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Programmable Controller

OMRON

SYSMAC

# CVM1

## The Perfect Programmable Controller for Large-Scale Machine Control



OMRON

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#11-01, UE Square,
Singapore 239920
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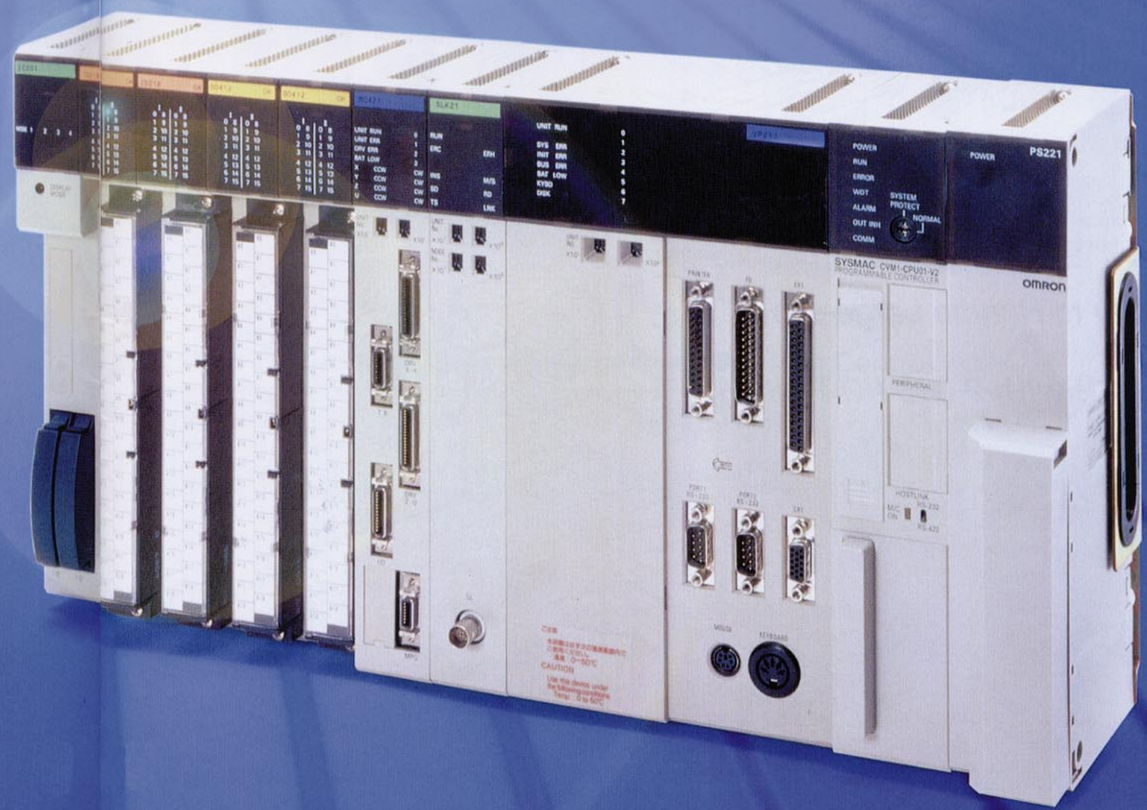
Cat. No. P034-E1-2

Note:Specifications subject to change without notice.

Printed in Japan
0500-?M (?)

# High-speed Control for Large-scale Machinery with the SYSMAC CVM1

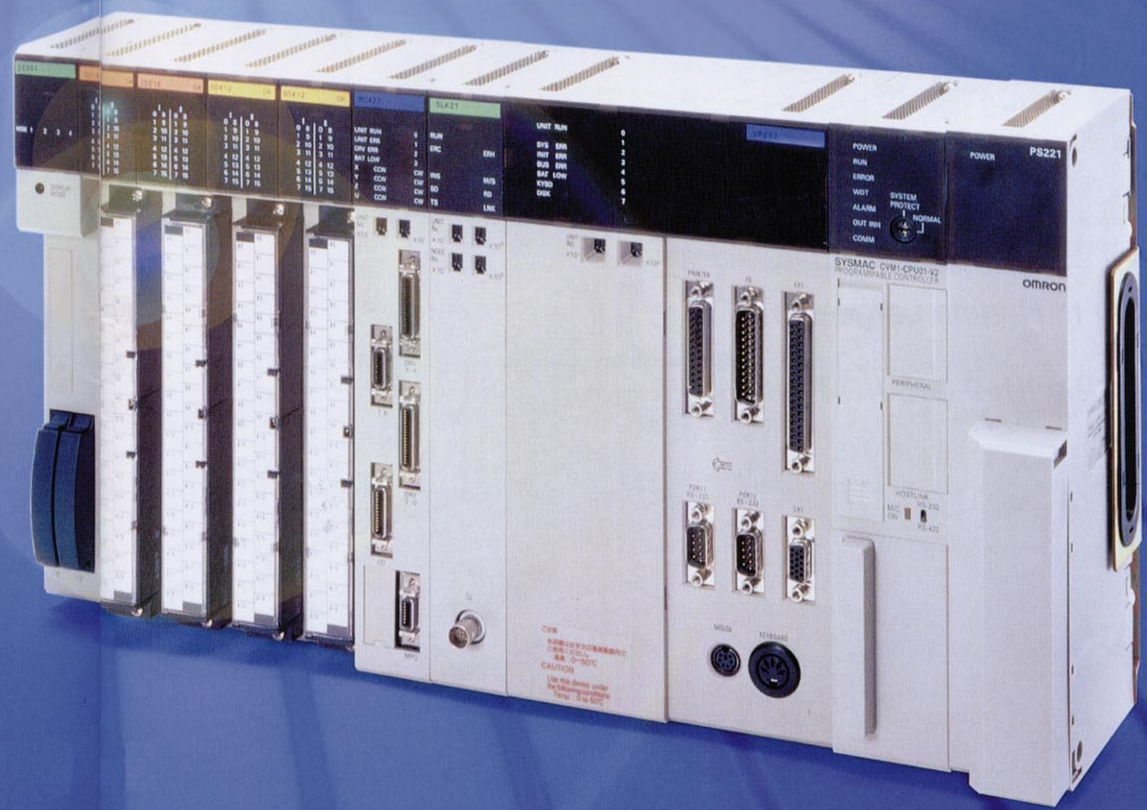
The SYSMAC CVM1 brings intelligence to large-scale machine control. A faster and more complete instruction set simplifies process control, data processing, and other control tasks. And there's plenty of I/O capacity to handle large-scale systems with CPU models that support up to 2,048 local I/O points. You also get three-level network communications with SYSMAC LINK, Controller Link, and/or Ethernet networks to easily achieve high-speed system control. The SYSMAC CVM1 is the ideal Programmable Controller for machine control in systems requiring data processing.




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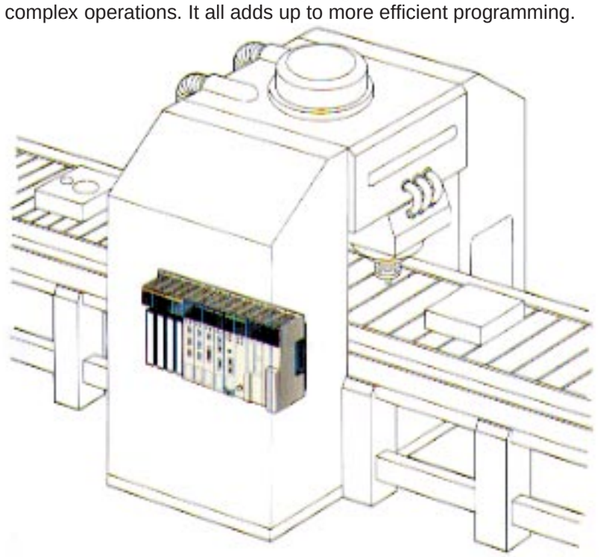
# Better Functionality

## Easier, Simpler Large-scale Control with Advanced PC Intelligence

CVM1

### *Simplify Complex Control Operations with New Instructions*
***(125 Instructions with 204 Variations)***

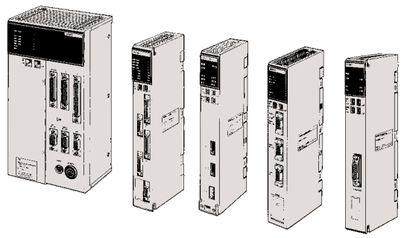
Floating-point arithmetic, symbol math, PID, and many other new instructions have been added to simplify everything from data processing and process control through high-speed positioning and other complex operations. It all adds up to more efficient programming.





### *System Control through Advanced Units*

A Motion Control Unit (scheduled for release soon) provides 4-axis position control capability, while a Personal Computer Unit places DOS right on the PC Rack (see page 11). And a Temperature Controller Data Link Unit manages data from multiple temperature controllers. These, and other CPU Bus Units achieve easy system control.

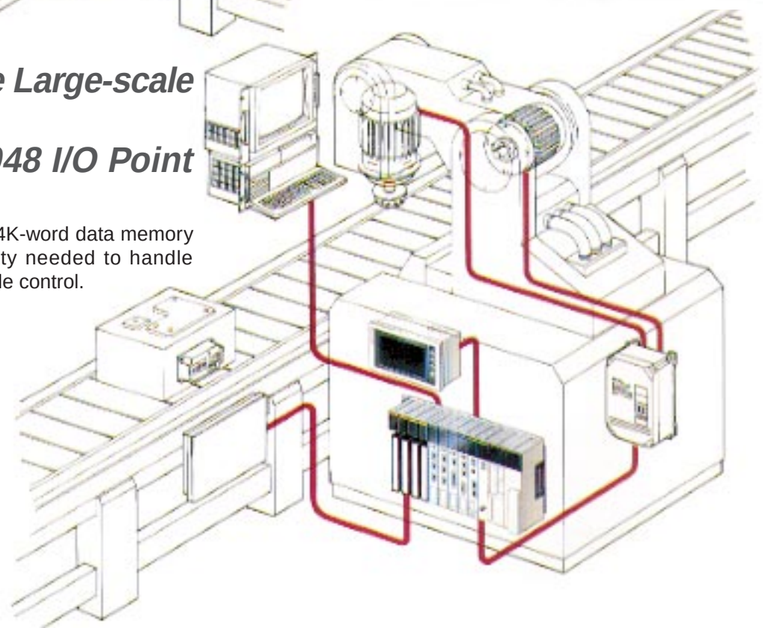


### *SYSMAC C-series Compatibility*

The SYSMAC Support Software allows you to program ladder diagrams that can be used both for the CVM1 and for C-series PCs.

