PRODUCT OVERVIEW

CVM1 Series — CVM1 Duplex

The CVM1D Duplex system's redundancy is a new option in Omron's large controllers. Two redundant CPUs and power supplies ensure that processes will continue operation when a failure occurs. This makes the CVM1D ideal for critical control system applications. Besides its redundancy, the CVM1D has several enhanced features of the CV/CVM1 Series, including a higher level of performance, communications, and networking.

- **Redundant CPUs**
- **Redundant power supplies**
- **Hot standby simultaneous processing**
- **Replace a CPU, power supply, and I/O modules on-line**
- **Synchronized program execution and switching functions**
- **Supports existing CVM1, C500, CV500 and 3G2A5 I/O modules**
- **High speed 0.125 μs processing**
- **Large 62K-word program and 24K-word data memory capacity**
- **Meets UL/CSA/CE standards**
- **275 instructions (500 variations)**
- **Supports various software tools and programming devices**
- **Duplex and simplex modes**

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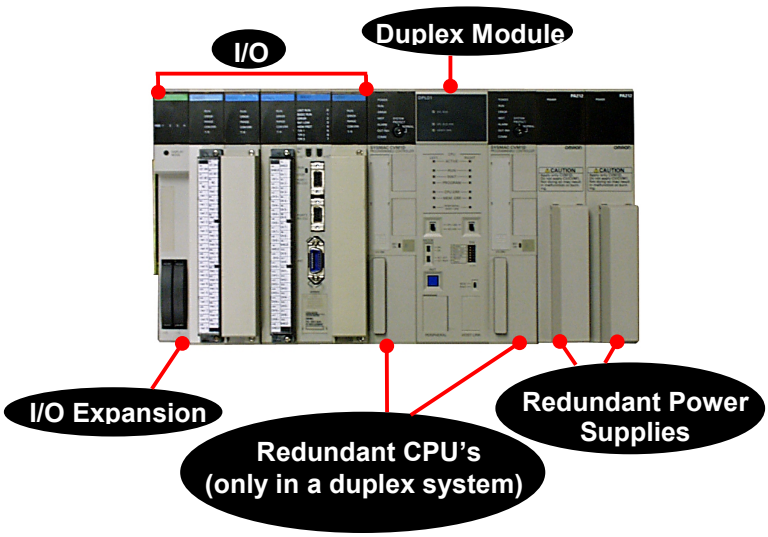
Duplex and Simplex Operation

Duplex System (DPL)

CVM1D CPU rack is equipped with:

1. Two CPUs
   - One active CPU controlling the system
   - One standby CPU operating in parallel with the active CPU
2. A duplex unit that monitors errors in the two CPUs, switches the CPU, I/O, and peripheral buses to the standby CPU if an error occurs in the active CPU
3. Two power supplies operating simultaneously

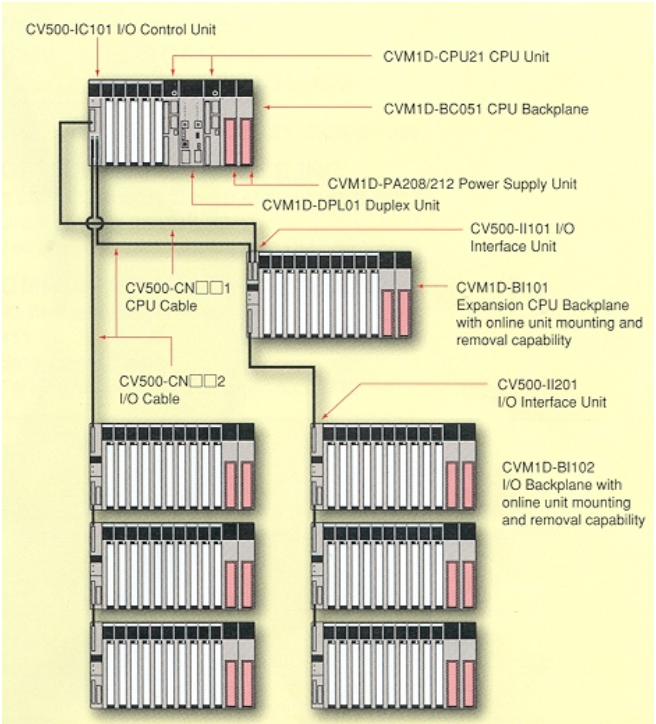


Simplex System (SPL)

CVM1D CPU Rack is equipped with:

1. One CPU to control the system
2. A duplex unit that primarily operates the duplex system. It also performs other functions including I/O bus switching.
3. Two power supplies operating simultaneously

