

# Rack PLCs

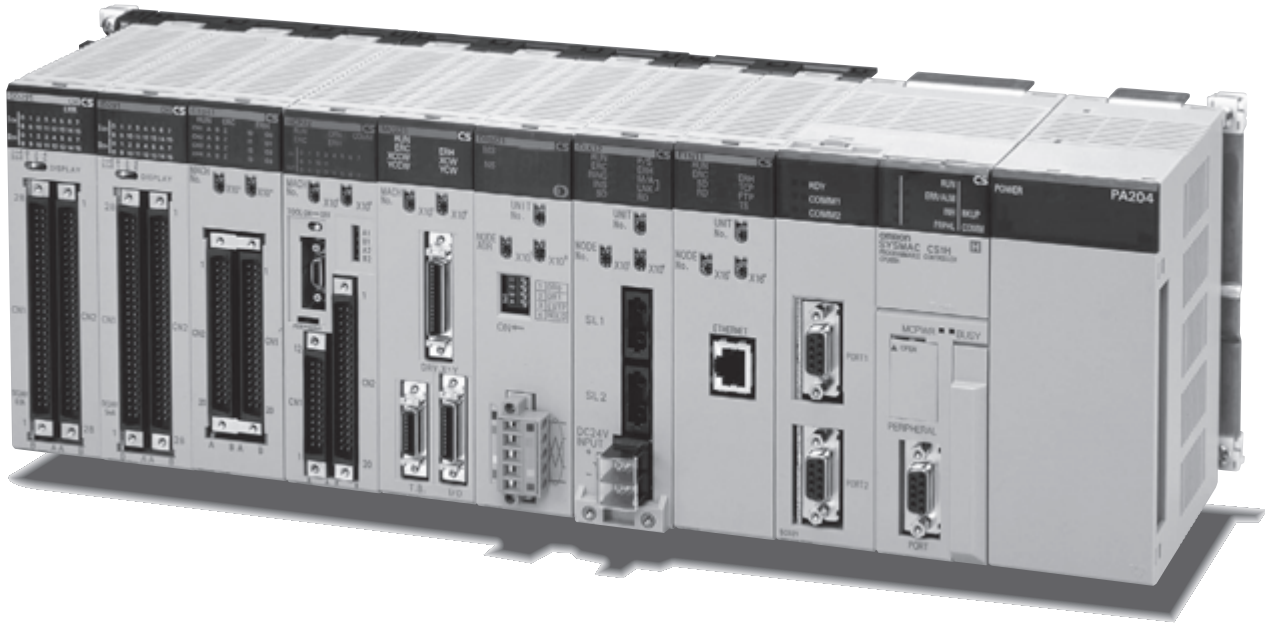
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Rack PLC series

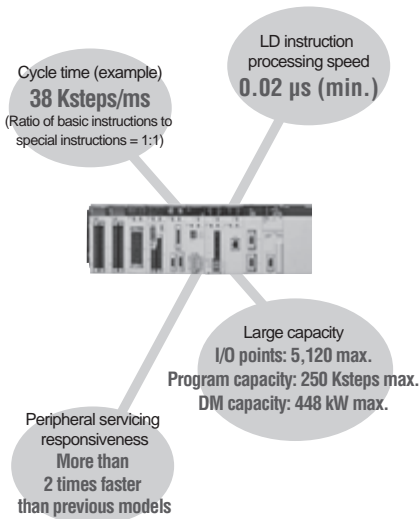
# CS1

The evolution of the SYSMAC CS1 is accelerating advances in the production site.



## 1 Ultimate Performance

Further improvements to instruction execution efficiency, the core of overall PLC performance, enable the highest speeds in the industry. This allows the optimization of processing time and accuracy.



## 2 Instructions That Fit the Application

These PLCs have a variety of special instructions that allow their operation to suit the

application. High-precision control can be achieved without complex programs.

- High-precision Positioning
- Double-precision floating-point instructions
- Automatic Adjustment of PID Constants
- PID instructions with autotuning
- Program Simplification
- Set and reset instructions for DM/EM Area bits

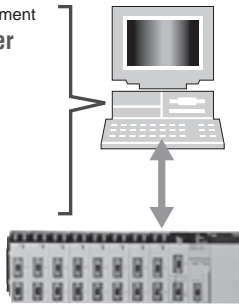


- Error Generation for Debugging
- Failure diagnosis instructions
- High-resolution Approximation
- APR instruction
- Workpiece Information Control for Conveyor Systems
- Table data processing instructions for stacks

## 3 Integrated Development Environment and Middleware

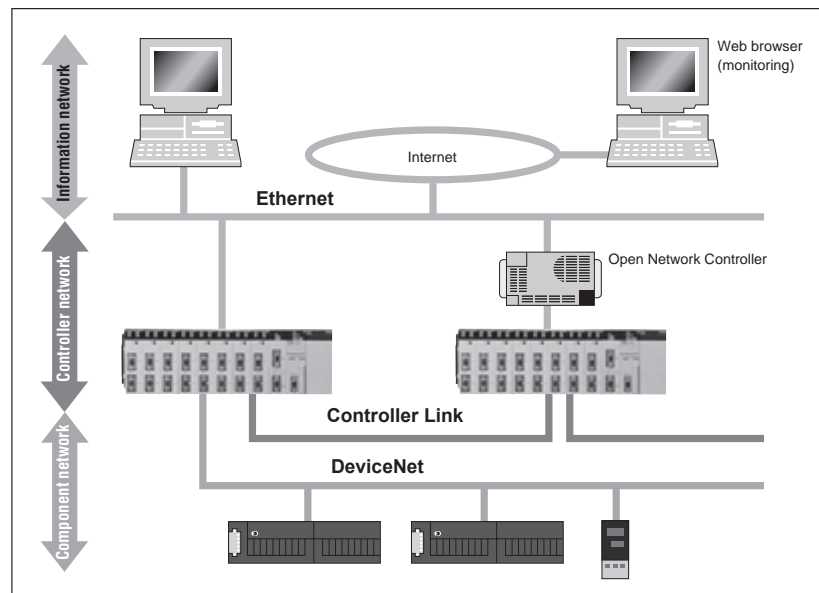
CX-One includes powerful software packages for program development, simulation, and communications. Develop more efficient value-added systems in the time allowed.

- Program development
- CX-Programmer
- Simulation
- CX-Simulator
- Communications middleware
- CX-Server



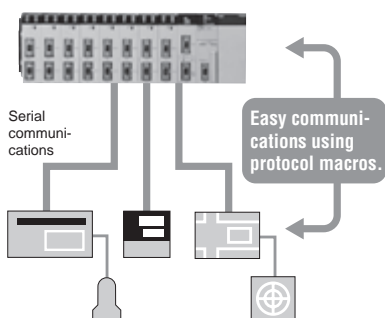
## 4 Seamless Networking

The CS1 supports message communications across three network levels, from information networks down to component networks, allowing greater on-site information management. Remote monitoring of installations is also possible using Web functions via the Internet.



## 5 Easier Connection to Peripheral Devices

Up to 35 peripheral devices can be connected to a CS1 PLC via serial communications. Data can be exchanged with peripheral devices easily using the protocol macro function, eliminating the need for time-consuming communications programs.



## 6 Inheritance and Maintenance

Today's CS1 PLCs have complete upward compatibility with existing CS1 systems. Facilities performance can be upgraded simply by replacing the CPU Unit (see note). Also, features such as battery-free operation ensure greater convenience for maintenance and operation.

**100% Upward Compatibility with Existing CS1 Systems**  
**Battery-free Operation**  
**Memory Cards**  
**Remote Maintenance**  
**Conformance to Global Standards**  
**Etc.**



Note: When replacing a CPU Unit with a different model, always test the system to confirm that it has not been adversely affected.

## 7 PLC-based System Expansion

A variety of system expansions based on CS1 PLCs, such as PLC-based process automation systems, high-precision positioning systems, and remote monitoring systems are possible.

**PLC base**



**PLC-based process automation systems**

**High-precision positioning systems**

**Remote monitoring systems**

**Field network systems**

**Onsite information terminals**



Use the improved SYSMAC CS1 PLCs to scale advanced systems to the optimum size.

# 1

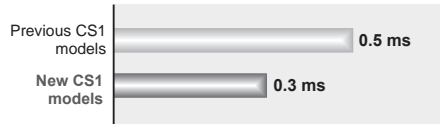
The evolution of the SYSMAC CS1 is accelerating advances in the production site.

## Faster Instruction Execution and Faster Overall Performance

In addition to further improvements to the instruction execution engine, which is the core of overall PLC performance, the high-speed RISC chip has been upgraded to realize the fastest instruction execution performance in the industry. Also, the

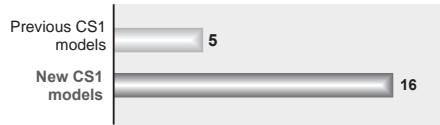
new models have a mode where instruction execution and peripheral processing are processed in parallel, enabling balanced improvements in overall speed.

### Common Processing: 1.6 Times Faster



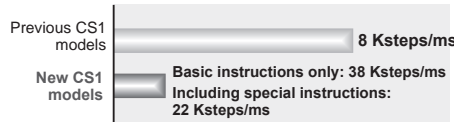
The figures above are for high-speed, general-purpose PLCs with interchangeable boards.

### PC MIX Value: 3 Times Higher



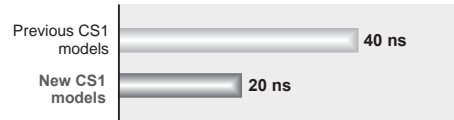
The PC MIX is the average number of instructions that can be executed in 1  $\mu$ s and expresses the over execution performance of the ladder program. This unit was conceived to allow comparing the performance of PLCs from different manufacturers using a common metric.

### Cycle Time: 2.5 to 4.8 Times Shorter (Cycle time for 128 inputs and 128 outputs)



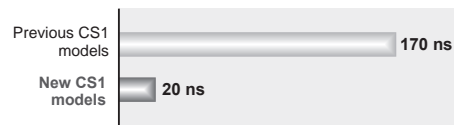
With normal I/O refresh, 1-ms pulses are not lost even for large-capacity (e.g., 30-Kstep) programs. This allows use in applications requiring a high working accuracy, such as molding equipment.

### LD Instruction Processing Speed: 2 Times Faster



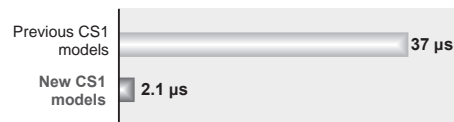
The development of a special LSI to execute instructions and use of a high-speed RISC chip enable high-speed processing at the CPU.

### OUT Instruction Processing Speed: 8 Times Faster



Programs consisting mainly of basic instructions are processed at ultrahigh speed.

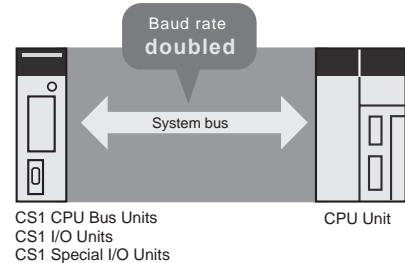
### Subroutine Processing Speed: 17.6 Times Faster



Cycle time overhead due to program structuring is minimized.