### *Capacity to Handle Large-scale Control: New CPU with 2,048 I/O Point Capacity*

A 62K-word user memory and 24K-word data memory also provide the added capacity needed to handle complex operations for large-scale control.



## ■ More Features for Powerful Large-scale Machine Control

**High Speed and Capacity**
You get basic instructions processed in 0.125 µs, 64K words of user memory, 24K words of data memory, up to 2,048 local I/O points, up to 2,048 SYSMAC BUS remote I/O points, and up to 2,048 SYSMAC BUS/2 remote I/O points.

**Expandable Data Memory**
Expansion Data Memory can be added to increase the data memory capacity to up to 256K words (32K words x 8 banks).

**Standard Memory Card Interface**
Memory Cards enable easy and rapid production line switchovers. Data can also be written from Memory Cards to EEPROM in the CPU.

**Error Logs**
An internal clock can be used to store up to 20 records of time-tagged error information to greatly facilitate managing operating status.

**Standard RS-232C Port**
An RS-232C port is provided in addition to the peripheral port to enable direct connection to personal computers, Programmable Terminals, and other RS-232C devices.

**High-speed Programmable Terminal Communications**
A special NT link enables high-speed communications with NT-series Programmable Terminals for real-time screen displays and inputs.

**Expansion I/O via One Cable**
When only one Expansion I/O Rack is required, it can be connected via a single cable without the use of any special interface units.

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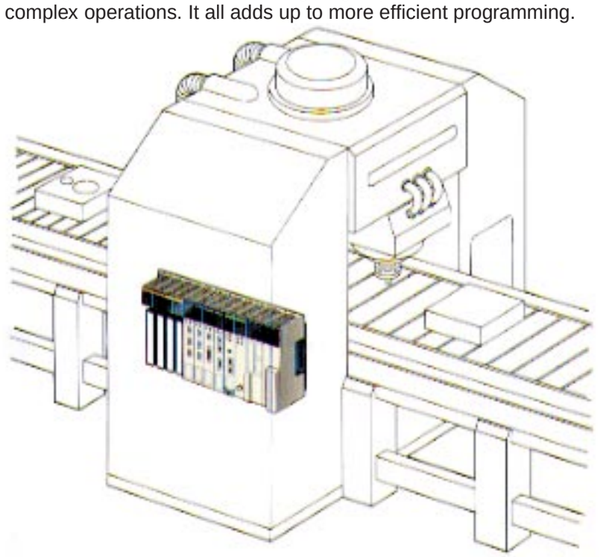
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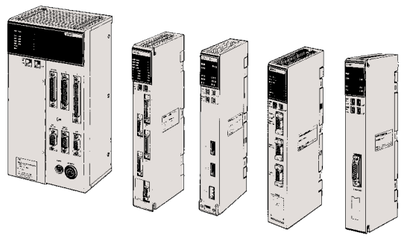
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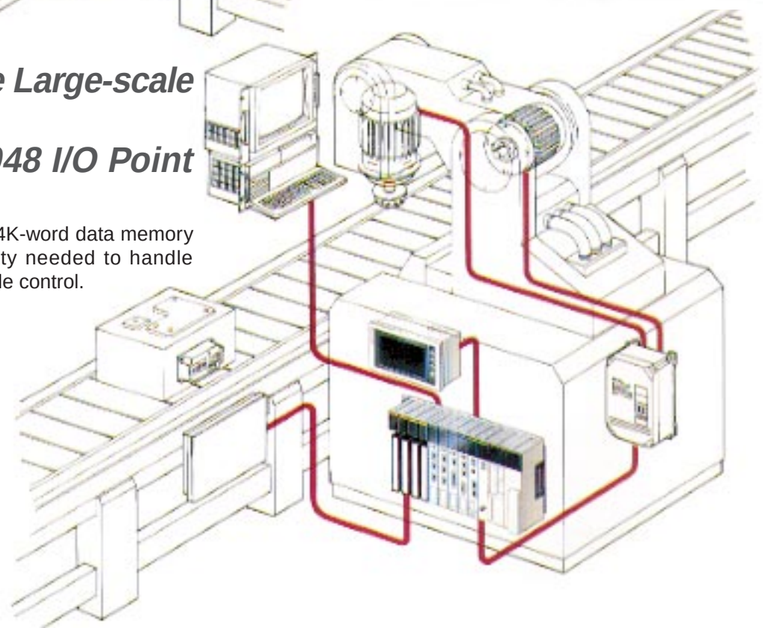


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# Complete Communications

## CVM1 Communications for Systemized Production Facilities

CVM1

### *High-speed Communications*

Various networks provide communications designed for essentially every level of FA production: between PCs, between PCs and host computers, or between PCs and other system components. High-speed communications processed asynchronously with the PC's cycle time are also possible.

### *Communications Across Three Hierarchies*

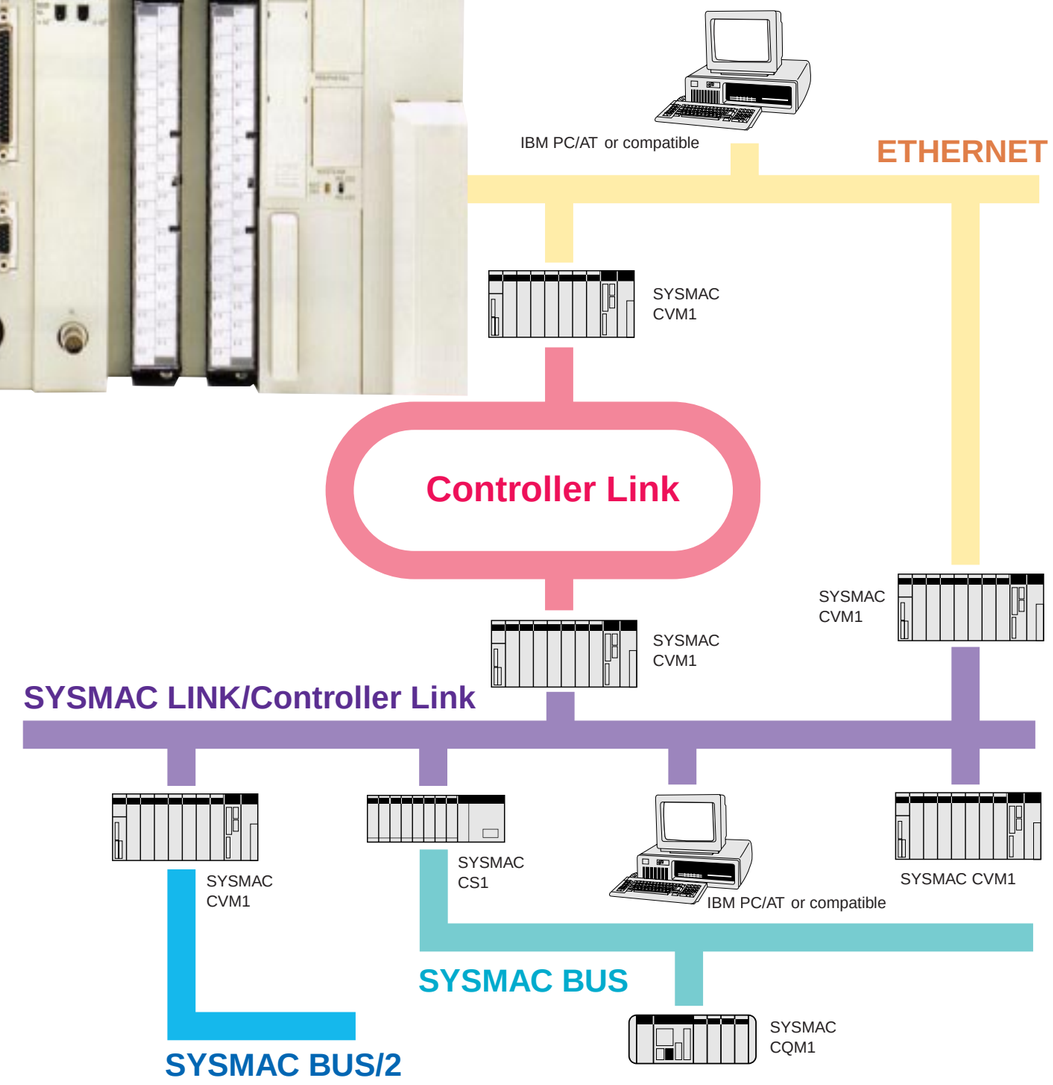
Connect Programming Devices to monitor and program the local node or go through Host Link, SYSMAC LINK, Controller Link, Ethernet, or SYSMAC BUS/2 networks to monitor and program other nodes. You can also connect Programming Devices to Remote I/O Racks or Expansion I/O Racks to enable monitoring and programming across networks.

### *Ethernet*

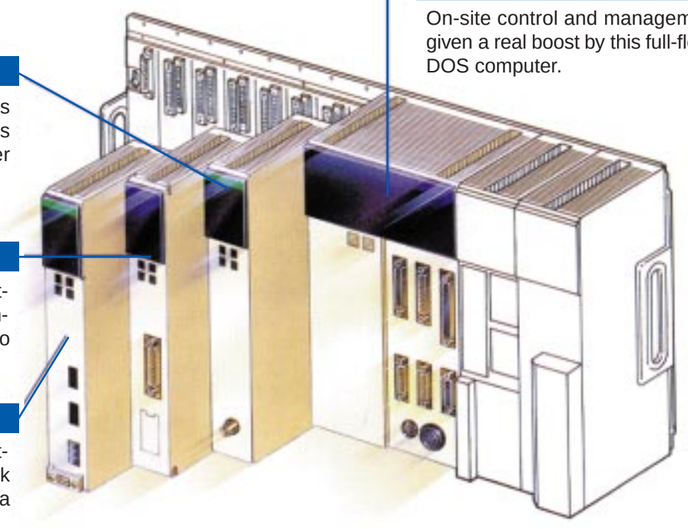
The CVM1 communicates easily with computers via an Ethernet network using the TCP/IP or UDP/IP international protocols. The CVM1's Ethernet Unit also supports a File Transfer Protocol, which enables file transfers as well. FINS (Factory Interface Network Service), a message communications protocol developed by OMRON for its FA controllers, also enables easy reading and writing of PC memory.