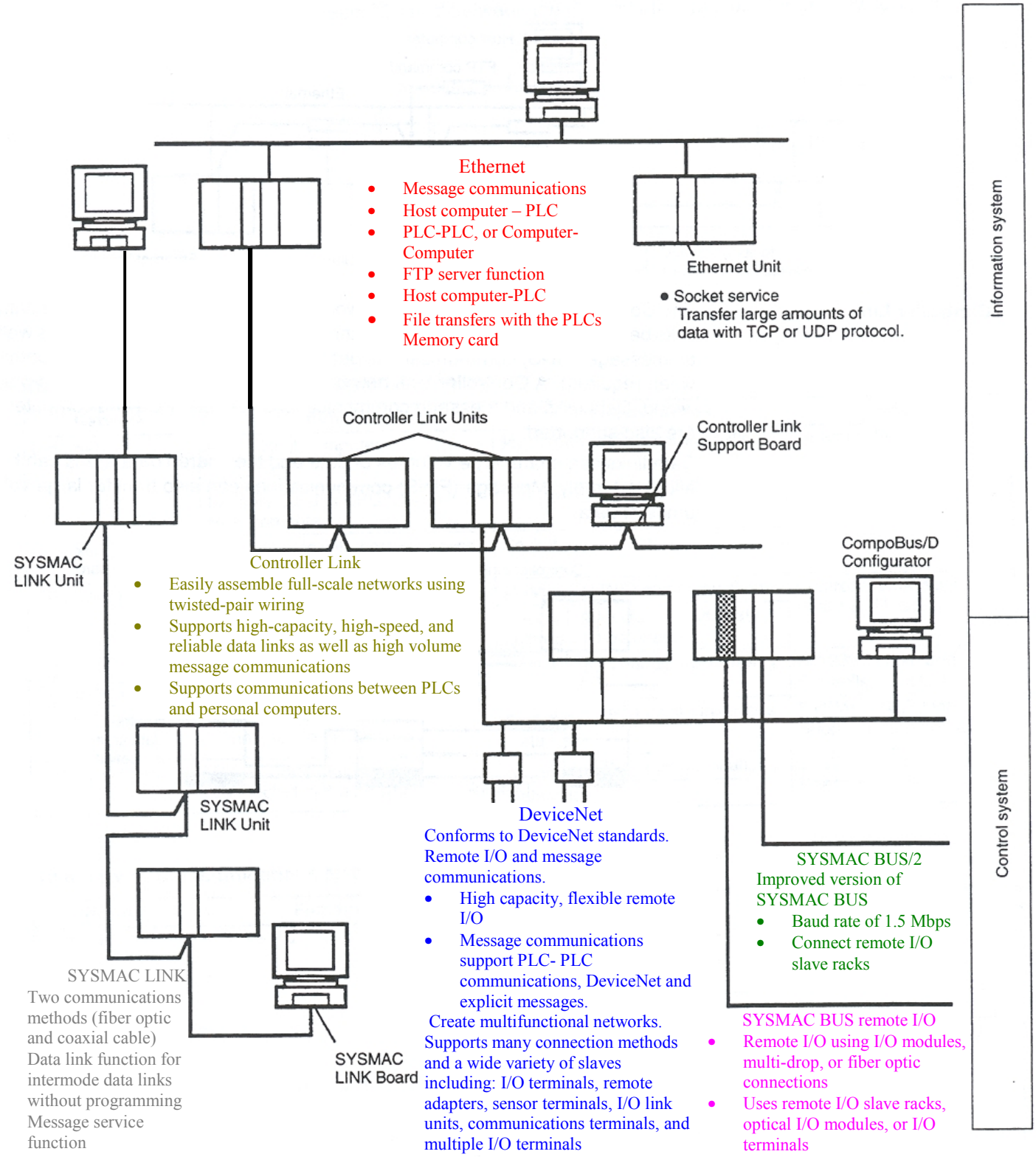
**Example of a Duplex System with an Expansion CPU Rack



System Configuration

1. Basic System with a CVM1D CPU rack and expansion I/O racks
   - Uses up to 5 "CPU bus" modules (units).
   - Uses redundant power supplies.
   - I/O Modules can be replaced online.
2. System with a CVM1D CPU rack, expansion CPU rack, and expansion I/O racks**
   - Uses up to 15 "CPU Bus" modules (units).
   - Uses redundant power supplies.
   - I/O Modules can be replaced online.
3. System with a CVM1D CPU rack, CVM1 or CV-series expansion CPU rack, and CVM1 or CV-series expansion I/O racks
   - Demonstrates how to convert an existing CVM1 or CV-series system to a duplex system
   - Uses redundant power supplies
   - I/O modules can be replaced online in the CPU Rack. (Supported by the CVM1 or CV-series racks.)
   - CVM1 or CV-series expansion I/O racks without I/O interface units cannot be connected.
4. System with a CVM1D CPU rack and C-series expansion I/O racks
   - Demonstrates how to upgrade an existing C2000H duplex system to a CVM1D Duplex system.
   - Uses redundant power supplies.
   - I/O modules can be replaced online in the CPU rack, but not the C-series racks.
   - C-series racks cannot be combined with CVM1 or CV-series expansion I/O racks.