## System Bus Baud Rate Doubled

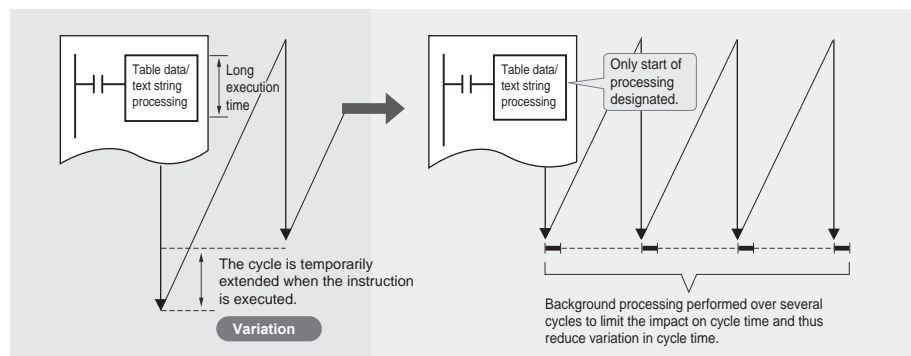
The data transfer rate between the CPU Unit and certain Units has been doubled to further improve total system performance.



## Reduced Variation in Cycle Time During Data Processing

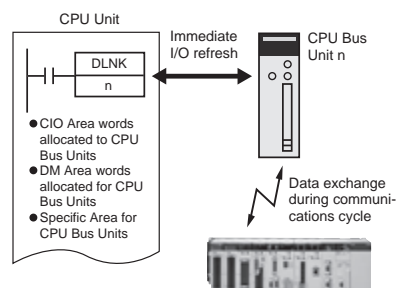
Instructions that require long execution time, such as table data processing instructions and text string processing instructions, are processed over multiple

cycles to minimize variations in cycle time and maintain stable I/O response.



## Improved Refresh Performance for Data Links, Remote I/O Communications, and Protocol Macros

In the past, I/O refresh processing with the CPU Bus Unit only occurred during I/O refresh after instructions were executed.



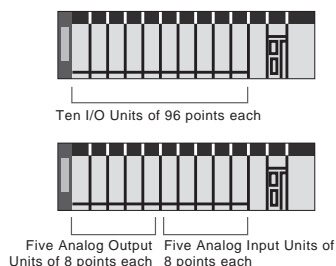
Unit name	Refresh function
Controller Link Unit	Data links
DeviceNet Unit	Remote I/O
Serial Communications Unit	Protocol macros
Ethernet Unit	Socket service based on manipulation of specific bits.

## Large Capacity CPU Units for Greater Component Control Power

The CS1 CPU Units boast amazing capacity with up to 5,120 I/O points, 250 Ksteps of programming, 448 Kwords of data memory (including expanded data memory) and 4,096 timers/counters each. With a large programming capacity, CS1 PLCs are not only ideal for large-scale systems but easily handle value-added applications and other advanced data processing.

## Control Up to 960 Points with Units Mounted to the CPU Rack

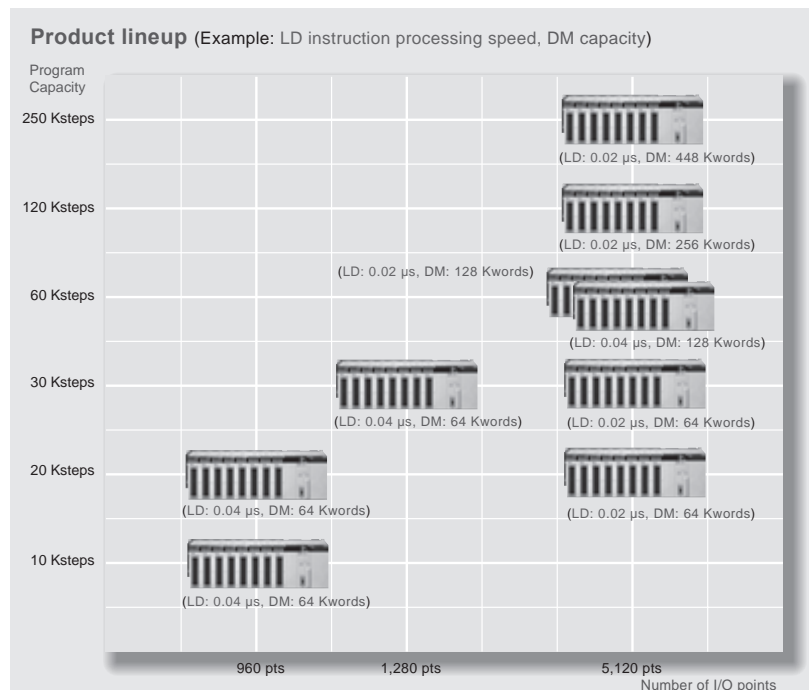
The CS1 provides a high level of space efficiency. As many as 960 I/O points can be controlled by simply mounting ten Basic I/O Units, with 96 I/O points each, to the CPU Rack. Alternatively, as many as 80 analog I/O points can be used by mounting five Analog Input Units and five Analog Output Units.



With the new CS1, however, I/O can be refreshed immediately by using the DLNK instruction. Immediate refreshing for processes peculiar to the CPU Bus Unit, such as for data links and DeviceNet remote I/O communications, and for allocated CIO Area/DM Area words when instructions are executed, means greater refresh responsiveness for CPU Bus Units.

## Wide Lineup Makes It Easy to Build the Optimum System

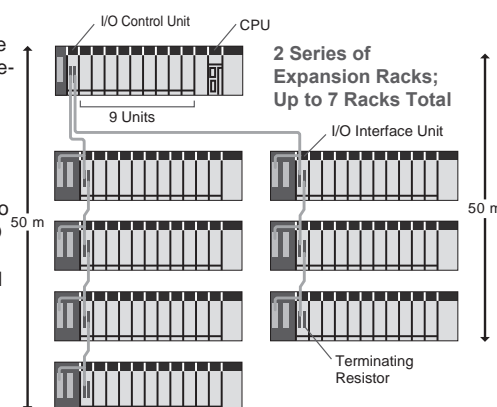
A total of nine CPU Unit models provide for a wide range of applications, from small-scale systems to large. The lineup also includes Memory Cards, Serial Communications Boards, and a wide selection of Special I/O Units that can be used with any CPU Units to flexibly build the system that meets the requirements.



## Two Series of Expansion Racks Up to 50 m Long for Long-distance Expansion with Up to 72 Units and 7 Racks

With an expansion capacity of up to 80 Units and 7 Racks over a distance of 12 meters, the CS1 can meet large-scale control needs. Alternatively, an I/O Control Unit and I/O Interface Units can be used to connect two series of CS1 Long-distance Expansion Racks extending up to 50 m each and containing a total of up to 72 Units and 7 Racks. CS1 Basic I/O Units, CS1 Special I/O Units, and CS1 CPU Bus Units can be mounted anywhere on the Racks and programmed without being concerned about special remote programming requirements.

Note: C200H Units cannot be mounted on the Long-distance Expansion Racks.



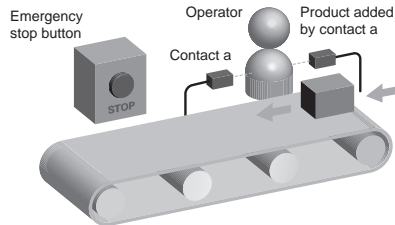
Equipped with functions demanded by the production site to suit a variety of applications

## 2

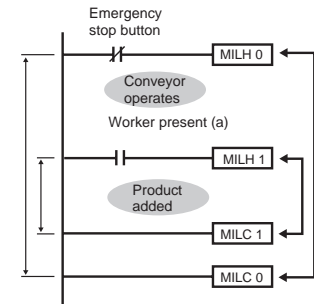
The evolution of the SYSMAC CS1 is accelerating advances in the production site.

### Nested Interlocks (for CPU Unit Ver. 2.0 or Later)

Although strictly speaking the present interlock instructions do not allow nesting, applications can be created to include combination of complete and partial interlock conditions that achieve nested interlocks.



- (1) Conveyor operates
- (2) Contact "a" turns ON when operator is present and products are supplied.
- (3) When the emergency stop button is pressed, the conveyor and product addition both stop.



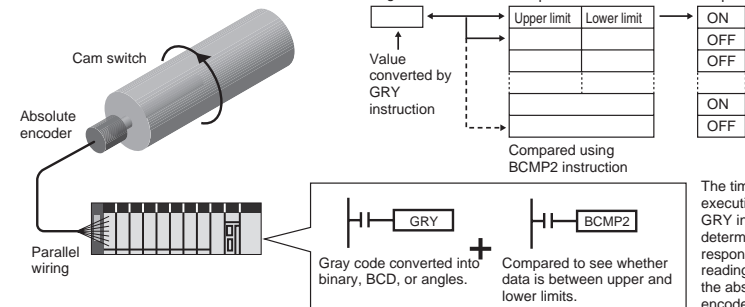
CX-Programmer Screen



Support Software clearly shows the interlock status.

### Easy Cam Switch Control with Ladder Instructions

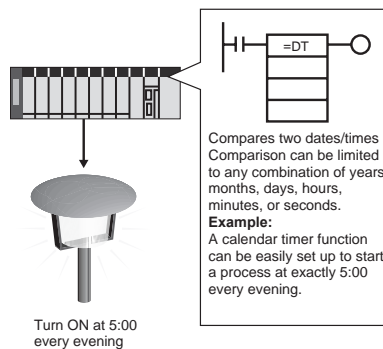
(for CPU Unit Ver. 2.0 or Later)



The time interval for execution by the GRY instruction is determined by the response speed for reading data from the absolute encoder.

### Easy Calendar Timer Function

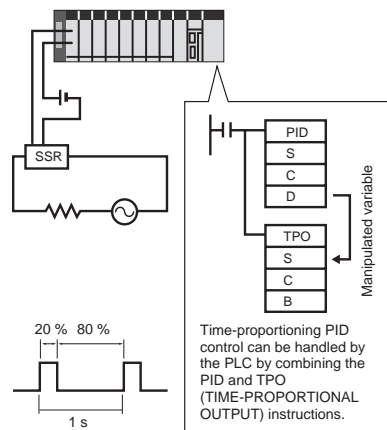
(for CPU Unit Ver. 2.0 or Later)



Compares two dates/times  
Comparison can be limited to any combination of years, months, days, hours, minutes, or seconds.  
**Example:**  
A calendar timer function can be easily set up to start a process at exactly 5:00 every evening.

### TIME-PROPORTIONAL OUTPUT (TPO) Instruction

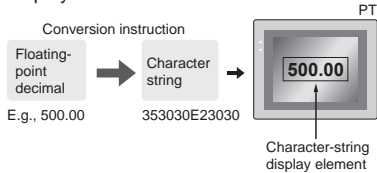
(for CPU Unit Ver. 2.0 or Later)



Time-proportioning PID control can be handled by the PLC by combining the PID and TPO (TIME-PROPORTIONAL OUTPUT) instructions.

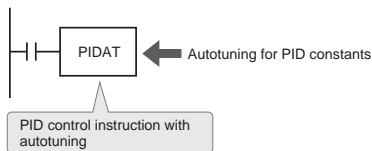
## Convert Between Floating-point Decimal and Character Strings

The new CS1 can convert floating-point decimal (real numbers) to character strings (ASCII) for display on a PT (operator interface). The data can be displayed on the PT as a character-string display element.



