errors will be placed in the error log.)				
	Error simulation with FAL/FALS	Supported. Fatal and nonfatal errors can be simulated in the system to aid in debugging.				
Data comparison instructions	AREA RANGE COMPARE (ZCP) and DOUBLE RANGE COMPARE (ZCPL)	Supported.				
Index register real I/O address conversion for CVM1/CV	Program and real I/O memory address compatibility with CVM1/CVseries PLCs	CVM1/CV-series real I/O memory addresses can be converted to CJ-series addresses and placed in index registers or CJ-series real I/O memory addresses in index registers can be converted to CVM1/CV-series addresses.				
Condition Flag saving and loading	Compatibility with CVM1/CV-series PLCs	Condition Flag status can be saved or loading using the SAVE CONDITION FLAGS (CCS) and LOAD CONDITION FLAGS (CCL) instructions, enabling applications where Condition Flag status must be passed between different program locations, tasks, or cycles.				
Disabling power interruptions in program sections		Supported. Instructions between DI and EI are executed without performing power OFF processing even if a power interruption has been detected and confirmed.				
Condition Flag operation		The statuses of the Equals, Negative, and Error Flags are maintained for execution of the following instructions. TIM, TIMH, TMHH, TIMU, TMUH, CNT, IL, ILC, JMP0, JME0, XCHG, XCGL, MOVR, input comparison instructions, CMP, CMPL, CPS, CPSL, TST, TSTN, STC, and CLC.				

Comparison between Ethernet Functional Elements and Ethernet Units

The following table shows the differences between CJ1M CPU Units with Ethernet Functions and CJ-series Ethernet Units.

Item		CJ-series Ethernet Unit	CJ1M CPU Units with Ethernet	
Model number		CJ1W-ETN21	CJ1M-CPU11-ETN CJ1M-CPU12-ETN CJ1M-CPU13-ETN	
Physical layer		100BASE-TX, 10BASE-T	Same	
Number of nodes on FINS network		254	Same	
Removing Ethernet functional element		Possible	Not possible	
Server specification		Specification by IP address or host name specifications (DNS client function)	Same	
Communications service	FINS communications service	FINS/UDP FINS/TCP	Same	
	FTP server function	The CPU Unit's file memory (Memory Card or EM file memory) can be read/written.	The CPU functional element's file memory (Memory Card only) can be read/written.	
	Automatic clock information adjustment	The CPU Unit's internal clock data can be automatically adjusted to the clock data received from the SNTP server	Same	
	Web functions	The Unit settings can be made and status can be read from a Web browser using the Web server.	Same	
	Mail functions	Mail send functions Mail receive functions	Not possible	
	Socket service function	TCP socket services UDP socket services	Not possible	
	FINS commands	RESET		Same
		CONTROLLER DATA READ		Same Responds to CJ1W-ETN21
		CONTROLLER STATUS READ		Same
		ECHOBACK TEST		Same
		BROADCAST TEST (READ RESULTS)		Same
		BROADCAST TEST (SEND TEST DATA)		Same
		ERROR LOG READ		Same
		ERROR LOG CLEAR		Same
		REQUEST TO OPEN UDP SOCKET		Not possible
		REQUEST TO RECEIVE UDP SOCKET		Not possible
		REQUEST TO SEND UDP SOCKET		Not possible
		REQUEST TO CLOSE UDP SOCKET		Not possible
		REQUEST TO OPEN TCP SOCKET (PASSIVE)		Not possible
		REQUEST TO OPEN TCP SOCKET (ACTIVE)		Not possible
		REQUEST TO RECEIVE TCP SOCKET		Not possible
		REQUEST TO SEND TCP SOCKET		Not possible
		REQUEST TO CLOSE TCP SOCKET		Not possible
		EXECUTE PING COMMAND		Same
		REQUEST TO CHANGE REMOTE NODE FOR FINS/TCP CONNECTION		Same
		REQUEST TO READ STATUS FOR FINS/TCP CONNECTION		Same
		IP ADDRESS TABLE WRITE		Same
		IP ADDRESS WRITE		Same
		IP ADDRESS TABLE READ		Same
	IP ROUTING TABLE READ		Same	
PROTOCOL STATUS READ		Same		
MEMORY STATUS READ		Same		
SOCKET STATUS READ		Same		
ADDRESS DATA READ		Same		
IP ADDRESS READ		Same		

Unit Versions

Units	Models	Unit Version	
		CPU Functional element	Ethernet Functional element
CJ1M CPU Unit (with Ethernet Function)	CJ1M-CPU1□-ETN	Unit Version 4.0	Unit Version 1.4 Unit Version 1.5

Functions Supported for Unit Versions of CJ1M CPU Units with Ethernet

Functions Supported for Unit Version 4.0 or Later

CX-Programmer version 7.0 or higher must be used to enable using the functions added for unit version 4.0.