The following diagram shows the communications networks supported by CVM1D Controllers.



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Summary of Communications Networks: Information Level Communications

Network	Function	Communications	Supporting Devices
Ethernet	PLC ⇔ Host Computer	Message (FINS) communications	Ethernet unit
	PLC ⇔ PLC	Message (FINS) communications	
	Memory Card in CPU Unit ⇔ Host Computer	File Transfer Protocol (FTP) server function	
	Socket service function	TCP/IP and UDP/IP	
Controller Link	PLC ⇔ Computer directly connected to the network	Message (FINS) communications	Controller Link support board and snit
		Data link (Offsets and automatic settings can be used.)	
RS-232C to Controller Link	Host computer and PLCs in the network	Host link commands and gateway functions	RS-232C cable and Controller Link unit
SYSMAC LINK	PLC ⇔ Computer directly connected to the network	Message (FINS) communications	SYSMAC LINK Support board and unit
		Data Link	

Summary of Communications Networks: Control Level Communications

Network	Function	Communications	Devices
Controller Link	PLC ⇔ PLC	Message (FINS) communications	Controller Link Unit
		Data link (Offsets and automatic settings can be used.)	
PC Link	PLC ⇔ PLC	Automatic data link	PC Link Unit
DeviceNet	PLC ⇔ PLC	Open network message (FINS) communications	DeviceNet Master Unit and Configurator
SYSMAC LINK	PLC ⇔ PLC	Message (FINS) communications	SYSMAC LINK Unit
		Data Link	

SPECIFICATIONS CVM1 Duplex

Item		Specification	
Power Supply		CVM1D-PA208	CVM1D-PA212
Input-Power Supply	**Rated Voltage**	100 to 120 or 200 to 240 VAC (automatic voltage setting)	
	Frequency	50/60 Hz ±5%	
	Operating Voltage Range	85 to 132 or 170 to 264 VAC	
Power Consumption		150VA max.	200VA max.
Inrush Current		30A max.	
Output Capacity		8A	12A
Overcurrent Protection		105% min.	
Overvoltage Protection		6V min.	
Grounding		Less than 100 Ω	
Enclosure		Mounted in panel	
Weight		0.9 kg	
Dimensions (mm) L x W x H		250 x 47 x 116 max.*	
Terminal Screw Size		M3.5	
Applicable Mounting Torque		0.8N m (8.1 kgf cm)	
Applicable Crimp Terminal		1.25 to YS3A, VD1.25 to 3.5	
Applicable Wire		0.25 to 1.65 mm2	
Insulation Resistance		20MΩmin. (at 500 VDC) between AC external terminals and GR terminals	
Dielectric Strength		2,300 VAC 50/60 Hz for 1 min between AC external and GR terminals, leakage current: 10mA max.	
Noise Immunity		1,500 Vp-p, pulse width: 100ns to 1 μs, rise time: 1ns (via noise simulation)	
Vibration Resistance		10 to 57Hz, 0.075mm amplitude, 57 to 150Hz, acceleration: 1 G in X, Y and Z directions for 80 minutes (time coefficient: 8 minutes x coefficient factor 10 = total time of 80 minutes) (according to JIS C0911)	
Shock Resistance		15G 3 times each in the X, Y and Z directions (according to JIS C0912)	
External Input Signal		Start input	
External Output Signal		Output while PLC is operating	
Ambient Operating Temperature		0 to 55 ˚C	
Ambient Operating Humidity		10% to 90% (with no condensation)	
Atmosphere		Must be free of corrosive gases	
Ambient Storage Temperature		-25 to 75°C	
Mounting Location		CPU, CPU expansion, or I/O expansion backplanes	CPU, CPU expansion, or I/O expansion backplanes

*Depth dimensions may vary due to cabling and connections.