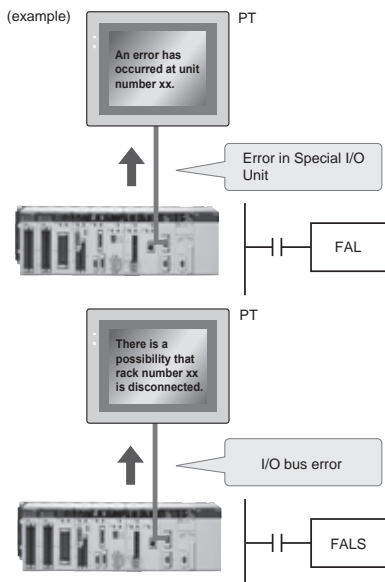
## PID Autotuning

The new CS1 can autotune PID constants with a PID control instruction. The limit cycle method is used for autotuning, so the tuning is completed quickly. This is particularly effective for multiple-loop PID control.

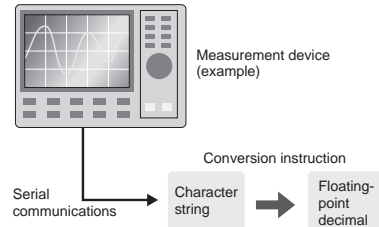


## Error Status Generation for Debugging

A specified error status can be simulated by executing the diagnostic instructions (FAL/FALS). With the new CS1, debugging is simple for applications that display messages on a PT or other display device based on the error status of the CPU Unit.

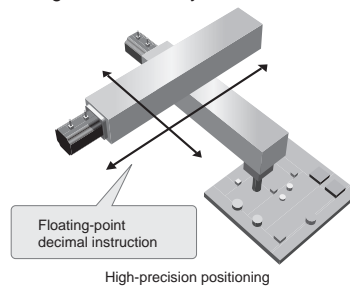


The new CS1 can convert ASCII character strings read from measurement devices by serial communications to floating-point decimal data for use in data processing.



## Highly Accurate Positioning with XY Tables

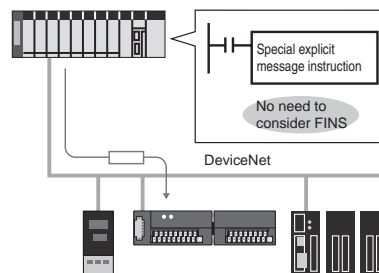
The new CS1 has many double-precision processing instructions for floating-point decimal operations, enabling positioning with greater accuracy.



## Easy Reading of Maintenance Data via DeviceNet

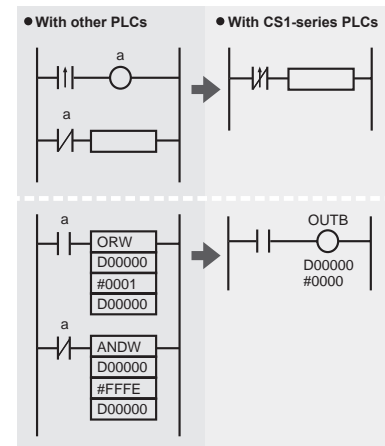
(for CPU Unit Ver. 2.0 or Later)

The addition of special explicit message instructions makes it easy to send explicit messages without having to consider FINS commands. Transferring data among PLCs with explicit messages is also simplified.



## Simpler Ladder Programs

Ladder programs that use a lot of basic instructions can be simplified using differentiation instructions LD NOT, AND NOT, and OR NOT, and instructions that access bits in the DM and EM Areas.



## Binary Set Values for Timer/Counter Instructions

The SV for a timer or counter instruction can be specified using either BCD or binary. Using binary SV enables longer timers and higher-value counters.

### Examples: Timer/Counter Instructions

TIM (BCD): 0 to 999.0 s  
TIMX(550) (binary) 0 to 6553.5 s  
CNT (BCD): 0 to 999 counts  
CNTX(546) (binary) 0 to 65,535 counts

### Applicable Timer/Counter Instructions

TIMER: TIMX(550)  
COUNTER: CNTX(546)  
HIGH-SPEED TIMER: TIMHX(551)  
ONE-MS TIMER: TMHX(552)  
ACCUMULATIVE TIMER: TTIMX(555)  
LONG TIMER: TIMLX(553)  
MULTI-OUTPUT TIMER: MTIMX(554)  
REVERSIBLE COUNTER: CNTRX(548)  
RESET TIMER/COUNTER: CNRX(547)

Easier and more efficient design, development and maintenance with Windows-based software and middleware

### 3

The evolution of the **SYSMAC CS1** is accelerating advances in the production site.

## Improved Support Software in an Integrated Windows-based Development Environment

The CX-One software suite provides tools for more efficient design and development using the CX-Programmer for programming and network configuration, and CX-Simulator for operation simulation.

CX-Programmer

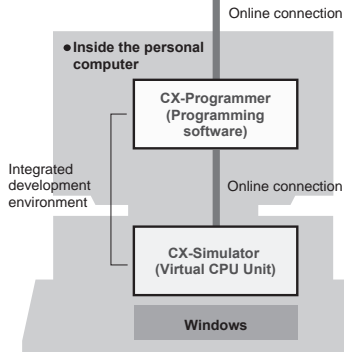


CX-Simulator



CX-Integrator Network Configuration Tool

System PLC  
CS1



## CX-Programmer



### OMRON FB Library

(Unit Ver. 3.0 or later)

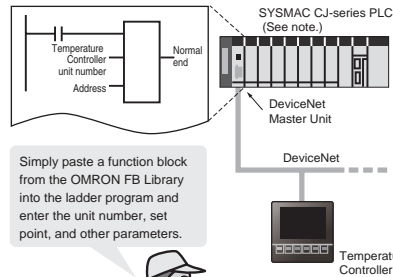
**NEW**

The OMRON FB library provides function blocks for setting SPs, reading PVs, and reading/writing RUN/STOP status and other Temperature Controller parameters. The programmer simply pastes function blocks from the OMRON FB Library into the ladder program. The desired functions can be utilized simply by inputting the Temperature Controller unit number and address.

#### What is the OMRON FB Library?

The OMRON FB Library is a set of functional objects for ladder programming for OMRON CS/CJ-series PLCs. By incorporating the OMRON function blocks provided by OMRON into a ladder program, the program interface for different control devices is easily completed. This reduces the number of working hours required for program development and, at the same time, improves product quality through standardization.

Example: Function Block for Writing Temperature Controller SPs



Simply paste a function block from the OMRON FB Library into the ladder program and enter the unit number, set point, and other parameters.



## The Structured Text (ST) Language Enables Trigonometric Functions and other Arithmetic Processes

**NEW**

In addition to ladder programming, function block logic can be written in ST, which conforms to IEC61131-3. With ST, arithmetic processing is also possible, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing difficult to achieve in ladder programs becomes easy to write.



**NEW**

CX-Programmer Ver. 5.0 or higher is required.

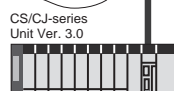
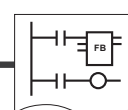
## Recovery Possible by Uploading Function Blocks from Working PLC

**NEW**

(Unit Ver. 3.0 or later)

Programs with function blocks can be uploaded from CPU Units, just like normal programs, without the need for additional memory, such as a Memory Card.

CX-Programmer  
Ver.5.0



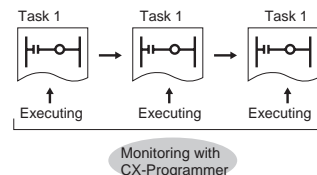
Programs with function blocks can be uploaded from working PLCs.

## Enhanced Efficiency for Program Development Teams

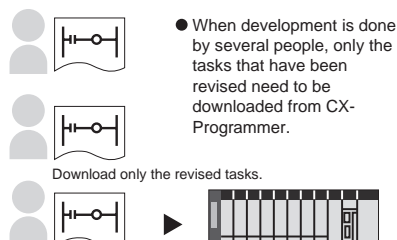
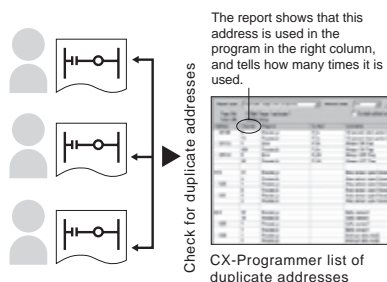
(for CPU Unit Ver. 2.0 or Later)

Multiple programmers will enjoy better efficiency when working on task-based programs, thanks to automatic checking for address duplication among tasks, downloading and uploading in task units, and easy monitoring of task operating status.

- The execution status of each task can be monitored with CX-Programmer to improve debugging efficiency.



- Checking for address duplication among tasks developed by multiple programmers is automatically executed with the cross reference report of CX-Programmer.



- When development is done by several people, only the tasks that have been revised need to be downloaded from CX-Programmer.

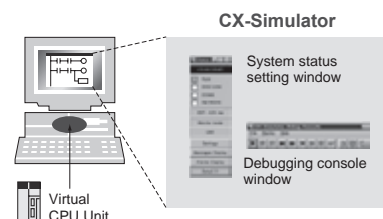
## Copy and Paste between Spreadsheets and Symbol Tables

You can use your favorite spreadsheet application to prepare an allocation table with symbol names, addresses, and I/O comments, then copy and paste it into a symbol table, and also do the reverse. This greatly improves programming productivity.

## CX-Simulator

### Programs Can Be Executed, Monitored, and Debugged without an Actual PLC

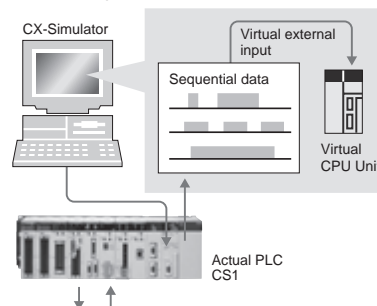
The CX-Simulator Software simulates ladder execution of the new CS1 CPU Unit on a computer. Online functions, such as monitoring of I/O bit status, monitoring of I/O memory present values, forced set/reset, differential monitoring, data tracing, and online editing, can be performed by connecting to the virtual CPU Unit on the computer from the CX-Programmer using the CX-Simulator. This reduces the total lead time to machine or system startup.



### Data Logging On-site and Operation Verification in the Office

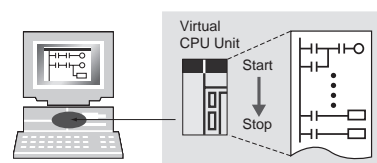
Sequential data from I/O memory in the actual PLC can be obtained and saved as a data recreation file (CSV format). On-site PLC ladder execution can be recreated on a computer by inputting this

data to the CX-Simulator as virtual external input data.



### Comprehensive Debugging Functions Including Ladder Step Execution and Break Points

The new CS1 has comprehensive debugging functions, including ladder step execution (execution by instruction), start point settings, break point setting, I/O break conditions, and scan execution. This enables more detailed debugging without using an actual PLC. Interrupt tasks can be simulated, enabling more realistic debugging.

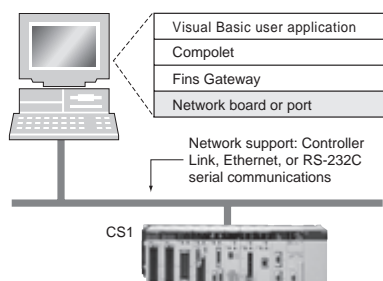


## Middleware to Support PLC-centered System Construction

Easy development of user applications for communications with the new CS1.