## ■ Build a Large-scale FA Network with Complete Communications




## ■ CPU Bus Units Let You Take Full Advantage of FA Networks



**Personal Computer Unit**

On-site control and management is given a real boost by this full-fledged DOS computer.

**SYSMAC LINK Unit**

The SYSMAC LINK Unit is OMRON's basic communications unit and it enables peer-to-peer PC communications.

**Ethernet Unit**

For information level networks, the Ethernet Unit enables direct connection to personal computers.

**Controller Link Unit**

For main control-level networks, the Controller Link Unit enables connection to a wide range of FA devices.

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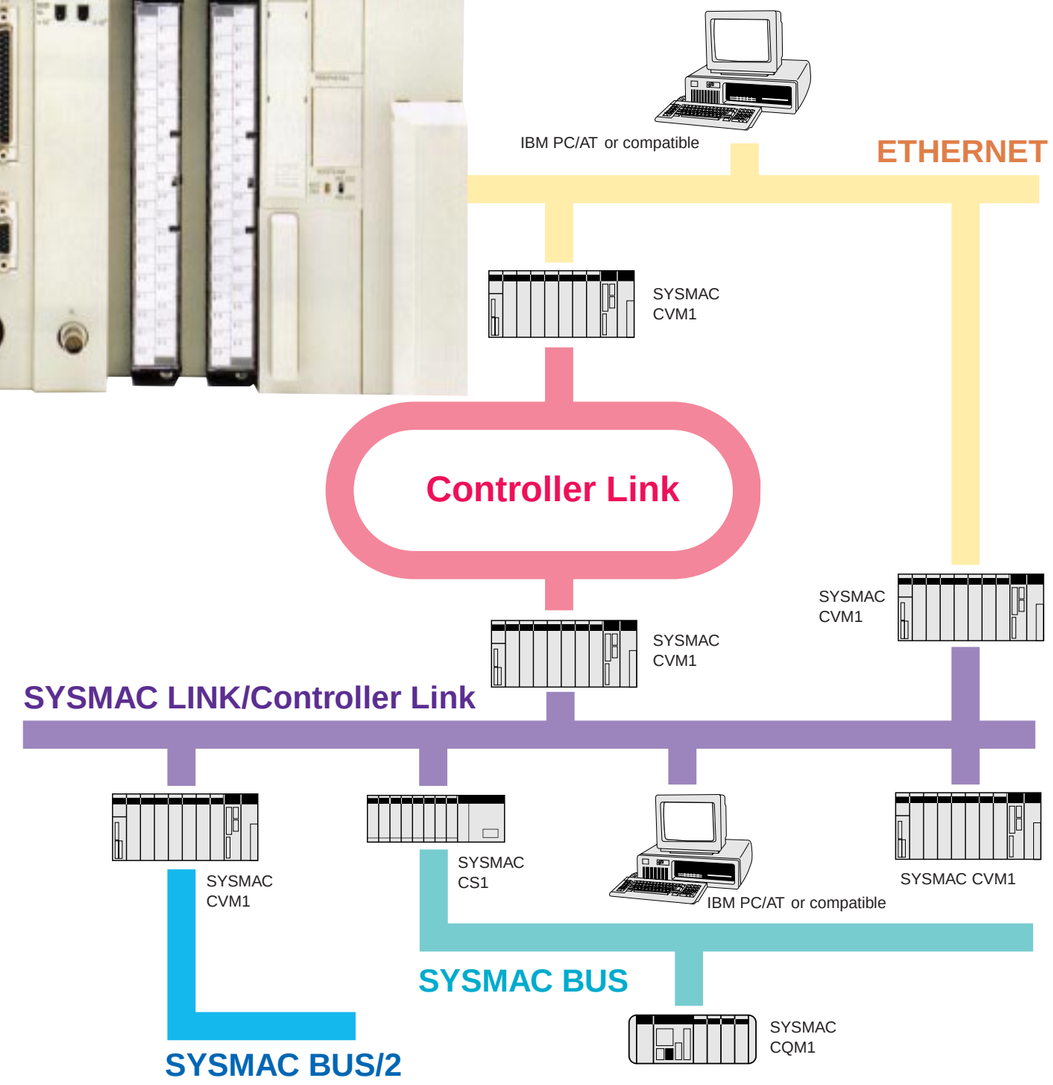
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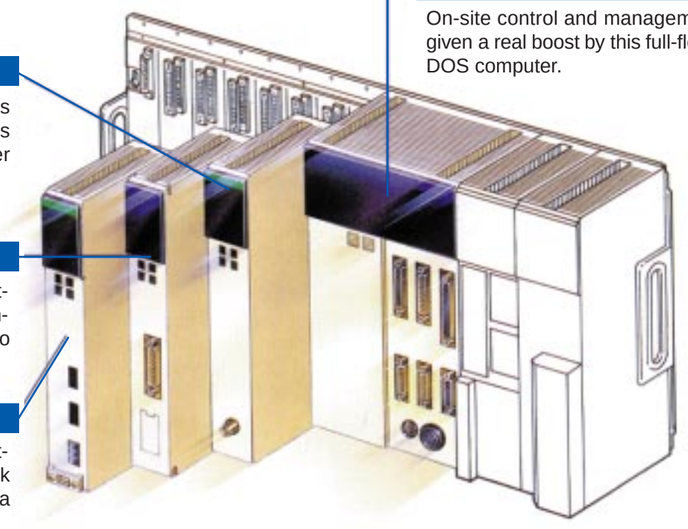
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**Ethernet Unit**

For information level networks, the Ethernet Unit enables direct connection to personal computers.

**Controller Link Unit**

For main control-level networks, the Controller Link Unit enables connection to a wide range of FA devices.

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# System Configuration

**Select from a wide range of units for large-scale machine control, system-oriented control, and essentially any special need.**

CVM1

Memory Card
RAM:
HMC-ES□□1
EEPROM:
HMC-EE□□1
EPROM:
HMC-EP□□1

Expansion Data Memory Unit
CV1000-DM□□1

CPU Backplane
CVM1-BC103/BC053
CV500-BC101/BC051/BC031

I/O Control Unit
CV500-IC101/IC201
/IC301

Power Supply Unit
CVM1-PA208
CV500-PS221/PS211

CPU
CVM1-CPU01-EV2
CVM1-CPU11-EV2
CVM1-CPU21-EV2

Expansion CPU Backplane
CV500-BI111

I/O Interface Unit
CV500-II101

Power Supply Unit
CV500-PS221/PS211
CVM1-PA208

Terminator
CV500-TER01
(Two provided with CV500-IC101/201)

Expansion I/O Backplane
CVM1-BI114/BI064
CV500-BI112/BI064/BI042

I/O Interface Unit
CV500-II201

Power Supply Unit
CVM1-PA208
CV500-PS221/PS208

I/O Backplane
3G2A5-BI081/BI051

I/O Interface Unit
3G2A5-II002

I/O Power Supply
3G2A5-PS222-E
/PS212-E

Expansion I/O Backplane
CV500-BI112

Remote I/O Slave Unit
CV500-RT211 (optical)
CV500-RT221 (wired)

Power Supply Unit
CVM1-PA208
CV500-PS221/PS212

I/O Backplane
3G2A5-BI081/
BI051

## CPU Rack

Mount up to 8 Special I/O Units.

## Expansion CPU Rack

Required to mount more than 10 CPU Bus Units.

CPU Bus Cable
CV500-CN□□1

I/O Cable
CV500-CN□□2

Mount up to 8 Special I/O Units.

## Expansion I/O Rack

Required to increase number of I/O Units.

I/O Cable
CV500-CN□□2/3

Mount up to 8 Special I/O Units.

## Expansion I/O Rack (C Series)

C500-CN□□N

Cannot connect Programming Devices.

## SYSMAC BUS/2 Slave Rack

Optical fiber cable or special shielded twisted-pair cable

Mount up to 8 Special I/O Units.

## SYSMAC BUS Slave Rack

Optical fiber cable or 2-core cable

Cannot connect Programming Devices; READ/WRIT instructions not supported.

## CPU Bus Units

BASIC Unit
CV500-BSC□1

Personal Computer Unit
CV500-VP□□□-E

Temperature Controller Data Link Unit
CV500-TDL21

Motion Control Unit
CV500-MC□□□
(scheduled for release soon)

## CPU Bus Units for Communications

Ethernet Unit
CV500-ETN01

Controller Link Unit
CVM1-CLK12
(optical)
CVM1-CLK21
(wired)

Host Link Unit
CV500-LK201

SYSMAC BUS/2 Remote I/O Master Unit
CV500-RM211
(optical)
CV500-RM221
(wired)

SYSMAC LINK Unit
CV500-SLK11 (optical)
CV500-SLK21 (coaxial)

## SYSMAC BUS Remote I/O Master Units

Remote I/O Master Unit
3G2A5-RM001-(P)EV1 (optical)
C500-RM201 (wired)

Optical I/O Link Unit
3G2A5-LK010-(P)E

Remote I/O Slave Unit
3G2A5-RT001-(P)EV1 (optical)
C500-RT201 (wired)

Power Feeder Unit
C1000H-APS01 (For optical SYSMAC LINK Unit)

## Special I/O Units

Analog Input Unit
3G2A5-AD□□□
/C500-AD□□□

Analog Output Unit
3G2A5-DA□□□
/C500-DA□□□

GPIB Interface Unit
C500-GPI01

High-speed Counter Unit
3G2A5-CT□□□

Cam Positioner Unit
C500-CP131

Ladder Program I/O Unit
C500-LDP01-V1

ID Sensor Unit
C500-IDS□□(-V1)

Fuzzy Logic Unit
C500-FZ001

Position Control Unit
3G2A5-NC□□□-E(V1)
C500-NC□□□-E

ASCII Unit
C500-ASC04

## I/O Units

DC Input Units
3G2A5-ID□1□

TTL Iutput Unit
C500-ID501CN
(32 pts)

AC Input Unit
3G2A5-IA□□□
(16/32 pts)

AC/DC Input Unit
3G2A5-IM21□
(16/32 pts)

Interrupt Input Unit
3G2A5-ID216
(8 pts)

Dummy I/O Unit

Contact Output Unit
3G2A5-OC22□
(16/32 pts)

Transistor Output Unit
3G2A5-OD□□□
(16/32/64 pts)

TTL Output Unit
C500-OD501CN
(32 pts)

Triac Output Unit
3G2A5-OA□□□
(16/32/64 pts)

DC Input/Triac Output Unit
C500-MD211CN
(16 input/16 output pts)

I/O Power Supply Unit
CV500-IPS01
(Not allocated words)

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CPU Backplane
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CV500-BC101/BC051/BC031

I/O Control Unit
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/IC301

Power Supply Unit
CVM1-PA208
CV500-PS221/PS211

CPU
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CVM1-CPU11-EV2
CVM1-CPU21-EV2

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CV500-BI111

I/O Interface Unit
CV500-II101

Power Supply Unit
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CVM1-PA208

Terminator
CV500-TER01
(Two provided with CV500-IC101/201)

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CVM1-BI114/BI064
CV500-BI112/BI064/BI042

I/O Interface Unit
CV500-II201

Power Supply Unit
CVM1-PA208
CV500-PS221/PS208

I/O Backplane
3G2A5-BI081/BI051

I/O Interface Unit
3G2A5-II002

I/O Power Supply
3G2A5-PS222-E
/PS212-E

Expansion I/O Backplane
CV500-BI112

Remote I/O Slave Unit
CV500-RT211 (optical)
CV500-RT221 (wired)

Power Supply Unit
CVM1-PA208
CV500-PS221/PS212

I/O Backplane
3G2A5-BI081/
BI051

## CPU Rack

Mount up to 8 Special I/O Units.