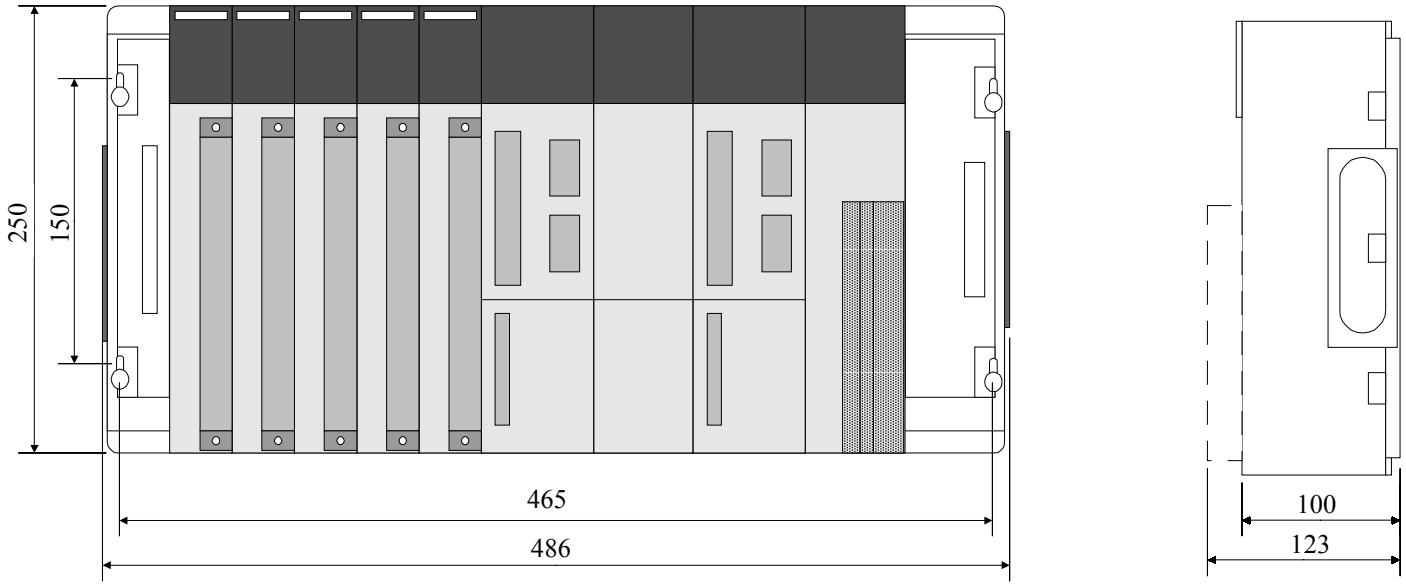
PERFORMANCE SPECIFICATIONS CVM1 Duplex

Item		Specification
CPU		CVM1D-CPU21 **
Control Method		Stored program
I/O Control Method		Cyclic refreshing
Programming		Ladder diagrams
Instruction Length		1 to 8 words/instruction, 1 address/instruction
Ladder Instruction		275 (500 variations)
Execution Time	**Basic**	0.125 to 0.375 µs
	Special	0.5 to 8.25 µs
Program Capacity		62K words
I/O Bits		2,048 (words 0000 to 0127)
Remote I/O Bits	**SYSMAC BUS/2**	2,048
	SYSBUS	2,048
Remote I/O Bits		SYSMAC BUS/2 : 12,800 (words 0200 to 999) SYSBUS : 4,096 (words 2300 to 2555)
Work Bits		1,152 (words 0128 to 0199) 6,400 (words 1900 to 2299)
Link Bits		3,200 : 100000 to 119915 (words 1000 to 1199)
Holding Bits		4,800 : 120000 to 149915 (words 1200 to 1499)
CPU Bus Unit Bits		6,400 : 150000 to 189915 (words 1500 to 1899)
Temporary Bits		8 (TR0 to TR7)
CPU Bus Link Bits		4,096 : G00000 to 25515 (words G000 to 255)
Auxiliary Bits		8,192 : A00000 to 51115 (words A000 to 511)
Timers		1,024 bits (T0000 to 1023) Timer : 0 to 999.9 s, High Speed Timer : 0 to 99.99 s
Counters		1,024 bits (C0000 to 1023) 0 to 9999 counts
Data Memory		24K words (D00000 to 24575)
Expansion DM		256K words (E00000 to 32765 x 8 banks)
Data Registers		3 words (DR0 to DR2)
Index Registers		3 words (IR0 to IR2)
Trace Memory		2K words (non-synchronous processing)
File Memory		Memory cards : RAM, EEPROM, or EPROM
Control Input Signal		START input : RUN mode PC begins operating when input is ON and stops when it is OFF Input specifications : 24VDC, 10mA
Control Output Signal		RUN output : The RUN output terminals are ON (closed) while the PC is operating Maximum switching capacity : 250VAC/2A (resistive load), 24VDC/2A, 250VAC/0.5A (inductive load: cos (=0.4)
Memory Protection		Holding bits and contents of counters and data memory
Battery Life		Service life: 5 years The memory backup time when the PC is not powered varies with ambient temperature
Self-diagnostics		CPU failure (watchdog timer), I/O verify error, I/O bus error, memory failure, remote I/O error, battery error, link error, special I/O error, and others