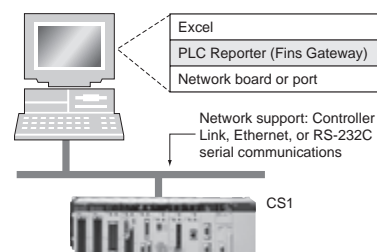
### SYSMAC Compolet: Accessing the CS1 with Visual Basic

Use SYSMAC Compolet for communications with OMRON PLCs to greatly reduce development time of user applications for CS1 I/O memory read and write, forced set/reset, and FINS message communications using Visual Basic.



### PLC Reporter 32: Add-on Software for Accessing the New CS1 Using Excel

Use PLC Reporter 32 to automatically collect specific CS1 I/O memory data into Excel 97 or Excel 2000 cells without special programming. Basically, a system can be constructed with a computer, PLC Reporter 32, Excel, and a host link cable. The cost of constructing a monitoring system can thus be greatly reduced.





Further improvements to communications functions. Seamless networks increase production site transparency

## 4

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

### The Solution for Communicating across Network Levels

The SYSMAC CS1 enables FINS message communications across a maximum of eight levels (See note) (using CX-Programmer Ver. 4.0 or higher) in comparison with three levels in previous OMRON systems. Expansion up to eight levels lets you build a seamless communications system for sending FINS messages across multiple levels of Ethernet and Controller Link networks.

**Note:** For CPU Unit Ver. 2.0 or later.

### A Wide Range of Systems, from Small-scale to Large

OMRON offers a full lineup of reliable PLCs including the "flagship" CS1 Series, and ranging from the small-scale CQM1H to the large-scale CV Series. The CS1 Series meets the needs not only of small-scale to large-scale systems, but of distributed systems as well. This allows the construction of the optimum system for the scale and applications of the production site.

### Flexible System Building Based on the DeviceNet

The CS1 Series supports the worldwide multivendor bus standard, DeviceNet. Component connections in a multivendor environment are greatly enhanced by connecting to up to 64 nodes for a wide range of FA applications, and by device profiles and configurator tools that ensure high reliability and easy maintenance. Production systems can be configured even more flexibly by incorporating products such as the MULTIPLE I/O TERMINAL.

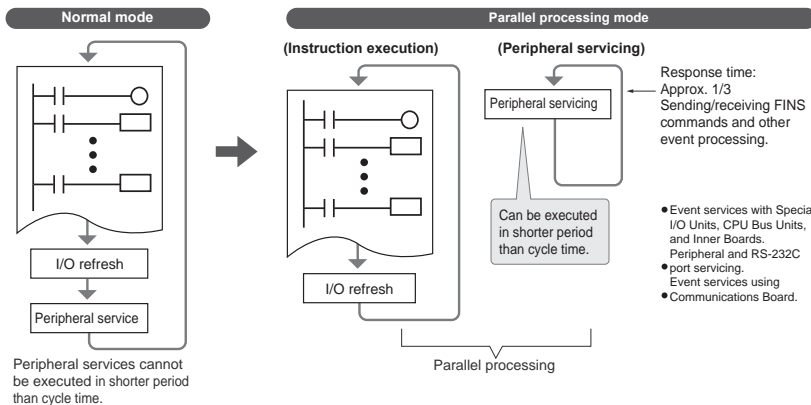
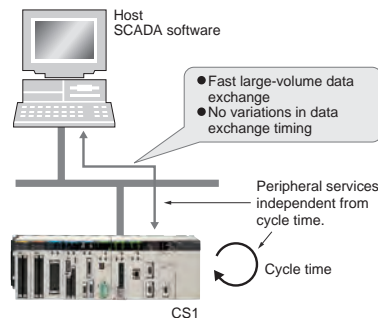
### Functions for Better Ethernet Support

Ethernet is becoming an increasingly important standard for information networks. Up to eight socket interfaces for TCP/IP and UDP/IP are supported, in addition to FINS messages, FTP file transfers, and mail notification, so that production management can now be organically linked with the production site.

### High Event Responsiveness and High-speed Instruction Execution

The new CS1 has an operating mode that allows parallel processing for program execution and peripheral services. This has the following benefits.

- Fast exchange with host computers of large amounts of data, without dependence on the program capacity of the new CS1.
- Smooth refreshing of data exchanged with SCADA software without variations in timing.
- Cycle time not affected if communications traffic or networks increase when expanding facilities in the future.

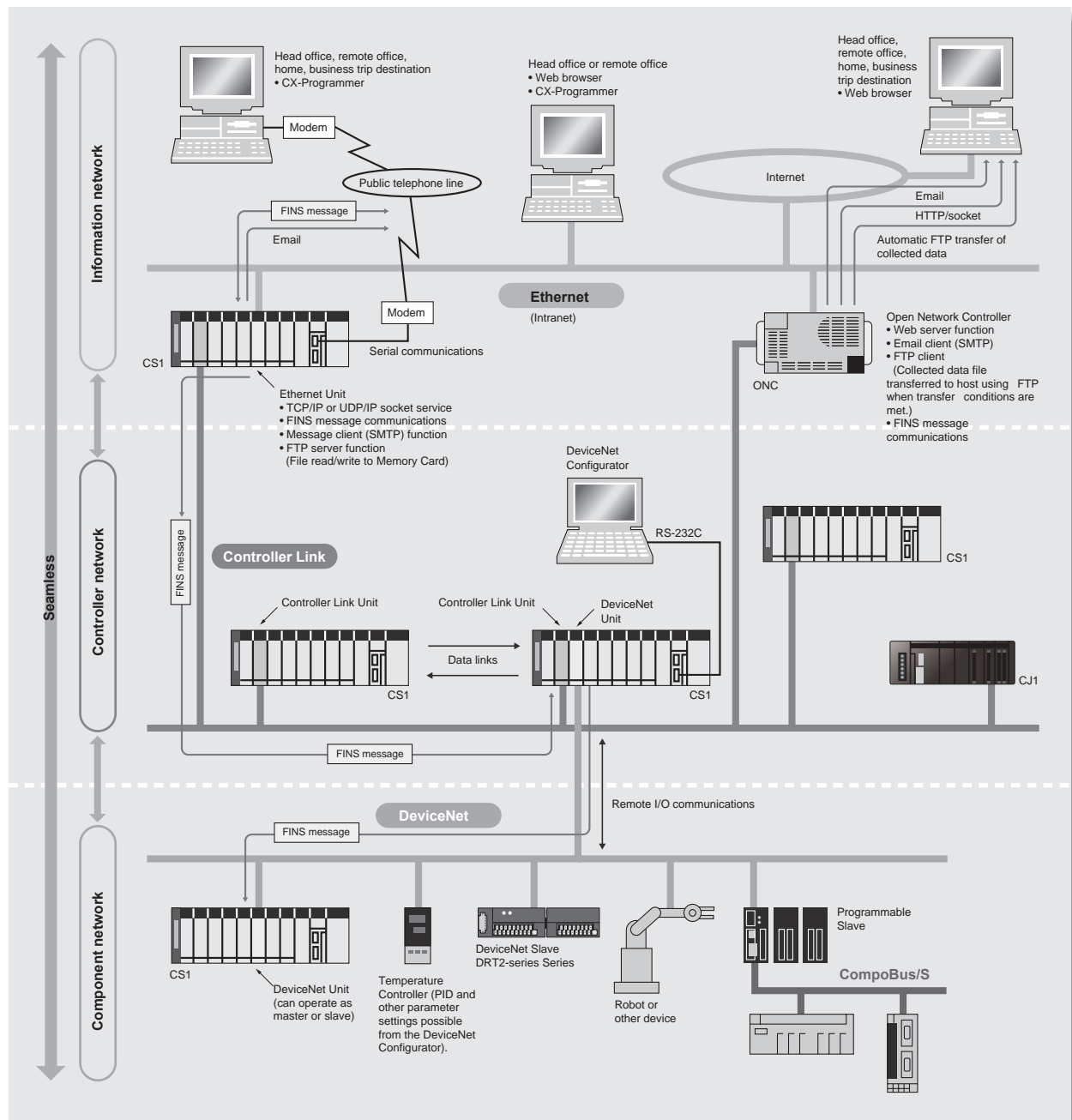


## Add a Redundant Optical Ring to Your Controller Link Communications

A redundant network configuration will keep communications flowing over the duplicate ring-shaped path in the event of a broken optical fiber, preventing system malfunction.

## Remote Monitoring via the Web

Connecting via an ONC enables remote monitoring from a Web browser with a user-defined Web application (using Web Tool Kit). It is also possible to automatically collect data on a Memory Card mounted to an ONC and automatically transfer data to the host PLC (using Data Collection/Distribution Software).





## Construction of systems in multivendor environments simplified with protocol macros.

### 5

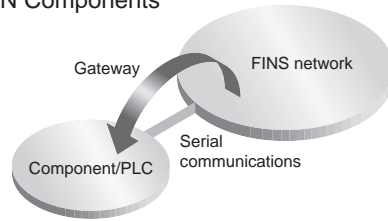
The evolution of the SYSMAC CS1 is accelerating advances in the production site.

#### **NEW Serial Gateway** (CPU Unit Ver. 3.0 or later) (Serial Communications Units/Boards with Ver. 1.2 or later)

##### Truly Seamless Incorporation of OMRON Components and Other Devices into Networks

When the CPU Unit (Ver. 3.0 or later) or Serial Communications Board or Serial Communications Unit (Ver. 1.2 or later) receive a FINS command containing a CompoWay/F command (see note 1) via network or serial communications, the command is automatically converted to a protocol suitable for the message and forwarded using serial communications.

- CompoWay/F (See note 2.)
- Host Link FINS  
(Possible only with Serial Communications Boards or Serial Communications Units Ver. 1.2 or later)

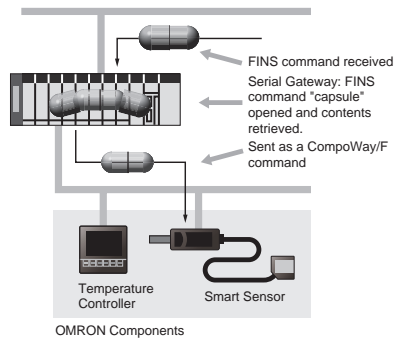


**Note 1:** FINS  
Abbreviation for Factory Interface Network Service. A command system for message services common to OMRON networks. FINS commands can be sent across up to 8 network levels, including serial communications paths using a serial gateway. (Possible only with CS/CJ-series CPU Unit Ver. 2.0 or later.)

**Note 2:** CompoWay/F  
CompoWay/F is an integrated communications protocol used for OMRON general-purpose serial communications. It is used by Temperature Controllers, Digital Panel Meters, Timer/Counters, Smart Sensors, Cam Positioners, Safety Controllers, etc. (as of July 2004).

#### ● Serial Gateway System (Reference)

When CompoWay/F commands are enclosed in FINS commands and sent to Serial Communications Boards or Serial Communications Units (Ver. 1.2) or serial ports on CPU Unit Ver. 3.0, the enclosed CompoWay/F command is retrieved using a Serial Gateway Function and sent as a CompoWay/F command.



#### More Ports for Even More Serial Device Connections

Protocol macros make it easy to create serial communications protocols (communications frames, error checks, retries, error processing, etc.) to match those of remote communications devices. Multiple ports are provided for this function. Each PLC supports up to 16 Serial Communications Units (32 ports total) and one Serial Communications Board (with 2 ports). This makes it possible to connect up to 34 devices with serial communications at a speed of 38.4 Kbps. Message length has been increased from 256 to 1,000 bytes to give communications more power than ever before.