## Expansion CPU Rack

Required to mount more than 10 CPU Bus Units.

CPU Bus Cable
CV500-CN□□1

I/O Cable
CV500-CN□□2

Mount up to 8 Special I/O Units.

## Expansion I/O Rack

Required to increase number of I/O Units.

I/O Cable
CV500-CN□□2/3

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Temperature Controller Data Link Unit
CV500-TDL21

Motion Control Unit
CV500-MC□□□
(scheduled for release soon)

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CVM1-CLK12
(optical)
CVM1-CLK21
(wired)

Host Link Unit
CV500-LK201

SYSMAC BUS/2 Remote I/O Master Unit
CV500-RM211
(optical)
CV500-RM221
(wired)

SYSMAC LINK Unit
CV500-SLK11 (optical)
CV500-SLK21 (coaxial)

## SYSMAC BUS Remote I/O Master Units

Remote I/O Master Unit
3G2A5-RM001-(P)EV1 (optical)
C500-RM201 (wired)

Optical I/O Link Unit
3G2A5-LK010-(P)E

Remote I/O Slave Unit
3G2A5-RT001-(P)EV1 (optical)
C500-RT201 (wired)

Power Feeder Unit
C1000H-APS01 (For optical SYSMAC LINK Unit)

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C500-ASC04

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TTL Iutput Unit
C500-ID501CN
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(16/32 pts)

AC/DC Input Unit
3G2A5-IM21□
(16/32 pts)

Interrupt Input Unit
3G2A5-ID216
(8 pts)

Dummy I/O Unit

Contact Output Unit
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(16/32 pts)

Transistor Output Unit
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TTL Output Unit
C500-OD501CN
(32 pts)

Triac Output Unit
3G2A5-OA□□□
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DC Input/Triac Output Unit
C500-MD211CN
(16 input/16 output pts)

I/O Power Supply Unit
CV500-IPS01
(Not allocated words)

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# Specifications

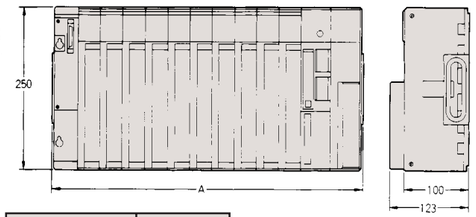
## Ratings

| Power Supply Unit | CVM1-PA208 | CV500-PS221 | CV500-PS211 |
|---|---|---|---|
| Supply voltage | 100 to 120 or 200 to 240 VAC (automatic voltage setting), 50/60 Hz | | 24 VDC |
| Operating voltage range | 85 to 132 or 170 to 264 VAC | | 20.4 to 28.8 VDC |
| Power consumption | 150 VA max. | 200 VA max. | 100 W max. |
| Output capacity | 8 A, 5 VDC | 12 A, 5 VDC | |
| Insulation resistance | 20 MΩ min. (at 500 VDC) between AC external terminals and GR terminals (See note.) | | |
| Dielectric strength | 2,300 VAC 50/60 Hz for 1 min between AC external and GR terminals, leakage current: 10 mA max.<br>1000 VAC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 20 mA max. | | |
| Noise immunity | 1,000 Vp-p, pulse width: 100 ns to 1 µs, rise time: 1 ns (via noise simulation) | | |
| Vibration resistance | 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s² in X, Y, and Z directions for 80 minutes (Time coefficient; 8 minutes x coefficient factor 10 = total time 80 minutes) (according to JIS C0911) | | |
| Shock resistance | 147 m/s² 3 times each in X, Y, and Z directions (according to JIS C0912) | | |
| Ambient operating temperature | 0° to 55°C | | |
| Ambient operating humidity | 10% to 90% (with no condensation) | | |
| Atmosphere | Must be free from corrosive gasses | | |
| Ambient storage temperature | –20° to 75°C (except Memory Card and battery) | | |
| Grounding | Less than 100 Ω | | |
| Enclosure rating | IEC IP-30 (mounted in a panel) | | |
| Weight | 9 kilograms max. per Rack | | |
| Dimensions (without cables) | CVM1-BC103/BI114, CV500-BC101/BI112: 480 x 250 x 123 mm (WxHxD)<br>CVM1-BC053/BI064, CV500-BC051/BI062: 306 x 250 x 123 mm (WxHxD)<br>CV500-BC031/BI042: 236 x 250 x 123 mm (WxHxD) | | |

Note: Disconnect the LG terminal of the Power Supply Unit from the GR terminal when performing insulation and dielectric strength tests. If the tests are repeatedly performed with the LG and GR terminals short-circuited, the internal components may be damaged.

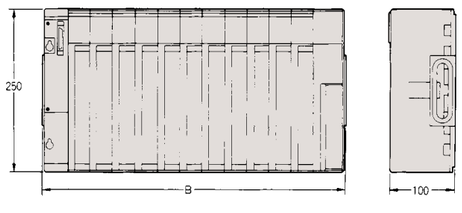
## Dimensions (Unit: mm)

### CPU Rack



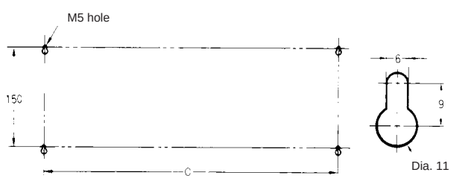

| Model | A |
|---|---|
| CVM1-BC103<br>CV500-BC101 | 480 |
| CVM1-BC053<br>CV500-BC051 | 306 |
| CV500-BC031 | 236 |

### Simple Expansion I/O Rack




| Model | B |
|---|---|
| CVM1-BI114<br>CV500-BI112 | 480 |
| CVM1-BI064<br>CV500-BI062 | 306 |
| CV500-BI042 | 236 |

### Panel Cutout Dimensions




| Model | C |
|---|---|
| CVM1-BC103<br>CVM1-BI114<br>CV500-BC101<br>CV500-BI112 | 465 |
| CVM1-BC053<br>CVM1-BI064<br>CV500-BC051<br>CV500-BI062 | 291 |
| CV500-BC031<br>CV500-BI042 | 221 |

Note: Panel cutouts are the same for CPU Racks and Simple Expansion I/O Racks.



CVM1

## CPU Specifications

| CPU | | CVM1-CPU01-EV2 | CVM1-CPU11-EV2 | CVM1-CPU21-EV2 |
|---|---|---|---|---|
| I/O capacity | | 512 pts<br>(2,048 max. with remote I/O) | 1,024 pts<br>(4,096 max. with remote I/O) | 2.048 pts<br>(6,144 max. with remote I/O) |
| Control method | | Stored program | | |
| I/O control method | | Cyclic, programmed, scheduled, and zero-cross refreshing | | |
| Programming | | Ladder diagrams or mnemonics | | |
| Instruction length | | 1 to 8 words/instruction, 1 address/instruction | | |
| Ladder instructions | | 284 (515 variations ) | | 285 (517 variations) |
| Execution time | | Basic: 0.15 µs min.<br>Special: 0.6 µs min. | Basic: 0.125 µs min.<br>Special: 0.5 µs min. | |
| Program capacity | | 30K words (16 bits/word) | | 62K words (16 bits/word) |
| Local I/O bits | | 512 pts<br>(words CIO 0000 to CIO 0031) | 1,024 pts<br>(words CIO 0000 to CIO 0063) | 2.048 pts<br>(words CIO 0000 to CIO 0127) |
| Remote I/O bits | SYSMAC BUS/2 | 1,024 pts | 2,048 pts | 2,048 pts |
| | SYSMAC BUS | 512 pts | 1,024 pts | 2,048 pts |
| Work bits | | 2,688 (words CIO 0032 to CIO 0199) | 2,176 (words CIO 0064 to CIO 0199) | 1,152 (words CIO 0128 to CIO 0199) |
| Temporary bits | | 8 (TR0 to TR7) | | |
| CPU bus link bits | | 4,096 (words G000 to G255) | | |
| Auxiliary bits | | 8,192 (words A000 to A511) | | |
| Timers | | 512 (T0000 to T0511) | 1,024 (T0000 to T1023) | |
| Counters | | 512 (C0000 to C0511) | 1,024 (C0000 to C1023) | |
| Data memory | | 8,192 words (D00000 to D08191) | 24,576 words (D00000 to D24575) | |
| Expansion DM | | --- | | 256K words<br>(E00000 to E32765 x 8 banks) |
| Data registers | | 3 (DR0 to DR2) | | |
| Index registers | | 3 (IR0 to IR2) | | |
| Trace memory | | 1K words | 2K words | |
| Control input signals | | START input: In RUN mode, PC begins operation when input is ON and halts when it is OFF.<br>Input specifications: 24 VDC, 10 mA | | |
| Control output signals | | RUN output: The RUN output terminals are ON (closed) while PC is operating.<br>Maximum switching capacity: 250 VAC/2 A (resistive load, cos ø = 1)<br>250 VAC/0.5 A (inductive load, cos ø = 0.4)<br>24 VDC/2 A | | |
| Memory protection | | Holding bits (internal status maintained), contents of counters and data memory | | |
| Battery life | | Service life: 5 years The memory backup time when PC is not powered varies with the ambient temperature.<br>If BAT ERR indicator lights, replace the battery with a new one within 1 week. | | |
| Self-diagnostics | | CPU failure (watchdog timer), I/O verify error, I/O bus error, memory failure, remote I/O error, battery error, link error, or Special I/O Unit/CPU Bus Unit errors | | |