More functions will be supported if you use CX-Programmer version 7.2 or higher.

CPU Unit		CJ1M CPU Unit with Ethernet	
Models		CJ1M-CPU1□-ETN	
Unit version		Unit version 4.0 or later	Other unit versions
Function			
Online editing of function blocks Note: Online editing is not supported by CX-Simulator.		OK	—
Input-output variables for function blocks		OK	—
Text strings (STRING data type) for function blocks		OK	—
New application instructions	Number-Text String Conversion Instructions: NUM4, NUM8, NUM16, STR4, STR8, and STR16	OK	—
	TEXT FILE WRITE (TWRIT)	OK	—
Using ST language in task programs		OK with CX-Programmer Ver.7.2 or later	—
Using SFC language in task programs		OK with CX-Programmer Ver.7.2 or later	—

User programs that contain functions supported only by CPU Units with unit version 4.0 or later cannot be used on CS/CJ-series CPU Units with unit version 3.0 or earlier. An error message will be displayed if an attempt is made to download programs containing unit version 4.0 functions to a CPU Unit with a unit version of 3.0 or earlier, and the download will not be possible.

If an object program file (.OBJ) using these functions is transferred to a CPU Unit with a unit version of 3.0 or earlier, a program error will occur when operation is started or when the unit version 4.0 function is executed, and CPU Unit operation will stop.

Functions Supported for Version 1.5 or Later of the Ethernet Functional Element

CX-Programmer version 8.2 or higher must be used to enable using the functions added for Ethernet functional element version 1.5.

CPU Unit type		CJ1M CPU Unit (with Ethernet function)	
Model		CJ1M-CPU1□-ETN	
Unit version		Ethernet Functional Element with unit version 1.5 or later	Other unit versions
Function			
Using subnet mask settings to enable CIDR		OK with CX-Programmer Ver.8.2 or later	—

Unit Versions and Programming Devices

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

Unit Versions and Programming Devices

CPU Functional Element	Functions		CX-Programmer				Programming Console
			Ver. 3.3	Ver. 4.0	Ver. 5.0 Ver. 6.0	Ver. 7.0 or later	
Unit Ver.4.0	Functions added for unit version 4.0	Using new functions	—	—	—	OK	No restrictions
		Not using new functions	OK	OK	OK	OK	
Ethernet Functional Element	Functions		CX-Programmer		Programming Console		
			Ver. 8.1	Ver. 8.2 or later			
Unit Ver.1.5	Functions added for unit version 1.5	Using new functions	—	OK	No restrictions		
		Not using new functions	OK	OK			

Device Type Setting

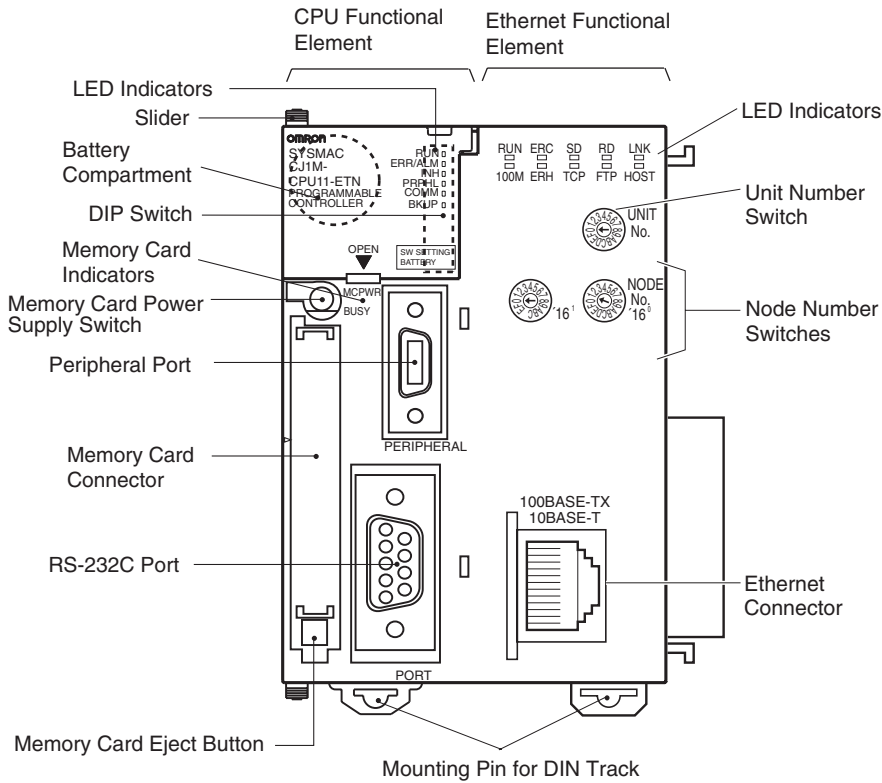
The unit version does not affect the setting made for the device type on the CX-Programmer. Select the device type as shown in the following table regardless of the unit version of the CPU Unit.