#### Windows-based Software Simplifies Serial Device Connections

Protocol macros for Serial Communications Units and Boards can be created using the CX-Protocol, thus enabling message tracing and greatly reducing the time involved in connecting various serial devices.



## Enhanced Protocol Macro **NEW** Functionality

(Serial Communications Units/Boards with Ver. 1.2 or later)

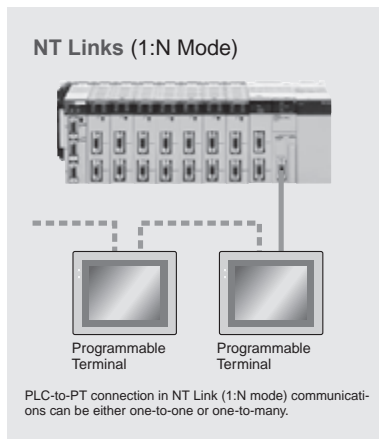
- Baud rate increased from 38,400 bps to 57,600 bps for faster communications.
- Standard system protocol added for greater connectability with components and PLCs.
  - CompoWay/F Master
  - Host Link Master functions
  - Mitsubishi Computer Link Master

## Wide Range of Applicable Protocols Allows for High Value-added Programs

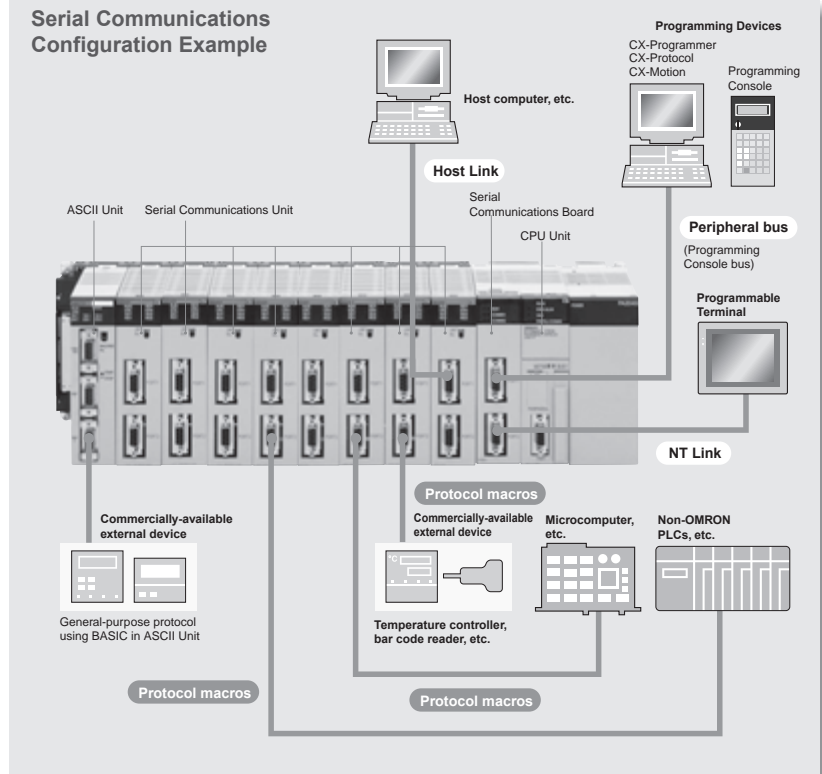
The CS1 Series supports a wide range of serial communications protocols, such as Host Link, no-protocol, NT Link, peripheral bus, and more. These allow for high value-added programs such as MMI, communications, and data processing.

## The Fastest Communications in the Industry with High-speed NT Links

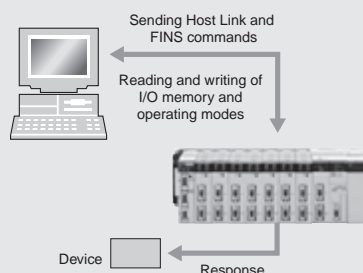
Combine with one of the NS Series Programmable Terminals (NS8, NS10, or NS12) to enable connecting High-speed NT Links. Using NT Link terminology together with a communications speed of 115 Kbps provides high-speed response.



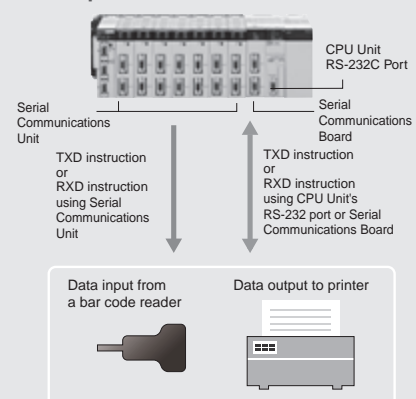
## Serial Communications Configuration Example



### Host Links



### No-protocol



## Supports No-protocol Communications **NEW**

(Serial Communications Units/Boards with Ver. 1.2 or later)

- No-protocol communications supported for Serial Communications Units and Serial Communications Boards
- This mode enables components to be connected to multiple communications ports using no-protocol communications.
- Serial port I/O instructions executable using no-protocol communications from Serial Communications Units and Serial Communications Boards (TXDU, RXDU, TXD, and RXD) are supported for CPU Units with Ver. 3.0 or later.

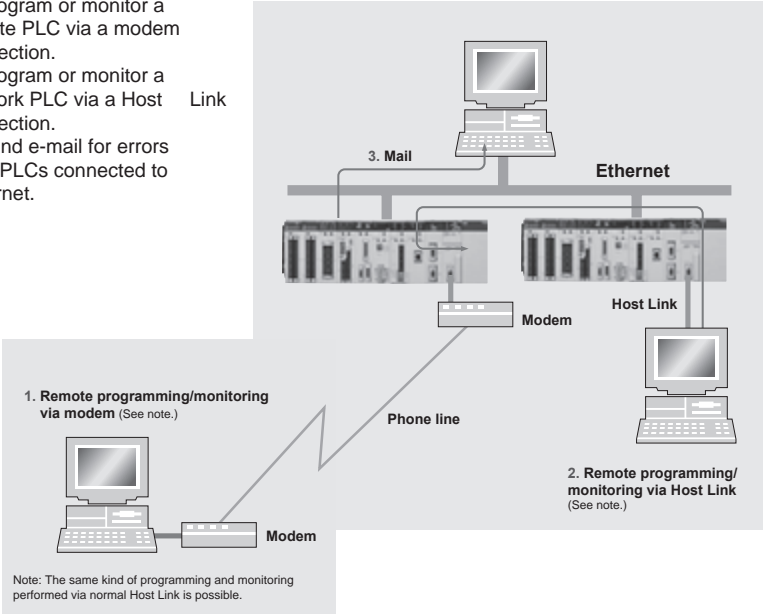
Advanced management and resource inheritance providing powerful support for maintenance and operation

6

The evolution of the  
SYSMAC CS1 is  
accelerating advances  
in the production site.

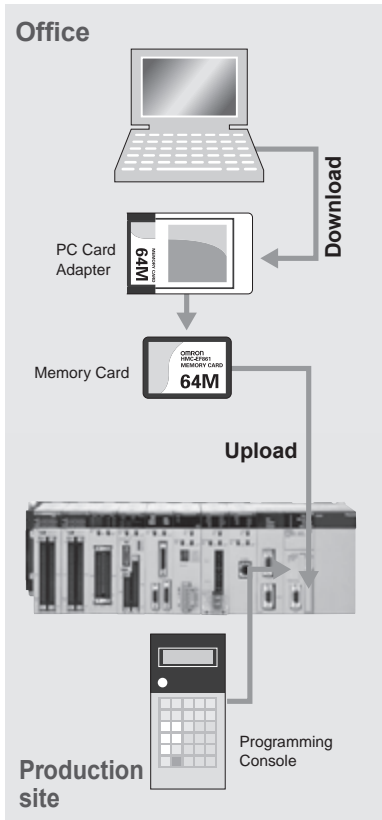
Remote Maintenance

1. Program or monitor a remote PLC via a modem connection.
2. Program or monitor a network PLC via a Host Link connection.
3. Send e-mail for errors from PLCs connected to Ethernet.



Memory Cards for Data File Management

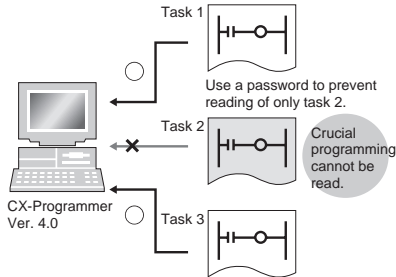
User programs, I/O memory, or system parameters can be converted to Windows-based files and stored in Memory Cards or in EM file memory in the CPU Unit. It is also possible to automatically read the user program and other data from the Memory Card to the CPU Unit at startup, replacing ROM operation. Change programs on-site using only a Memory Card and Programming Console, or use Memory Cards to store symbol tables or I/O comments. Connecting a Programming Device allows monitoring operations with ladder programs with comments. It is also possible to save and read data such as DM data to a Memory Card during operation, and the Memory Cards are ideal for operations such as saving quality data and reading recipes.



## Boost Program Security by Keeping Part of It Hidden

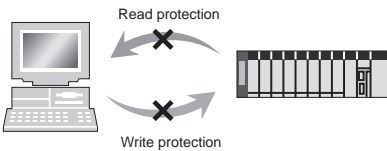
(for CPU Unit Ver. 2.0 or Later)

You can prevent access to special tasks by requiring the user to have a password to read them.



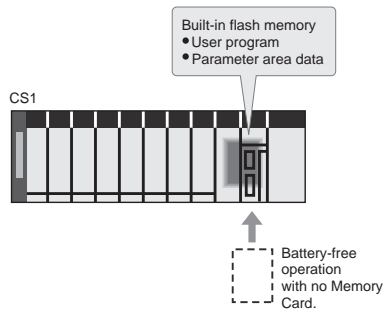
This allows you to hide crucial parts of the program.

By applying write protection, you can also prevent a user from inadvertently writing over the hidden part of the program. This provides additional protection for your program.



## Internal Flash Memory-based Battery-free Operation

Flash memory (non-volatile memory) is built into the new CS1's CPU Unit. User programs and system parameters (e.g., PC Setup and data link tables) are automatically saved to this flash memory. This means that the new CS1 can operate without a Memory Card and battery.

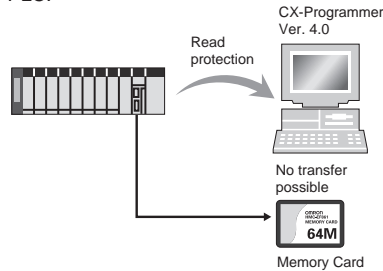


**NEW** CX-Programmer Ver. 5.0 or higher required.

## Prevent Information Leaks from PLCs

(for CPU Unit Ver. 2.0 or Later)

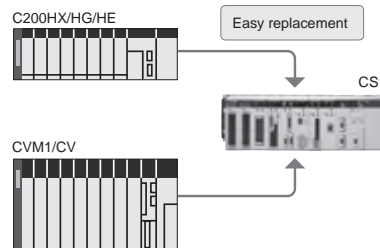
In addition to applying read protection functions to the user program area and tasks, you can also protect against the transfer of user programs to a Memory Card. This prevents leaks of proprietary information by completely protecting against the reading of programs inside the PLC.