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# Specifications

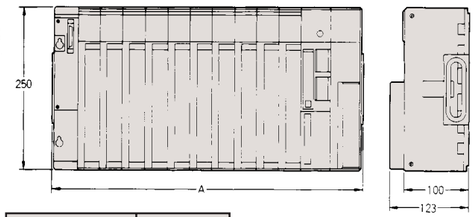
## Ratings

| Power Supply Unit | CVM1-PA208 | CV500-PS221 | CV500-PS211 |
|---|---|---|---|
| Supply voltage | 100 to 120 or 200 to 240 VAC (automatic voltage setting), 50/60 Hz | | 24 VDC |
| Operating voltage range | 85 to 132 or 170 to 264 VAC | | 20.4 to 28.8 VDC |
| Power consumption | 150 VA max. | 200 VA max. | 100 W max. |
| Output capacity | 8 A, 5 VDC | 12 A, 5 VDC | |
| Insulation resistance | 20 MΩ min. (at 500 VDC) between AC external terminals and GR terminals (See note.) | | |
| Dielectric strength | 2,300 VAC 50/60 Hz for 1 min between AC external and GR terminals, leakage current: 10 mA max.<br>1000 VAC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 20 mA max. | | |
| Noise immunity | 1,000 Vp-p, pulse width: 100 ns to 1 µs, rise time: 1 ns (via noise simulation) | | |
| Vibration resistance | 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s² in X, Y, and Z directions for 80 minutes (Time coefficient; 8 minutes x coefficient factor 10 = total time 80 minutes) (according to JIS C0911) | | |
| Shock resistance | 147 m/s² 3 times each in X, Y, and Z directions (according to JIS C0912) | | |
| Ambient operating temperature | 0° to 55°C | | |
| Ambient operating humidity | 10% to 90% (with no condensation) | | |
| Atmosphere | Must be free from corrosive gasses | | |
| Ambient storage temperature | –20° to 75°C (except Memory Card and battery) | | |
| Grounding | Less than 100 Ω | | |
| Enclosure rating | IEC IP-30 (mounted in a panel) | | |
| Weight | 9 kilograms max. per Rack | | |
| Dimensions (without cables) | CVM1-BC103/BI114, CV500-BC101/BI112: 480 x 250 x 123 mm (WxHxD)<br>CVM1-BC053/BI064, CV500-BC051/BI062: 306 x 250 x 123 mm (WxHxD)<br>CV500-BC031/BI042: 236 x 250 x 123 mm (WxHxD) | | |

Note: Disconnect the LG terminal of the Power Supply Unit from the GR terminal when performing insulation and dielectric strength tests. If the tests are repeatedly performed with the LG and GR terminals short-circuited, the internal components may be damaged.

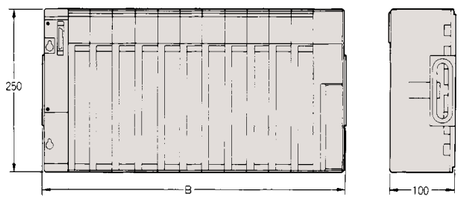
## Dimensions (Unit: mm)

### CPU Rack



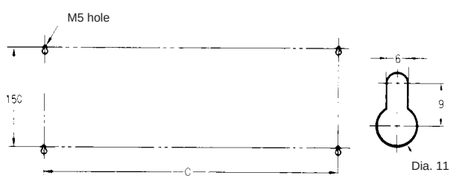

| Model | A |
|---|---|
| CVM1-BC103<br>CV500-BC101 | 480 |
| CVM1-BC053<br>CV500-BC051 | 306 |
| CV500-BC031 | 236 |

### Simple Expansion I/O Rack




| Model | B |
|---|---|
| CVM1-BI114<br>CV500-BI112 | 480 |
| CVM1-BI064<br>CV500-BI062 | 306 |
| CV500-BI042 | 236 |

### Panel Cutout Dimensions




| Model | C |
|---|---|
| CVM1-BC103<br>CVM1-BI114<br>CV500-BC101<br>CV500-BI112 | 465 |
| CVM1-BC053<br>CVM1-BI064<br>CV500-BC051<br>CV500-BI062 | 291 |
| CV500-BC031<br>CV500-BI042 | 221 |

Note: Panel cutouts are the same for CPU Racks and Simple Expansion I/O Racks.



CVM1

## CPU Specifications

| CPU | | CVM1-CPU01-EV2 | CVM1-CPU11-EV2 | CVM1-CPU21-EV2 |
|---|---|---|---|---|
| I/O capacity | | 512 pts<br>(2,048 max. with remote I/O) | 1,024 pts<br>(4,096 max. with remote I/O) | 2.048 pts<br>(6,144 max. with remote I/O) |
| Control method | | Stored program | | |
| I/O control method | | Cyclic, programmed, scheduled, and zero-cross refreshing | | |
| Programming | | Ladder diagrams or mnemonics | | |
| Instruction length | | 1 to 8 words/instruction, 1 address/instruction | | |
| Ladder instructions | | 284 (515 variations ) | | 285 (517 variations) |
| Execution time | | Basic: 0.15 µs min.<br>Special: 0.6 µs min. | Basic: 0.125 µs min.<br>Special: 0.5 µs min. | |
| Program capacity | | 30K words (16 bits/word) | | 62K words (16 bits/word) |
| Local I/O bits | | 512 pts<br>(words CIO 0000 to CIO 0031) | 1,024 pts<br>(words CIO 0000 to CIO 0063) | 2.048 pts<br>(words CIO 0000 to CIO 0127) |
| Remote I/O bits | SYSMAC BUS/2 | 1,024 pts | 2,048 pts | 2,048 pts |
| | SYSMAC BUS | 512 pts | 1,024 pts | 2,048 pts |
| Work bits | | 2,688 (words CIO 0032 to CIO 0199) | 2,176 (words CIO 0064 to CIO 0199) | 1,152 (words CIO 0128 to CIO 0199) |
| Temporary bits | | 8 (TR0 to TR7) | | |
| CPU bus link bits | | 4,096 (words G000 to G255) | | |
| Auxiliary bits | | 8,192 (words A000 to A511) | | |
| Timers | | 512 (T0000 to T0511) | 1,024 (T0000 to T1023) | |
| Counters | | 512 (C0000 to C0511) | 1,024 (C0000 to C1023) | |
| Data memory | | 8,192 words (D00000 to D08191) | 24,576 words (D00000 to D24575) | |
| Expansion DM | | --- | | 256K words<br>(E00000 to E32765 x 8 banks) |
| Data registers | | 3 (DR0 to DR2) | | |
| Index registers | | 3 (IR0 to IR2) | | |
| Trace memory | | 1K words | 2K words | |
| Control input signals | | START input: In RUN mode, PC begins operation when input is ON and halts when it is OFF.<br>Input specifications: 24 VDC, 10 mA | | |
| Control output signals | | RUN output: The RUN output terminals are ON (closed) while PC is operating.<br>Maximum switching capacity: 250 VAC/2 A (resistive load, cos ø = 1)<br>250 VAC/0.5 A (inductive load, cos ø = 0.4)<br>24 VDC/2 A | | |
| Memory protection | | Holding bits (internal status maintained), contents of counters and data memory | | |
| Battery life | | Service life: 5 years The memory backup time when PC is not powered varies with the ambient temperature.<br>If BAT ERR indicator lights, replace the battery with a new one within 1 week. | | |
| Self-diagnostics | | CPU failure (watchdog timer), I/O verify error, I/O bus error, memory failure, remote I/O error, battery error, link error, or Special I/O Unit/CPU Bus Unit errors | | |

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# CPU Bus Units

**Advanced Data Processing in BASIC Language**

## BASIC Unit



CV500-BSC11
(w/o EEPROM)
CV500-BSC21
(w/EEPROM)

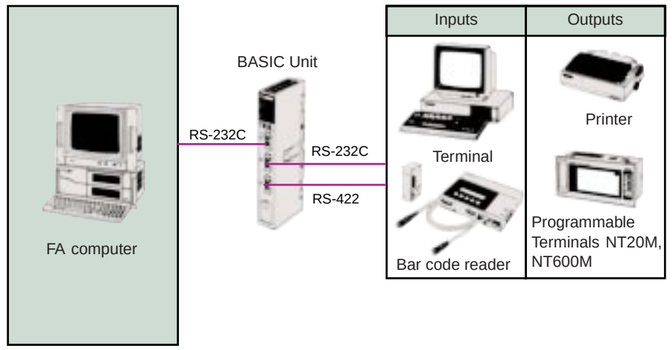


CV500-BSC31
(w/o EEPROM)
CV500-BSC41
(w/EEPROM)



CV500-BSC51
(w/o EEPROM)
CV500-BSC61
(w/EEPROM)

- **Multiple I/O Interfaces**
  Select from RS-232C, RS-422, Centronics, or GP-IB interfaces. Input from bar code readers and other devices; output to display devices, printers, or other devices. Communicate with measurement instruments.
- **High-speed Multi-task BASIC**
  Intermediate language execution enables fast, easy-to-use BASIC without compiling. Multi-task execution enables parallel processing.
- **Exchange Data with PC**
  No programming is required in the PC's CPU to read and write data from the BASIC Unit.