** The CVM1D only operates in synchronous RUN mode.

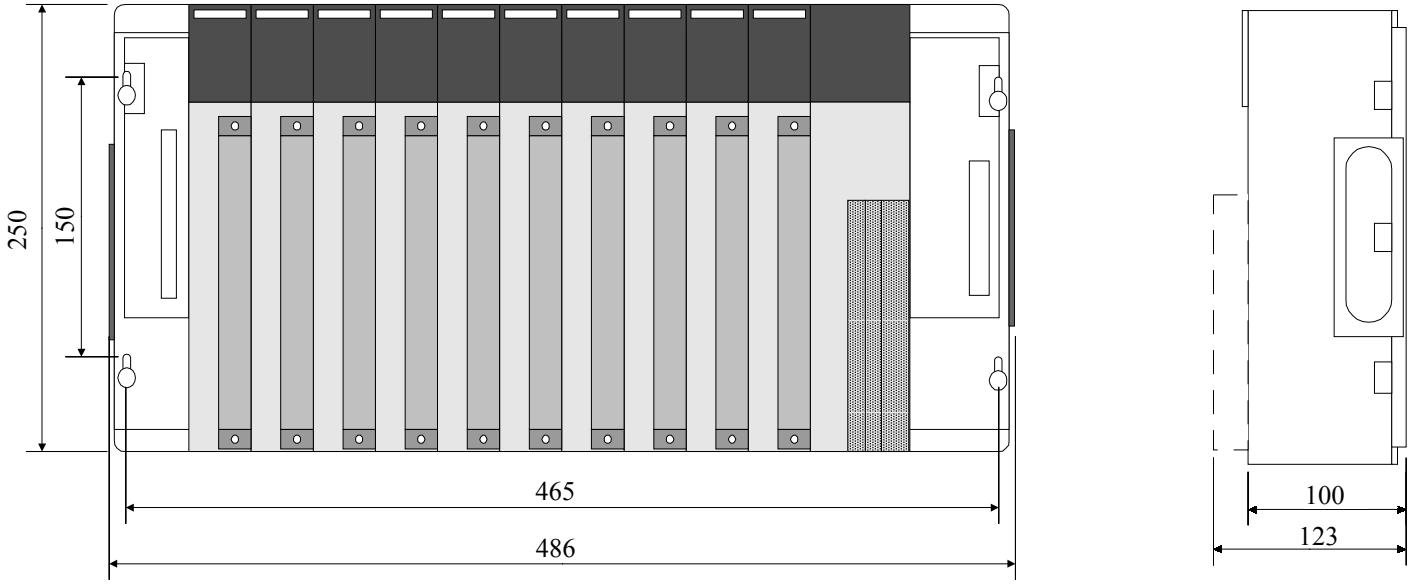
- CPU Rack (Unit : mm)

The diagram below shows the rack without one power supply and an I/O control unit.



- Expansion CPU and Expansion I/O Racks (Unit : mm)

The diagram below shows the rack without one power supply and an I/O control unit.



ORDERING INFORMATION CVM1 Duplex

Description	Part Number	Standards
CVM1D CPU Two required for a duplex system	CVM1D-CPU21	UL, CSA, CE
Duplex Module Required in a simplex and duplex system	CVM1D-DPL01	UL, CSA, CE
CPU Backplane 5-slot	CVM1D-BC051	UL, CSA, CE
Expansion CPU Backplane 10-slot	CVM1D-BI101	UL, CSA, CE
Expansion I/O Backplane 10-slot	CVM1D-BI102	UL, CSA, CE
Power Supply 12A output capacity/85 to 135VAC operating voltage range *	CVM1D-PA208	UL, CSA, CE
Power Supply 8A output cpapcity/170 to 264VAC operating voltage range *	CVM1D-PA212	UL, CSA
Programming Console	CVM1-PRS21-EV1	UL, CSA, CE
CX-Programmer Software (Configure as CVM1-CPU21-V2 CPU) **	WS02-CXPC1-EV2.x	
Operation Manual	W351	
Installation Manual	W350	

* Requires 2 power supplies of the same type per backplane.

** SYSWIN, CX-Programmer, SYSMAC-CPT, SYSMAC Support Software (SSS), and CVSS can be used also.