## Easy Replacement of Existing Models

Programs designed for existing models (C200HX/HG/HE, CVM1, or CV-series PLCs) using the CX-Programmer can be converted for use with the new CS1. The following functions are available to make the conversion to the new CS1 even easier.

- CV-CS address conversion instruction to convert programs designed for the CVM1/CV that include internal I/O memory addresses.
- C200HX/HG/HE: Region comparison (ZCP and ZCPL) instructions.



## Store All I/O Comments, Symbol Names, Rung Comments, and Other Information in CPU Unit Comment Memory **NEW**

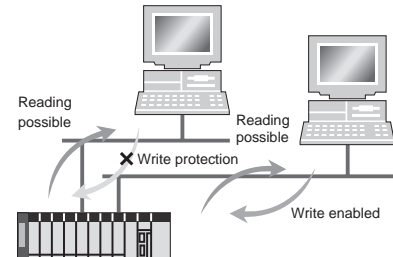
(Unit Ver. 3.0 or later)

When downloading projects, the Memory Card, EM file memory, or comment memory (in the CPU Unit's flash memory) can be selected as the transfer destination for I/O comments, symbol names, rung comments, and other data. This enables data such as I/O comments, symbol names, and rung comments to be stored in the CPU Unit's internal comment

## Write Protection from a Specific Node over the Network

(for CPU Unit Ver. 2.0 or Later)

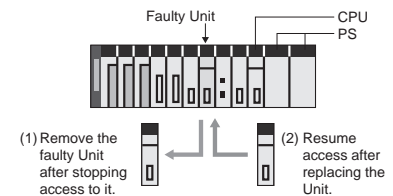
You can now stop specific nodes from writing over the network. By preventing unintentionally writes to the PLC while monitoring data over the network, you can prevent potential problems.



## Replace Malfunctioning Units without Turning OFF the Power (Online Unit Replacement)

When an I/O Unit, a Special I/O Unit, or a CPU Bus Unit is malfunctioning, it is now possible to replace the faulty Unit while the system continues operating.

This is particularly effective for systems that cannot be stopped when a problem has occurred in another part of the system. (This function requires a CS1D-CPU S CPU Unit, a CS1D-BC082 or CS1D-BI092 Backplane, and a CS1D-PA207R or CS1D-PD024 Power Supply Unit.)



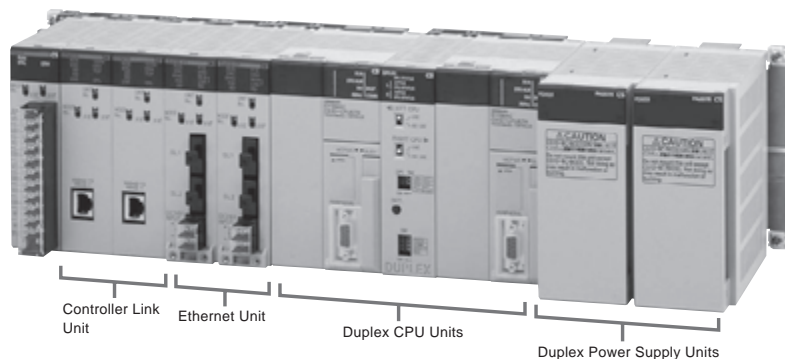
## The CS1 Duplex System Boots the Reliability of Facilities and Equipment

### 7

The evolution of the SYSMAC CS1 is accelerating advances in the production site.



### Duplex-CPU System



#### Hot Standby System Adopted for CPU Unit Duplexing

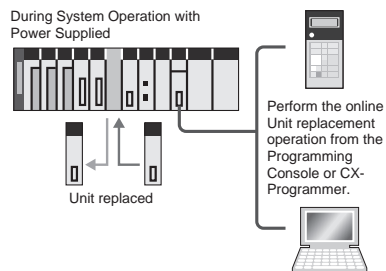
- When a problem occurs in the CPU Unit, the system instantly switches control to the other CPU Unit, enabling continuous operation with minimal effect on the system.
- Because there is no need for special duplex programming, the design process is simple and design steps are reduced.

The system can also be configured with only one each of the CPU, Power Supply, and Communications Units. This lets you optimize the system cost by selecting the Units that you need. (The Duplex Unit must be used even when using only one each of the CPU, Power Supply, and Communications Units.)

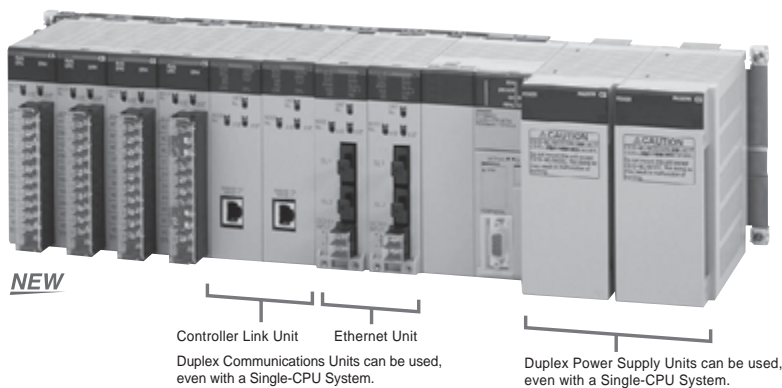
#### Online Unit Replacement

With either a Duplex-CPU or Single-CPU CS1D System, Basic I/O Units, Special I/O Units, and CPU Bus Units can be replaced online while the system continues operation.

Although operation will stop for the Unit being replaced, all other Units will continue operation.



### Single-CPU System



#### Duplex operation is possible for any or all of the following: CPU Units, Power Supply Units, and Communications Units.

Use duplex operation for the CPU Unit, power supply, or communications depending on system requirements for reliability, costs, and functionality. For example, use duplex operation for all of these for systems that must never go

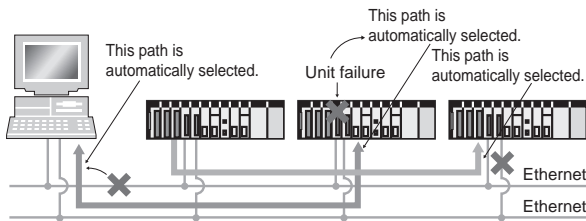
down or use duplex operation for only the power supply (which has a relatively short service life). Just build in the redundancy required by the system.

## Increase the Reliability of Information with Duplex Networks

### Duplex Ethernet for Greater Information Network Reliability **NEW**

With redundant networks and Communications Units, communications will continue even if a network line is broken or one of the Communications Units fails. The communications path is automatically selected for each

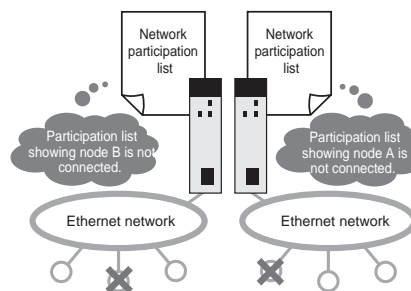
communications process (as opposed to switching the entire line), to enable creating a highly reliable network even against a network line broken in more than one location.



The CS1D-ETN21D and CS1D CPU Unit version 1.1 or higher are required for a duplex Ethernet network.

### Monitor Connection Status to an Ethernet Network **NEW**

The connection status for each line is stored in the CIO Area words allocated in the CPU Unit. This enables the ladder program or host to quickly detect faulty nodes or lines to make maintenance easier.



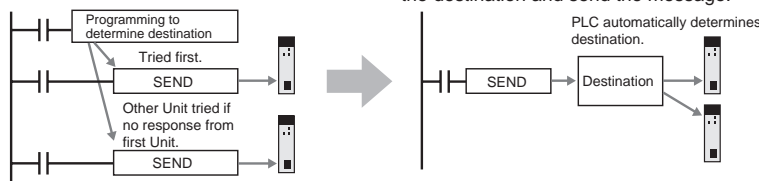
### Program without Being Concerned with Duplex Operation

No special programming is required to use duplex communications with the CS1D, making it simple to design programs for duplex systems.

#### ● The complex programming required in previous applications for duplex communications with Ethernet is eliminated. **NEW**

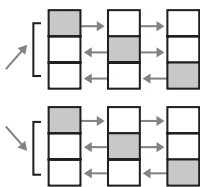
Previously it was necessary to program operation for both Ethernet Units.

Just program the operation as if for one Ethernet Unit, and the PLC will determine the destination and send the message.



#### ● Controller Link networks enable allocating data link areas without wasting memory.

Previously, twice the memory was required to implement data links for two Controller Link Units, and it was necessary to determine which data could be used. Two sets of the same data link areas were required and programming was required to select the areas.

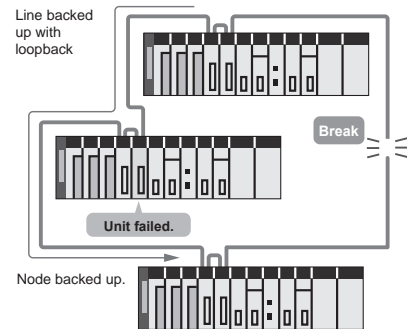


Just create the data links for one Controller Link Unit to eliminate wasted data memory. The Duplex Controller Link Units share the data links.

### Duplex Networks between PLCs with Controller Link

Even if one Unit fails, the other Unit will back it up and continue communications. Even if a line breaks, a loopback will be used to maintain the network.

Either the CS1W-CLK12-V1 or CS1W-CLK52-V1 is required for a Duplex Controller Link network.



### Initial and maintenance costs are reduced.

#### Allows effective use of software assets.

The same support software can be used in systems combining the CS1 and CJ1 Series, and all software programs and data are compatible. Their application and reuse are extremely easy. There is also no need for ladder programs for duplexing. This means that when converting an existing system to a Duplex System, there is almost no need to revise ladder programs.

#### Complete compatibility among Units.

The CS1D Duplex System is fully compatible with the I/O Units of the entire CS Series. Accordingly, the same Units and materials can be used for restoring the system and conducting maintenance. There is no need to purchase different Units and materials for each system, making the CS1D Duplex System highly economical. (C200H Units, however, cannot be used with CS1D PLCs. Refer to user documentation for details.)



# 8

## Machine performance improved with high-speed, high precision, flexible motion control

### Position Control Units

#### Two Types of Outputs and Control of 1, 2, or 4 Axes

Select from 1-axis, 2-axis, and 4-axis models with either open-collector output or line-driver output to suit a number of different applications.

#### A Variety of Positioning Functions

There are 2 operating modes: direct operation (position, speed, acceleration, and deceleration data specified from the ladder program), which is effective for setting target positions, speeds, and acceleration rates immediately or during operation, and memory operation, where fixed patterns are stored beforehand in the Unit and used for operation. There are also a variety of positioning functions, such as interrupt feeding, which is effective for feeder control, and forced interrupt, which is useful in emergencies.

### Advanced Motion Control Units

#### Easy System Construction

Up to 30 physical axes and two virtual axes, making a total of 32, can be controlled, and the servo interface is handled by high-speed servo communications (MECHATROLINK-II, a registered trademark of Yaskawa Electric Corporation). This makes it possible to control multiple axes with less wiring.

#### Easy Data Control

High-speed servo communications lets you read programs and parameter settings from CX-Programmer on a PC.

You can also read and track the operating status of parameter settings inside the Servo Driver.

### Easy Motion Control

Motion control, including positioning, synchronizing (electronic gears, electronic cams, tracking), speed, and torque control, can all be handled by the CS1.