| Interface | BSC11/21 | BSC31/41 | BSC51/61 |
|---|---|---|---|
| RS-232C | 2 ports | 2 ports | 1 port |
| RS-422 | 1 port | --- | --- |
| Centronics | --- | 1 port | --- |
| GP-IB | --- | --- | 1 port |

| | |
|---|---|
| **RS-232C** | |
| Communications: | Half duplex |
| Sync: | Start-stop |
| Baud rate: | 300, 600, 1,200, 2,400, 4,800, 9,600, 19,200 bps |
| Transmission method: | Point to point |
| Transmissiondistance: | 15 m max. |
| Interface: | Conforming to EIA RS-232C |
| **Centronics** | |
| Communications: | Simplex |
| Handshaking: | Two-line (STROBE and BUSY) |
| Data transmissions: | 8-bit parallel |
| Interface: | TTL level Low: Output ≦ 0.5 V, Input ≦ 0.8 V<br>High: Output ≧ 2.4 V, Input ≧ 2.0 V |
| **RS-422** | |
| Communications: | Half duplex |
| Sync: | Start-stop |
| Baud rate: | 300, 600, 1,200, 2,400, 4,800, 9,600, 19,200 bps |
| Transmission method: | 1:N up to 1:32<br>Termination resistance set via front-panel DIP switch |
| Transmission distance: | 500 m total max. |
| Interface: | Conforming to EIA RS-422<br>(RS-485 applicable driver used) |
| **GP-IB** | |
| Communications: | Half duplex |
| Handshaking: | Three-line handshaking |
| Baud rate: | Depends on device connected |
| Data transmissions: | 8-bit parallel |
| Transmission distance: | 4 m max. between devices<br>(Total of 20 m or 2 m x number of devices on bus, which ever is less) |
| Number of connectable devices: | 15 including BASIC Unit |
| Interface: | IEE Std; Conforming to 488-1978 standard |

| Item | | Specification |
|---|---|---|
| Programming language | | Interpreter, multi-task BASIC and machine language (V25) |
| Number of user tasks | | 16 (parallel operation possible) |
| Intertask communications | | Messages sent/received via SEND/RECV instructions. Common data via global variables. |
| Intertask sync | | Event generation/communications via SENDSIG, ON SIGNAL, GOSUB, and TWAIT commands. |
| Task control | | Starting: TASK command; stopping: END, STOP, and EXIT commands |
| Debugging functions | | Tracing via TRON command; statement execution via STEP command; pausing via STOP, BREAK, and CONT commands. |
| Memory | RAM | Source program area: 63 KB<br>Variable and execution code area: 110 KB<br>(32 KB non-volatile) |
| | EEPROM | Source program save area: 63 KB<br>(BSC21/41/61 only) |
| Battery life | | 5 years (effective battery life) |
| CPU interface | Cyclic | IN/OUT 384 words total max.<br>Default: 10 input words<br>15 output words<br>(for cyclic servicing) |
| | CPU bus link | Reading from PC's CPU: 128 words max.<br>With other CPU Bus Units: 8 words each<br>(refreshed every 10 ms) |
| | Events | Execution with PC READ and PC WRITE commands:<br>512 bytes max. read/written<br>Execution with PRINT command:<br>538 bytes max. read/written |
| Diagnostic functions | BASIC Unit | Watchdog timer, low battery voltage detection |
| | PC's CPU | Bus disconnection check, horizontal parity check for send/receive data |



# Mount a 4-slot DOS Computer to the Rack to Manage Data More Effectively than Ever Before

CVM1

## Personal Computer Unit



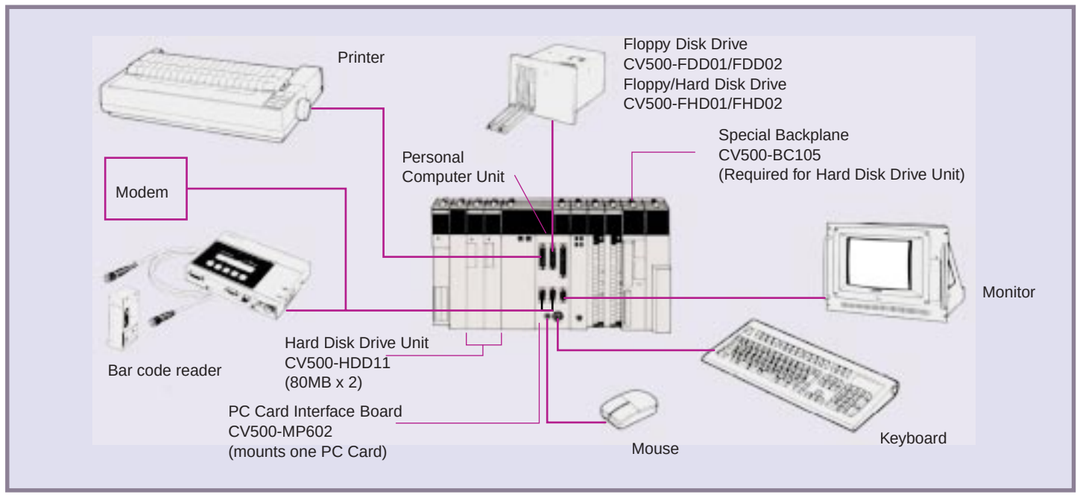
CV500-VP213-E (4-MB memory; w/o floating-point processor)
CV500-VP217-E (8-MB memory; w/o floating-point processor)
CV500-VP223-E (4-MB memory; w/floating-point processor)
CV500-VP227-E (8-MB memory; w/floating-point processor)
[486 SX: W/O floating-point processor]
[486 DX: W/ floating-point processor]

- **On-Rack PC**
  Mount directly to the Rack without any extra wiring while saving the space required for a separate computer. You also get faster SYSMAC communications.
- **Hard Disk Drive Unit**
  To save even more space, the 80-MB hard disk also mounts directly to the Rack. You can mount up to two Units to provide extra storage space.
- **Complete Peripherals**
  Connect the peripherals required by your system just as you would for a stand-alone computer: displays, keyboard, drives, etc.
- **DOS Software**
  You can run any of a wide range of IBM PC/AT compatible software available world-wide (VGA compatible).
- **Advanced Development Environment**
  Standard function libraries include BASIC and C languages to support your software development needs.

With the Personal Computer Unit, you can mount a full-fledged DOS computer right to the Rack to take advantage of networking and support production line monitoring and control.

### Specifications

| Item | | Specification | |
|---|---|---|---|
| CPU | | i80486SX (25 MHz) or i80486DX (25 MHz) | |
| Memory | | Standard | Optional |
| | Main memory | 4 MB or 8 MB | --- |
| | RAM | 64 KB | 2 MB (two RAM max.) |
| | ROM | 1.5 MB (Contains part of DOS.) | --- |
| Interfaces | | Two RS-232C ports (D-sub 9-pin)<br>Keyboard interface<br>Mouse interface<br>Printer interface (D-sub 25-pin)<br>Floppy disk interface<br>Hard disk interface (Optional)<br>CRT interface | |
| Expansion slots | | 2 slots (dedicated slots) | |
| PC Card (Optional) | | PC Card Interface Board (sold separately):<br>One PC card can be installed. (PCMCIA 2.1 Type II) | |
| Self-diagnostic functions | | Main memory parity check<br>ROM checksum<br>CPU bus communications check<br>Low battery voltage detection | |
| Battery life | | Effective life: 5 years max. | |
| Dimensions | | 140 x 250 x 100 mm (WxHxD) | |
| Weight | | 3.2 kg max. | |



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# CPU Bus Units

**Advanced Data Processing in BASIC Language**

## BASIC Unit



CV500-BSC11
(w/o EEPROM)
CV500-BSC21
(w/EEPROM)

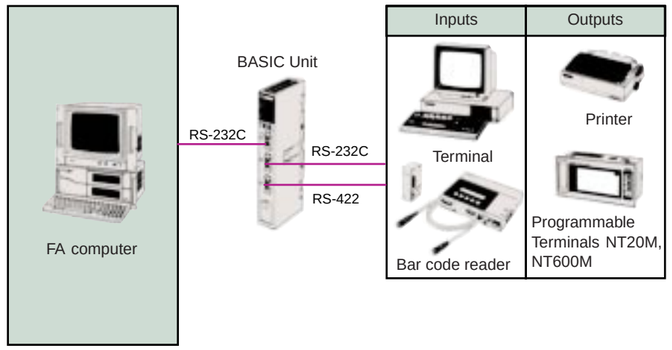


CV500-BSC31
(w/o EEPROM)
CV500-BSC41
(w/EEPROM)



CV500-BSC51
(w/o EEPROM)
CV500-BSC61
(w/EEPROM)

- **Multiple I/O Interfaces**
  Select from RS-232C, RS-422, Centronics, or GP-IB interfaces. Input from bar code readers and other devices; output to display devices, printers, or other devices. Communicate with measurement instruments.
- **High-speed Multi-task BASIC**
  Intermediate language execution enables fast, easy-to-use BASIC without compiling. Multi-task execution enables parallel processing.
- **Exchange Data with PC**
  No programming is required in the PC's CPU to read and write data from the BASIC Unit.




| Interface | BSC11/21 | BSC31/41 | BSC51/61 |
|---|---|---|---|
| RS-232C | 2 ports | 2 ports | 1 port |
| RS-422 | 1 port | --- | --- |
| Centronics | --- | 1 port | --- |
| GP-IB | --- | --- | 1 port |

| | |
|---|---|
| **RS-232C** | |
| Communications: | Half duplex |
| Sync: | Start-stop |
| Baud rate: | 300, 600, 1,200, 2,400, 4,800, 9,600, 19,200 bps |
| Transmission method: | Point to point |
| Transmissiondistance: | 15 m max. |
| Interface: | Conforming to EIA RS-232C |
| **Centronics** | |
| Communications: | Simplex |
| Handshaking: | Two-line (STROBE and BUSY) |
| Data transmissions: | 8-bit parallel |
| Interface: | TTL level Low: Output ≦ 0.5 V, Input ≦ 0.8 V<br>High: Output ≧ 2.4 V, Input ≧ 2.0 V |
| **RS-422** | |
| Communications: | Half duplex |
| Sync: | Start-stop |
| Baud rate: | 300, 600, 1,200, 2,400, 4,800, 9,600, 19,200 bps |
| Transmission method: | 1:N up to 1:32<br>Termination resistance set via front-panel DIP switch |
| Transmission distance: | 500 m total max. |
| Interface: | Conforming to EIA RS-422<br>(RS-485 applicable driver used) |
| **GP-IB** | |
| Communications: | Half duplex |
| Handshaking: | Three-line handshaking |
| Baud rate: | Depends on device connected |
| Data transmissions: | 8-bit parallel |
| Transmission distance: | 4 m max. between devices<br>(Total of 20 m or 2 m x number of devices on bus, which ever is less) |
| Number of connectable devices: | 15 including BASIC Unit |
| Interface: | IEE Std; Conforming to 488-1978 standard |

| Item | | Specification |
|---|---|---|
| Programming language | | Interpreter, multi-task BASIC and machine language (V25) |
| Number of user tasks | | 16 (parallel operation possible) |
| Intertask communications | | Messages sent/received via SEND/RECV instructions. Common data via global variables. |
| Intertask sync | | Event generation/communications via SENDSIG, ON SIGNAL, GOSUB, and TWAIT commands. |
| Task control | | Starting: TASK command; stopping: END, STOP, and EXIT commands |
| Debugging functions | | Tracing via TRON command; statement execution via STEP command; pausing via STOP, BREAK, and CONT commands. |
| Memory | RAM | Source program area: 63 KB<br>Variable and execution code area: 110 KB<br>(32 KB non-volatile) |
| | EEPROM | Source program save area: 63 KB<br>(BSC21/41/61 only) |
| Battery life | | 5 years (effective battery life) |
| CPU interface | Cyclic | IN/OUT 384 words total max.<br>Default: 10 input words<br>15 output words<br>(for cyclic servicing) |
| | CPU bus link | Reading from PC's CPU: 128 words max.<br>With other CPU Bus Units: 8 words each<br>(refreshed every 10 ms) |
| | Events | Execution with PC READ and PC WRITE commands:<br>512 bytes max. read/written<br>Execution with PRINT command:<br>538 bytes max. read/written |
| Diagnostic functions | BASIC Unit | Watchdog timer, low battery voltage detection |
| | PC's CPU | Bus disconnection check, horizontal parity check for send/receive data |