Series	CPU Unit group	CPU Unit model	Device type setting on CX-Programmer Ver. 4.0 or higher
CJ-Series	CJ1M CPU Units (with Ethernet function)	CJ1M-CPU1□-ETN	CJ1M

Note: Select the CPU type either CPU11, CPU12, or CPU13 as the CPU type for CJ1M.

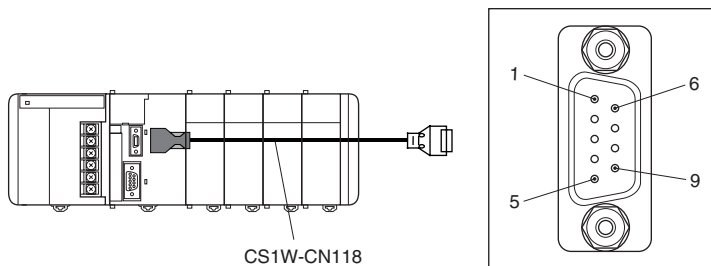
External Interface

A CJ-series CJ1M CPU Unit (with Ethernet function) provides three communications ports (a peripheral port, an RS-232C port and Ethernet connectors).



Peripheral port

The peripheral port is used to connect a Programming Device (including a Programming Console) or a host computer. It can also be used as an RS-232C port by connecting a suitable cable, such as the CS1W-CN118 or CS1W-CN□26. The connector pin arrangement when using a connecting cable for an RS-232C port is shown below.

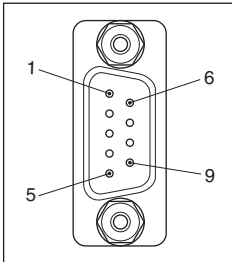


Pin No.	Signal	Name	Direction
1	—	—	—
2	SD (TXD)	Send data	Output
3	RD (RXD)	Receive data	Input
4	RS (RTS)	Request to send	Output
5	CS (CTS)	Clear to send	Input
6	Reserved	None	—
7	—	—	—
8	—	—	—
9	SG (0V)	Signal ground	—
Connector hood	FG	Protection earth	—

RS-232C Port

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 (See note.)
Transmission distance	15 m max.
Interface	EIA RS-232C
Protocol	Host Link, NT Link, 1:N, No-protocol, or Peripheral Bus

Note: 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.



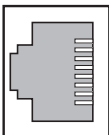
Pin No.	Signal	Name	Direction
1	FG	Protection earth	—
2	SD (TXD)	Send data	Output
3	RD (RXD)	Receive data	Input
4	RS (RTS)	Request to send	Output
5	CS (CTS)	Clear to send	Input
6	5V	Power supply	—
7	DR (DSR)	Data set ready	Input
8	ER (DTR)	Data terminal ready	Output
9	SG (0V)	Signal ground	—
Connector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

Note: Do not use the 5-V power from pin 6 of the RS-232C port for anything but the NT-AL001-E Link Adapter. Using this power supply for any other external device may damage the CPU Unit or the external device.

Ethernet Connectors

The following standards and specifications apply to the connectors for the Ethernet twisted-pair cable.

- Electrical specifications: Conforming to IEEE802.3 standards.
- Connector structure: RJ45 8-pin Modular Connector
(conforming to ISO 8877)