Eight motion tasks can be used for simultaneous motion program execution.

### Motion Control Units

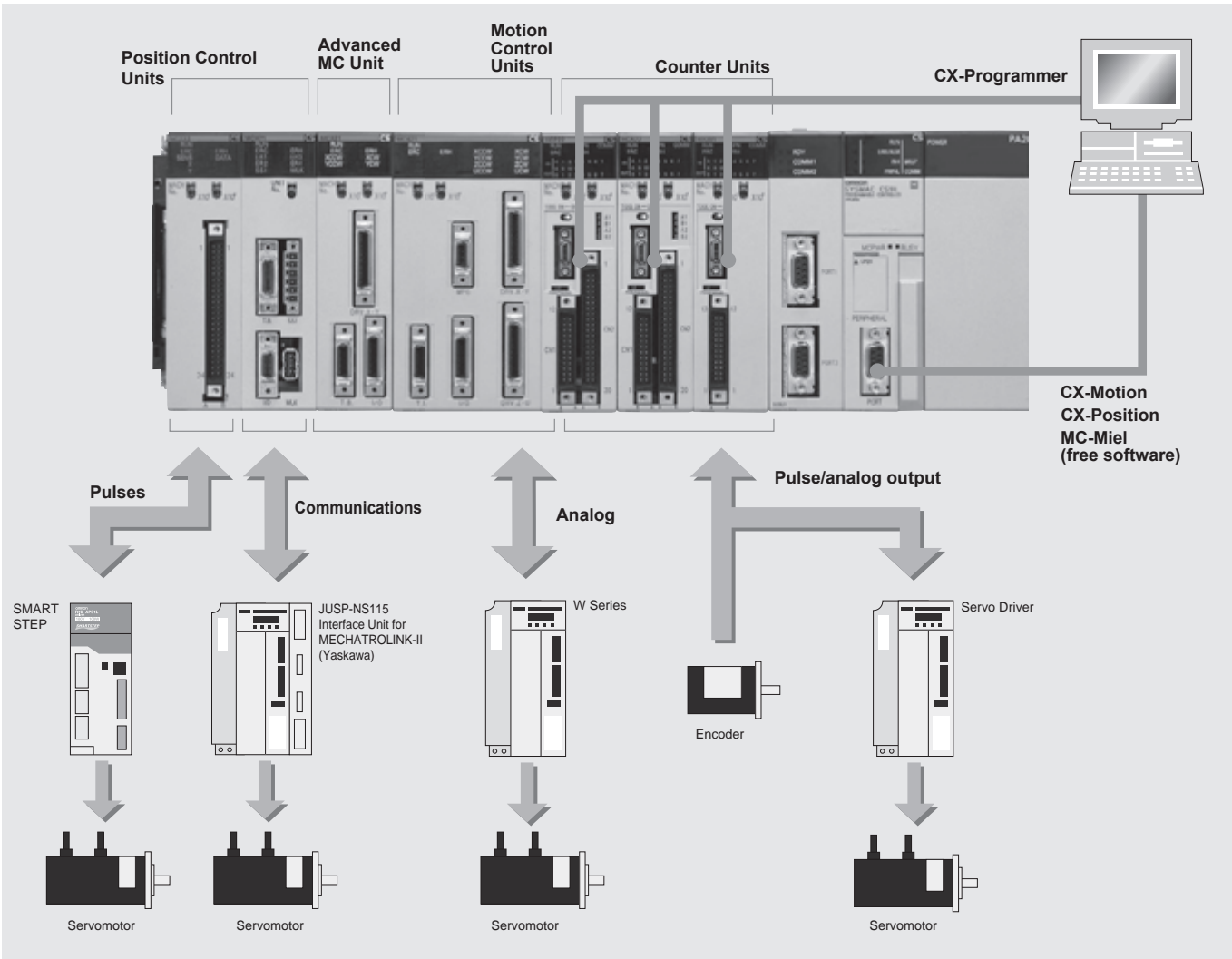
#### Easy Programming with G Language and Multitasking

The Motion Control Units use G language to ensure easy programming. The Units have a large programming capacity of up to 100 programs and 2,000 program blocks, and allow independent operation of 4 tasks.

#### High-speed Interlocks

Interrupt programs can be executed from the motion control program using D codes (interrupt codes). Easy, fast interlocks ensure greater production efficiency.

Synchronous control (electronic gears, electronic cams) is also possible.

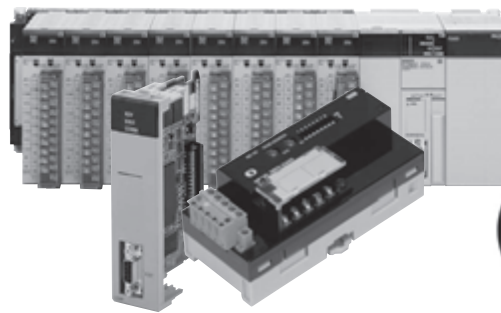


## Smart Process Control

### OMRON PLC-based Process Control brings Major Innovations to Process Automation

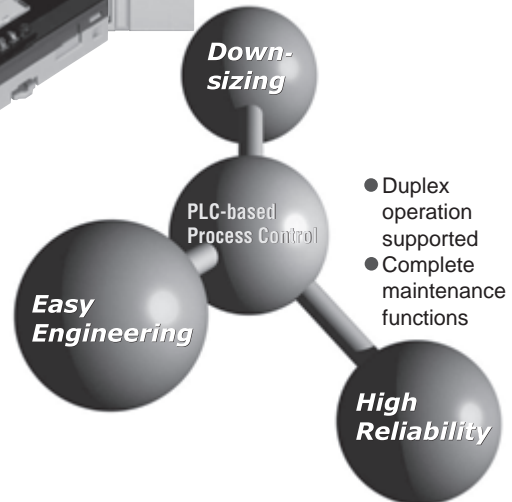
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The evolution of the SYSMAC CS1 is accelerating advances in the production site.

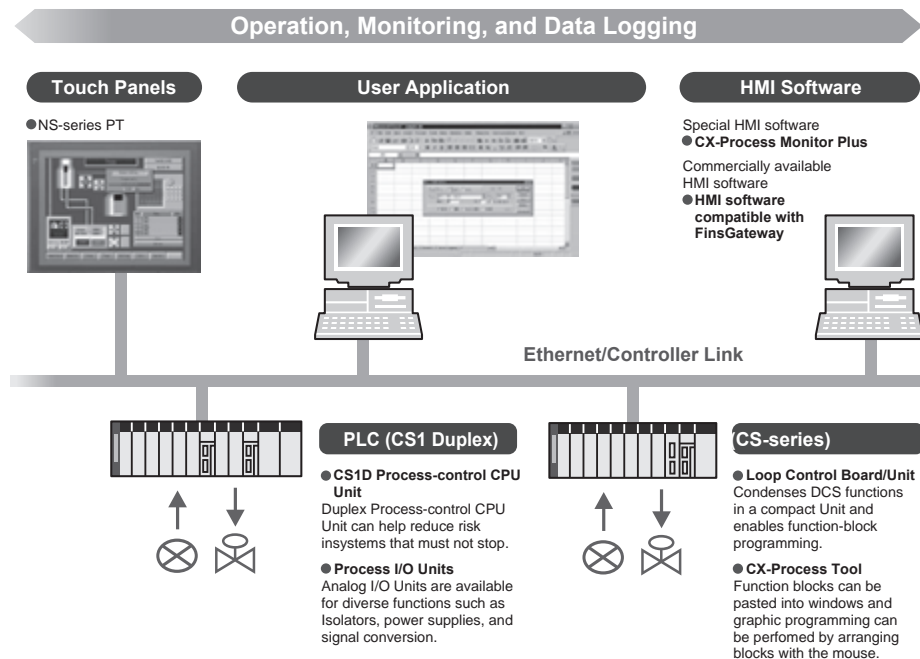


- Function block programming
- Sequence programming using either step ladders or sequence tables
- A direct link to HMI products

- DCS functionality in a PLC
- Analog Units with signal conversion functions
- A scalable system configuration



Provides an exceptionally open environment with PLC-based process control to advance standardization and IT integration of the process control system.

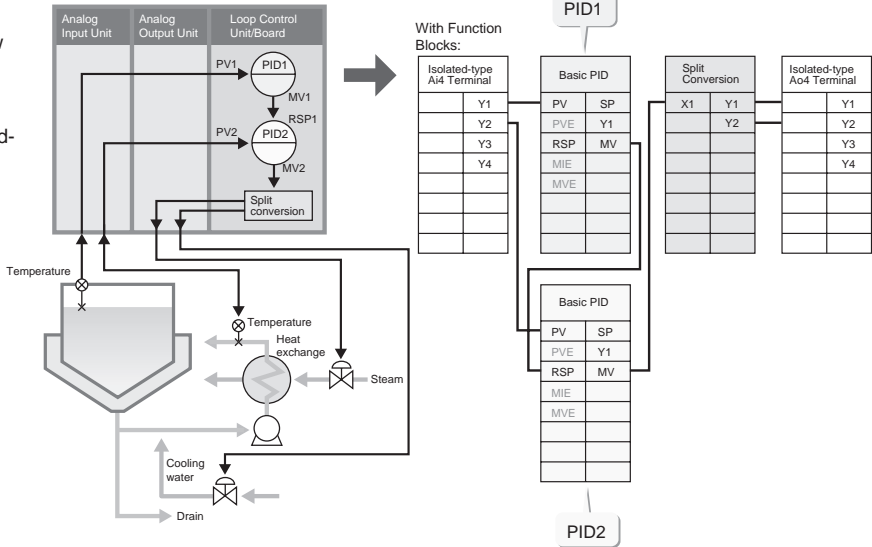




**Diversified Loop Control is even easier to use.**  
**Programming becomes even easier with function-block programming.**

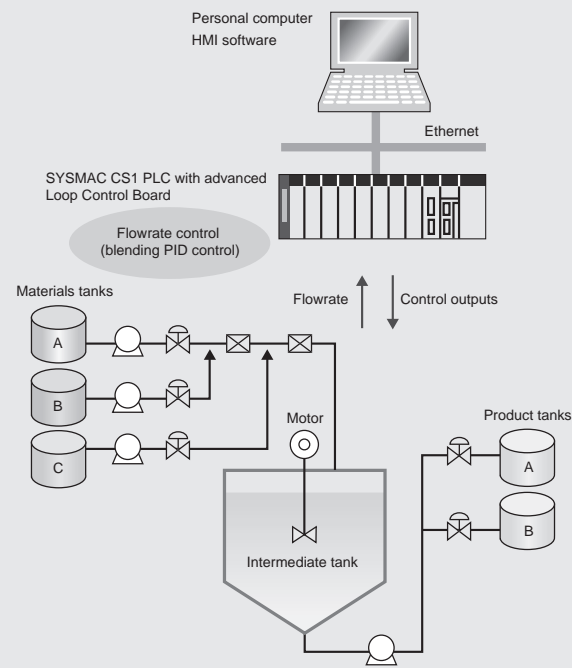
Packed with complete DCS functionality, the LCBs/LCUs are programmed with function blocks designed specifically for process control. Similar to preparing a flow sheet, function blocks are pasted and connections made using a graphic interface. A wide array of control methods, from basic PID control to cascade and feed-forward control, are possible.