# Mount a 4-slot DOS Computer to the Rack to Manage Data More Effectively than Ever Before

CVM1

## Personal Computer Unit



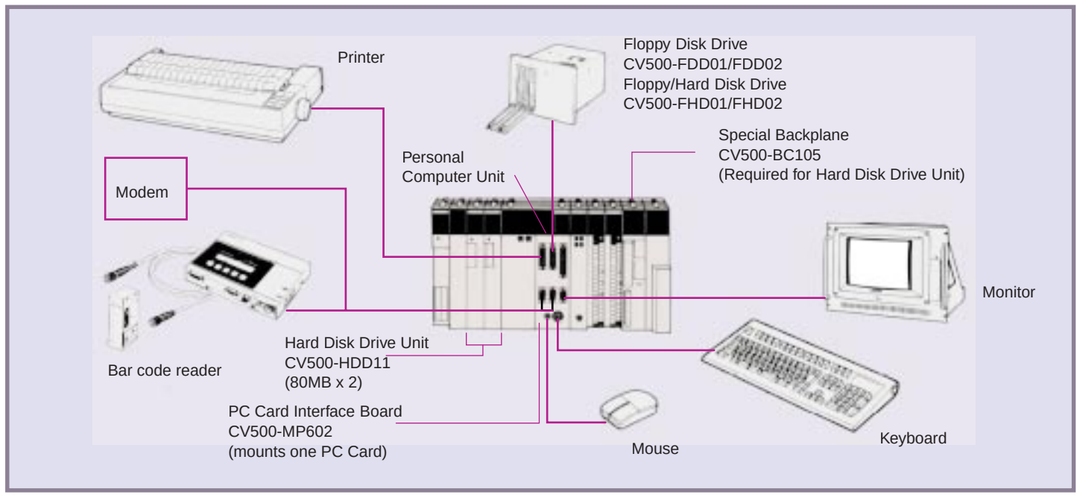
CV500-VP213-E (4-MB memory; w/o floating-point processor)
CV500-VP217-E (8-MB memory; w/o floating-point processor)
CV500-VP223-E (4-MB memory; w/floating-point processor)
CV500-VP227-E (8-MB memory; w/floating-point processor)
[486 SX: W/O floating-point processor]
[486 DX: W/ floating-point processor]

- **On-Rack PC**
  Mount directly to the Rack without any extra wiring while saving the space required for a separate computer. You also get faster SYSMAC communications.
- **Hard Disk Drive Unit**
  To save even more space, the 80-MB hard disk also mounts directly to the Rack. You can mount up to two Units to provide extra storage space.
- **Complete Peripherals**
  Connect the peripherals required by your system just as you would for a stand-alone computer: displays, keyboard, drives, etc.
- **DOS Software**
  You can run any of a wide range of IBM PC/AT compatible software available world-wide (VGA compatible).
- **Advanced Development Environment**
  Standard function libraries include BASIC and C languages to support your software development needs.

With the Personal Computer Unit, you can mount a full-fledged DOS computer right to the Rack to take advantage of networking and support production line monitoring and control.

### Specifications

| Item | | Specification | |
|---|---|---|---|
| CPU | | i80486SX (25 MHz) or i80486DX (25 MHz) | |
| Memory | | Standard | Optional |
| | Main memory | 4 MB or 8 MB | --- |
| | RAM | 64 KB | 2 MB (two RAM max.) |
| | ROM | 1.5 MB (Contains part of DOS.) | --- |
| Interfaces | | Two RS-232C ports (D-sub 9-pin)<br>Keyboard interface<br>Mouse interface<br>Printer interface (D-sub 25-pin)<br>Floppy disk interface<br>Hard disk interface (Optional)<br>CRT interface | |
| Expansion slots | | 2 slots (dedicated slots) | |
| PC Card (Optional) | | PC Card Interface Board (sold separately):<br>One PC card can be installed. (PCMCIA 2.1 Type II) | |
| Self-diagnostic functions | | Main memory parity check<br>ROM checksum<br>CPU bus communications check<br>Low battery voltage detection | |
| Battery life | | Effective life: 5 years max. | |
| Dimensions | | 140 x 250 x 100 mm (WxHxD) | |
| Weight | | 3.2 kg max. | |



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# CPU Bus Units for Communications

## Ethernet Unit



CV500-ETN01

The CV-series Ethernet Unit supports the TCP/IP or UDP/IP international protocols to enable the PC to connect to an Ethernet network without going through a personal computer. The Ethernet Unit also supports a built-in File transfer Protocol, which enables file transfers between the PC and host computers. FINS commands also enable any host computer connected to the Ethernet Unit to easily read and write PC memory. Finally, RAS functions ensure reliable operation.

### Specifications

| Item | | Specifications |
|---|---|---|
| Transmission specifications | Medium access method | CSMA/CD |
| | Modulation | Base band |
| | Transmission path | Bus |
| | Baud rate | 10 Mbit/s |
| | Transmission medium | Coaxial cable |
| | Transmission distance | 500 m max./segment; 2.5 km max./network |
| | Number of connectable nodes | 100 nodes/segment |
| | Distance between nodes | Multiples of 2.5 m |
| | Transceiver cable length | 50 m max. |
| | Transceiver power supply capacity | 0.35 A at 12 V |
| Communications services | | 1. TCP/IP and UDP/IP socket services<br>2. FINS communications<br>3. FTP server |
| RAS (Reliability, Availability, and Safety) functions | | 1. PING command (echo request via ICMP)<br>PING response (echo response via ICMP)<br>2. Internode tests<br>3. Error logs<br>4. Self-diagnostic functions (hardware operation check)<br>5. Network status reads (via FINS commands) |

## Controller Link Units



CVM1-CLK21
(Coaxial cable)



CVM1-CLK12
(Optical fiber)

The Controller Link is OMRON's main FA-level network. It supports automatic data links between PLCs and between PLCs and host computer, as well as programmed data transfers using a message service. You get high-capacity, flexible data links and high-capacity data transfers with messages. For a low-cost communications system, twisted-pair cables can be used.

### CVM1-CLK21
### Wired System

| Items | Specifications |
|---|---|
| Model | CVM1-CLK21 (Twisted pair) |
| Communications method | N:N token bus |
| Transmission path form | Multi-drop bus |
| Baud rate and maximum transmission distance | The maximum transmission distance varies with the baud rate as follows:<br>2 Mbps: 500 m<br>1 Mbps: 800 m<br>500 Kbps: 1 km |
| Media | Specified shielded twisted-pair cable<br>Number of signal lines: 2, shield line: 1 |
| Node connection method | PC: Connected to a terminal block<br>IBM PC/AT or compatible: Connected via a special connector (included) |
| Maximum number of nodes | 32 nodes |
| Communications functions | Data links and message service |
| Number of data link words | Transmission area per node:<br>1,000 words (2,000 bytes) max.<br>Data link area in one CVM1, CV-series, (send/receive):<br>8,000 words (16,000 bytes) max.<br>Number of data link words in one network (total transmission):<br>32,000 words (64,000 bytes) max. |
| Data link areas | Bit area (IR, AR, LR, CIO), data memory (DM), and extended data memory (EM) |
| Message length | 2,012 bytes max. (including the header) |
| RAS functions | Polling node backup function<br>Self-diagnosis function (hardware checking at startup)<br>Echoback test and broadcast test (using the FINS command)<br>Watchdog timer<br>Error log function |
| Error control | CRC check (CCITT $X^{16} + X^{12} + X^5 + 1$) |

### CVM1-CLK12
### Optical Ring System

| Items | Specifications |
|---|---|
| Model | CVM1-CLK12 (Optical cable: H-PCF cable) |
| Communications method | N:N token-ring method (token-ring mode)<br>N:N token-bus method (token-bus mode) |
| Transmission path format | Ring method (token-ring mode)<br>Daisy-chain method (token-bus mode) |
| Transmission speed | 2 Mbps |
| Maximum transmission distance | 20 km |
| Maximum distance between nodes | Crimp cut: 800 m<br>Adhesive: 1 km |
| Medium | H-PCF cable (optical two-core cable) |
| Node connection method | Connected via a special (full-lock connector) connector.<br>(A half-lock connector can also be used.) |
| Maximum number of nodes | 62 nodes |
| Applicable Programming Devices | Controller Link Support Software (Ver. 2.00 or later) and CX-Net in CX-Programmer |
| Communications functions | Data links and message service |
| Number of data link words | Transmission area per node:<br>1,000 words max.<br>Data link area (send/receive) that can be created for one CVM1 or CV-series PC : 8,000 word max.<br>Number of data link words that can be used in one network (total transmission):<br>32,000 words max. |
| Data link areas | Bit areas (CIO, AR, LR), DM, EM |
| Message length | 2,012 bytes max. (including the header) |
| RAS functions | Polling node backup function<br>Self-diagnosis function (hardware checking at startup)<br>Echoback test and broadcast test (using the FINS command)<br>Watchdog timer<br>Error log function<br>Node bypass function<br>Transmission path duplication (For ring method in token-ring mode only.)<br>Disconnect detection and notification (Token-ring mode only.)<br>Node connection configuration data reading (For ring method in token-ring mode only.) |
| Error control | CRC check (CCITT $X^{16} + X^{12} + X^5 + 1$) |



## SYSMAC LINK Units



CV500-SLK11
(Optical fiber)



CV500-SLK21
(Coaxial cable)

SYSMAC LINK System enable high-speed, large-scale data links between PCs or between PCs and host computers in either a wired or optical network. Bridges can be used to communicate between interconnected SYSMAC LINK networks, or the PC gateway function can be used to communicate with PCs on SYSMAC BUS/2 networks, enabling centralized system management from a host computer.