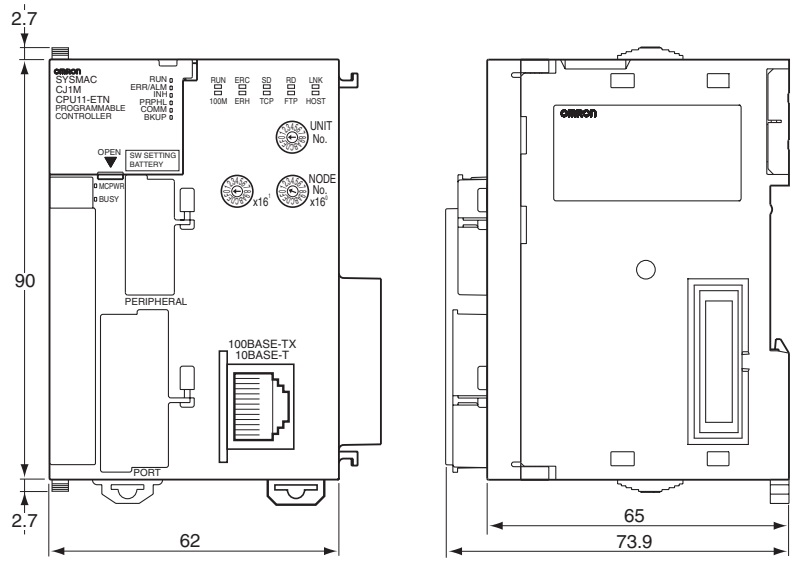
Pin No.	Signal	Name	Direction
1	TD+	Transmission data +	Output
2	TD-	Transmission data -	Output
3	RD+	Reception data +	Input
4	—	Not used.	—
5	—	Not used.	—
6	RD-	Reception data -	Input
7	—	Not used.	—
8	—	Not used.	—
Hood	FG	Frame ground	—

Dimensions

(Unit : mm)

CJ1M CPU Unit (with Ethernet function)

CJ1M-CPU11-ETN/CPU12-ETN/CPU13-ETN



Related Manuals

Cat. No.	Model	Manual	Application	Description
W441	CJ1M-CPU1□-ETN	CJ-series CJ1M CPU Unit (with Ethernet function) Operation Manual	Information on CPU Units with Ethernet, including an overview, specifications, and maintenance	Describes the following for CJ1M CPU Units with Ethernet function <ul style="list-style-type: none"> • Overview and features • Basic system configuration Also refer to the Operation Manual (W393) and Ethernet Units Operation Manual (W420 and W421)
W393	CJ1H-CPU□□H-R CJ1G-CPU□□ CJ1M-CPU□□ CJ1G-CPU□□P CJ1G/H-CPU□□H	SYSMAC CJ/NSJ Series Operation Manual	Basic specifications on CJ-series PLCs, including an overview, designing, installation, and maintenance	Describes the following for CJ-series CPU Units <ul style="list-style-type: none"> • Overview and features • System configuration • Mounting and setting procedure • Remedies for errors Also refer to the Programming Manual (W394)
W394	CS1G/H-CPU□□H CS1G/H-CPU□□-EV1 CS1D-CPU□□H CS1D-CPU□□S CJ1H-CPU□□H-R CJ1G/H-CPU□□H CJ1G-CPU□□ CJ1G-CPU□□P CJ1M-CPU□□ NSJ□□-□□□□□-□□□□	SYSMAC CS/CJ/NSJ Series Programming Manual	Information on all of the PLCs in the CS/CJ Series	This manual describes programming and other methods to use the functions of the CS/CJ-series and NSJ-series PLCs.
W474	CS1□-CPU□□□□-□□ CJ1□-CPU□□□□-□□ CJ2□-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 for the CPU Units when you do programming.
W342	CJ2H-CPU6□-EIP CJ2H-CPU6□ 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□□□□□-□ CP1E-□□□□□□-□ 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.
W341	CQM1H-PRO01-E CQM1-PRO01-E C200H-PRO27-E	SYSMAC CS/CJ Series Programming Consoles Operation Manual	Programming Console operating procedure	Provides information on how to program and operate CS/CJ-series PLCs using a Programming Console.
W420	CS1W-ETN21 CJ1W-ETN21	Ethernet Units Operation Manual Construction of Networks	Information when using an Ethernet Unit	Provides information on operating and installing 100Base-TX Ethernet Units, including details on basic settings and FINS communications. Refer to the Communications Commands Reference Manual (W342) for details on FINS commands that can be sent to CS-series and CJ-series CPU Units when using the FINS communications service.
W421	CS1W-ETN21 CJ1W-ETN21	Ethernet Units Operation Manual Construction of Applications		Provides information on constructing host applications for 100Base-TX Ethernet Units, including functions for sending/receiving mail, socket service, automatic clock adjustment, FTP server functions, and FINS communications.
W446		CX-Programmer Operation Manual	Support Software for Windows computers	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	WS02-CXPC□-V□	CX-Programmer Operation Manual Functions Blocks	CX-Programmer operating procedure	
W464	CXONE-AL□□□-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.
W463	CXONE-AL□□□-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.

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