### Specifications

| Item | Specifications | |
|---|---|---|
| Model | CV500-SLK21 (coaxial) | CV500-SLK11 (optical) |
| Method | N:N token bus | |
| Transemission path | Bus | Daisy chain |
| Baud rate | 2 Mbps | |
| Transmission distance | 1 km total | 800 m between nodes, 10 km total |
| Transmission cable | Coaxial cable (5C-2V) | 2-core optical fiber cable (H-PCF) |
| Number of connecting nodes | 62 max. | |
| Connector | BNC connector | Full- or half-lock crimping style connector |
| Link services | Datalink and message service | |
| Data link words | 2,966 words max. (in I/O Area + DM Area) | |
| Message length | 542 bytes max. (excluding the header) | |
| Send buffer capacity | 1 message | |
| Receive buffer capacity | 2 messages | |
| RAS (Reliability, Availability, and Safety) functions | 1. Automatic polling unit backup<br>2. Self-diagnostics (internode tests)<br>3. Node bypasses (optical system) using power supply<br>4. Watchdog timer<br>5. Error detection (CRC-CCITT: Generating function = $X^{16} + X^{12} + X^5 + 1$)<br>6. Error log | |

## SYSMAC BUS/2 Remote I/O Units



SYSMAC BUS/2
Remote I/O Master Unit
CV500-RM211 (optical)
CV500-RM221 (wired)



SYSMAC BUS/2
Remote I/O Slave Unit
CV500-RT211 (optical)
CV500-RT221 (wired)

SYSMAC BUS/2 Systems provide high-speed bus networks that can be used to connect the PC to I/O devices and FA components. They effectively reduce the time and expense of wiring distributed controls and increase system maintenance efficiency by enabling remote monitoring and programming.

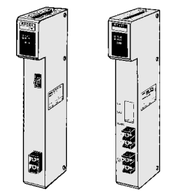
### Specifications

| Item | Specifications | |
|---|---|---|
| | Wired Units | Optical Units |
| Transmission medium | Special shielded twisted-pair cable | 2-core optical fiber cable |
| Communications method | 1:N polling and selection | |
| Data transfer speed | 1.5 Mbps | |
| Transmission path | Multidrop | Daisy chain or loop |
| Transmission distance | 500 m total length | Total length: 10 km;<br>Between nodes: 1 km with purchased connector-equipped cables or 800 m with user-produced cables |
| Max. I/O capacity on Slave Racks | CVM1-CPU01-EV2: 1,024 pts<br>CVM1-CPU11-EV2: 2,048 pts<br>CVM1-CPU21-EV2: 2,048 pts | |

## SYSMAC BUS Remote I/O Units



Remote I/O Master Unit
3G2A5-RM001-(P)EV1
(optical)
C500-RM201 (wired)



Remote I/O Slave Unit
3G2A5-RT001/002-
(P)EV1 (optical)
3G2A5-RT201 (wired)

SYSMAC BUS Systems enable communications between the PC and controllers/components with reduced wiring time and expense, and are ideal for large-scale distributed control or any other time remote I/O processing is required. Select either a wired or optical system to suit your needs. With an optical system, I/O Link Units can also be used to easily transfer data between PCs.

### Specifications

| Item | Specifications | |
|---|---|---|
| | Wired Units | Optical Units |
| Transmission medium | Twisted-pair cable | 2-core optical fiber cable |
| Communications method | 2-line half duplex | Time-shared multiplex cyclic system |
| Data transfer speed | 187.5 kbps | |
| Transmission path | Multidrop | Daisy chain or loop |
| Transmission distance | 200 m total length | Total length: 6.4 km;<br>Between nodes: 800 m max. |
| Max. I/O capacity on Slave Racks | CVM1-CPU01-EV2: 512 pts<br>CVM1-CPU11-EV2: 1,024 pts<br>CVM1-CPU21-EV2: 2,048 pts | |

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# CPU Bus Units for Communications

## Ethernet Unit



CV500-ETN01

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### Specifications

| Item | | Specifications |
|---|---|---|
| Transmission specifications | Medium access method | CSMA/CD |
| | Modulation | Base band |
| | Transmission path | Bus |
| | Baud rate | 10 Mbit/s |
| | Transmission medium | Coaxial cable |
| | Transmission distance | 500 m max./segment; 2.5 km max./network |
| | Number of connectable nodes | 100 nodes/segment |
| | Distance between nodes | Multiples of 2.5 m |
| | Transceiver cable length | 50 m max. |
| | Transceiver power supply capacity | 0.35 A at 12 V |
| Communications services | | 1. TCP/IP and UDP/IP socket services<br>2. FINS communications<br>3. FTP server |
| RAS (Reliability, Availability, and Safety) functions | | 1. PING command (echo request via ICMP)<br>PING response (echo response via ICMP)<br>2. Internode tests<br>3. Error logs<br>4. Self-diagnostic functions (hardware operation check)<br>5. Network status reads (via FINS commands) |

## Controller Link Units



CVM1-CLK21
(Coaxial cable)



CVM1-CLK12
(Optical fiber)

The Controller Link is OMRON's main FA-level network. It supports automatic data links between PLCs and between PLCs and host computer, as well as programmed data transfers using a message service. You get high-capacity, flexible data links and high-capacity data transfers with messages. For a low-cost communications system, twisted-pair cables can be used.

### CVM1-CLK21
### Wired System

| Items | Specifications |
|---|---|
| Model | CVM1-CLK21 (Twisted pair) |
| Communications method | N:N token bus |
| Transmission path form | Multi-drop bus |
| Baud rate and maximum transmission distance | The maximum transmission distance varies with the baud rate as follows:<br>2 Mbps: 500 m<br>1 Mbps: 800 m<br>500 Kbps: 1 km |
| Media | Specified shielded twisted-pair cable<br>Number of signal lines: 2, shield line: 1 |
| Node connection method | PC: Connected to a terminal block<br>IBM PC/AT or compatible: Connected via a special connector (included) |
| Maximum number of nodes | 32 nodes |
| Communications functions | Data links and message service |
| Number of data link words | Transmission area per node:<br>1,000 words (2,000 bytes) max.<br>Data link area in one CVM1, CV-series, (send/receive):<br>8,000 words (16,000 bytes) max.<br>Number of data link words in one network (total transmission):<br>32,000 words (64,000 bytes) max. |
| Data link areas | Bit area (IR, AR, LR, CIO), data memory (DM), and extended data memory (EM) |
| Message length | 2,012 bytes max. (including the header) |
| RAS functions | Polling node backup function<br>Self-diagnosis function (hardware checking at startup)<br>Echoback test and broadcast test (using the FINS command)<br>Watchdog timer<br>Error log function |
| Error control | CRC check (CCITT $X^{16} + X^{12} + X^5 + 1$) |

### CVM1-CLK12
### Optical Ring System

| Items | Specifications |
|---|---|
| Model | CVM1-CLK12 (Optical cable: H-PCF cable) |
| Communications method | N:N token-ring method (token-ring mode)<br>N:N token-bus method (token-bus mode) |
| Transmission path format | Ring method (token-ring mode)<br>Daisy-chain method (token-bus mode) |
| Transmission speed | 2 Mbps |
| Maximum transmission distance | 20 km |
| Maximum distance between nodes | Crimp cut: 800 m<br>Adhesive: 1 km |
| Medium | H-PCF cable (optical two-core cable) |
| Node connection method | Connected via a special (full-lock connector) connector.<br>(A half-lock connector can also be used.) |
| Maximum number of nodes | 62 nodes |
| Applicable Programming Devices | Controller Link Support Software (Ver. 2.00 or later) and CX-Net in CX-Programmer |
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| Error control | CRC check (CCITT $X^{16} + X^{12} + X^5 + 1$) |



## SYSMAC LINK Units



CV500-SLK11
(Optical fiber)



CV500-SLK21
(Coaxial cable)

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### Specifications

| Item | Specifications | |
|---|---|---|
| Model | CV500-SLK21 (coaxial) | CV500-SLK11 (optical) |
| Method | N:N token bus | |
| Transemission path | Bus | Daisy chain |
| Baud rate | 2 Mbps | |
| Transmission distance | 1 km total | 800 m between nodes, 10 km total |
| Transmission cable | Coaxial cable (5C-2V) | 2-core optical fiber cable (H-PCF) |
| Number of connecting nodes | 62 max. | |
| Connector | BNC connector | Full- or half-lock crimping style connector |
| Link services | Datalink and message service | |
| Data link words | 2,966 words max. (in I/O Area + DM Area) | |
| Message length | 542 bytes max. (excluding the header) | |
| Send buffer capacity | 1 message | |
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Remote I/O Master Unit
CV500-RM211 (optical)
CV500-RM221 (wired)



SYSMAC BUS/2
Remote I/O Slave Unit
CV500-RT211 (optical)
CV500-RT221 (wired)

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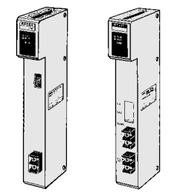
### Specifications

| Item | Specifications | |
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| | Wired Units | Optical Units |
| Transmission medium | Special shielded twisted-pair cable | 2-core optical fiber cable |
| Communications method | 1:N polling and selection | |
| Data transfer speed | 1.5 Mbps | |
| Transmission path | Multidrop | Daisy chain or loop |
| Transmission distance | 500 m total length | Total length: 10 km;<br>Between nodes: 1 km with purchased connector-equipped cables or 800 m with user-produced cables |
| Max. I/O capacity on Slave Racks | CVM1-CPU01-EV2: 1,024 pts<br>CVM1-CPU11-EV2: 2,048 pts<br>CVM1-CPU21-EV2: 2,048 pts | |

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C500-RM201 (wired)



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| Data transfer speed | 187.5 kbps | |
| Transmission path | Multidrop | Daisy chain or loop |
| Transmission distance | 200 m total length | Total length: 6.4 km;<br>Between nodes: 800 m max. |
| Max. I/O capacity on Slave Racks | CVM1-CPU01-EV2: 512 pts<br>CVM1-CPU11-EV2: 1,024 pts<br>CVM1-CPU21-EV2: 2,048 pts | |

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Programmable Controller

OMRON

# SYSMAC CVM1

## The Perfect Programmable Controller for Large-Scale Machine Control



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Printed in Japan
0500-?M (?)

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