● Example: Cascade Control (Heating and Cooling)

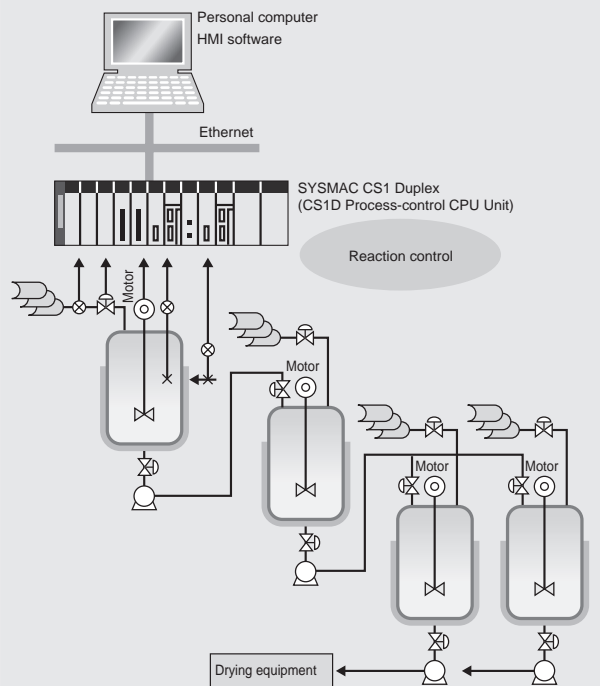


**PLC-based Process Control Application Examples**

● In-line Blending in a Food Plant



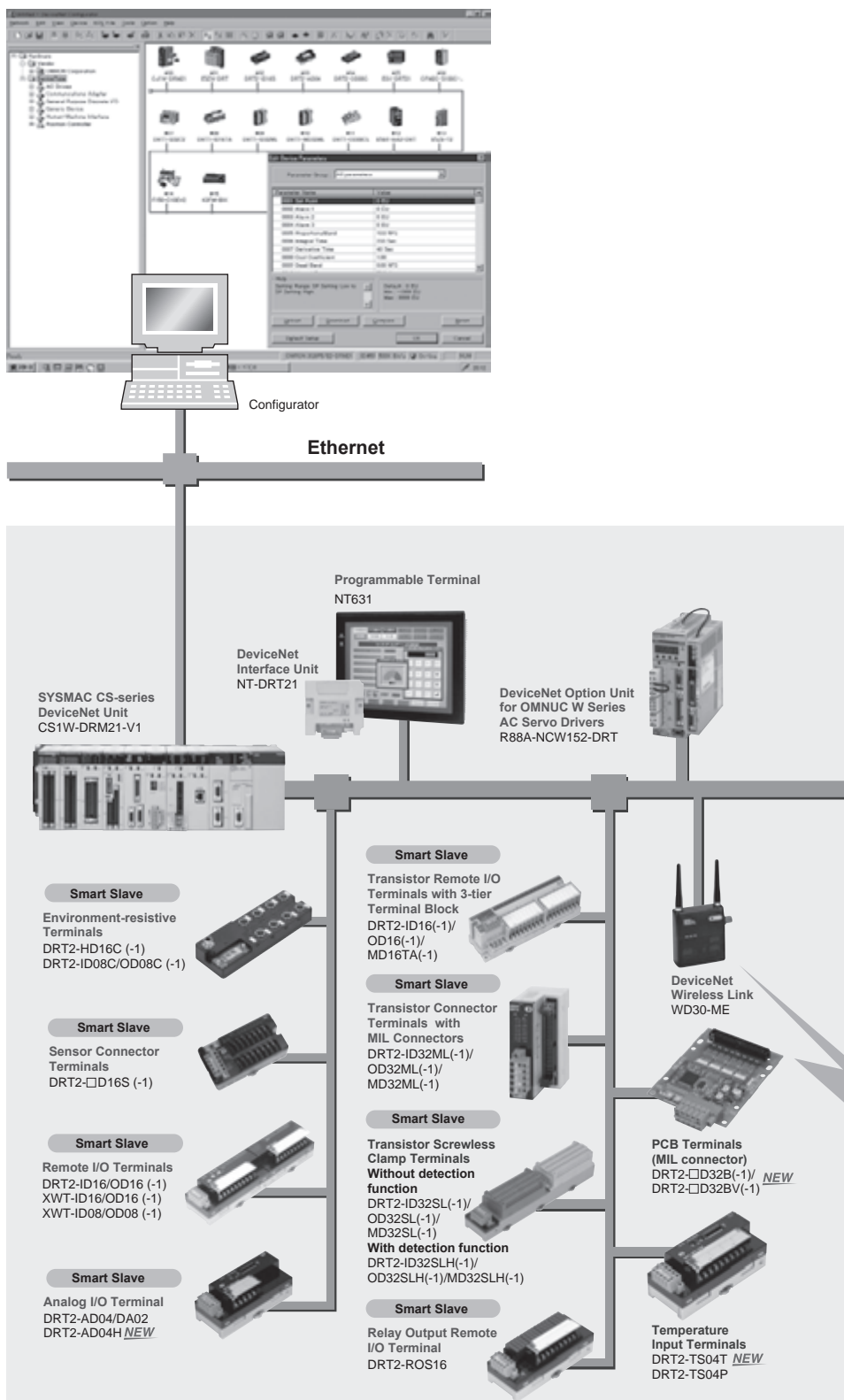
● Batch Control in a Chemical Plant



# DeviceNet Creates Many Advantages for Development and Design, for Production and Startup, and for Operation and Maintenance

## 10

The evolution of the SYSMAC CS1 is accelerating advances in the production site.



## Advantages in Development and Design

### Hardware Advantages

- Many compatible components for more options and easier system construction. No restrictions on Master, enabling
- equipment modularization at the Slaves.

### Software Advantages

- Simple software standardization with profile specified for each component.
- Open network construction eliminates the need to consider communications protocols, allowing program development using ladder diagrams only.

## Advantages in Production and Startup

### Hardware Advantages

- Assembly time shortened by standardization and modularization.
- Number of work hours reduced by less wiring.
- Simple wiring checking process to help prevent wiring mistakes.
- Simple implementation of distributed equipment manufacturing.
- Distributed I/O for more compact control panels and equipment.

### Startup Advantages

- Simple re-assembly at delivery site.
- Simple settings and communications work, shortening startup time.
- Establishing communications with components with plug-and-play simplicity.
- Simple identification of faults with complete monitoring tools.

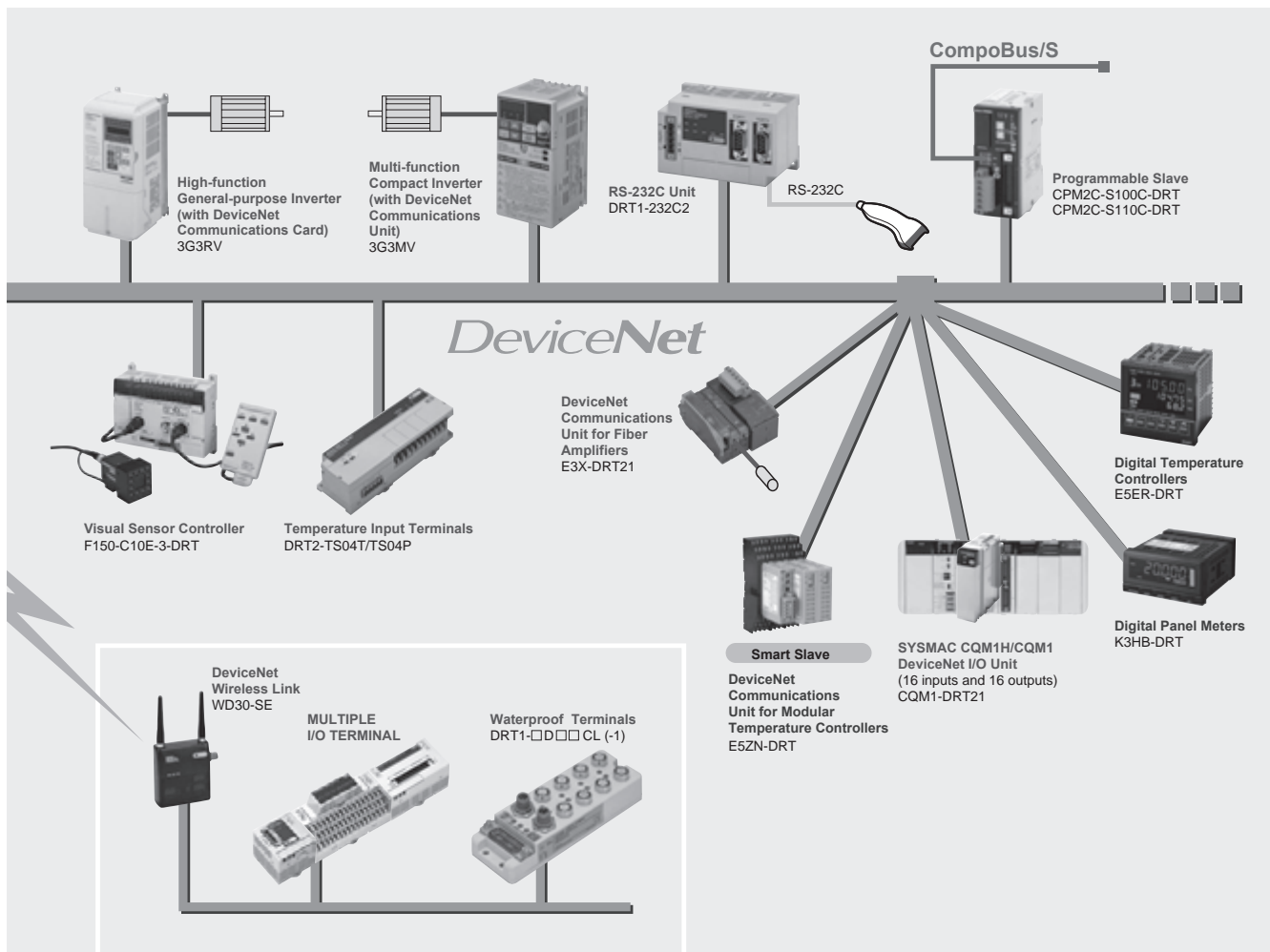
## Advantages in Operation and Maintenance

### Operation Advantages

- Recipe control quickly improves yields. Preventative maintenance to avoid
- system shutdowns and increase operating rates.
- Simple layout changes.
- Lines can be constructed for modular
- replacement.

### Maintenance Advantages

- Easy identification of fault locations reduces time to restore operation.
- A wide variety of data can be collected from components, aiding preventative maintenance.
- Simple plug-and-play replacement using connectors.
- Online replacement for maintenance without stopping the system.



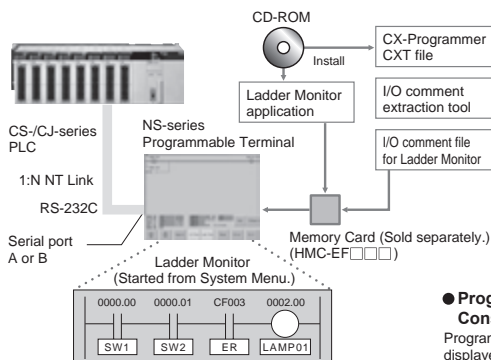
## Greater Compatibility with PLCs Multilingual Globalization for Greater Machine Flexibility

### 11

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

#### Ladder Monitor Function

Save the NS-EXT01 Ladder Monitor system program on a Memory Card (the NS-EXT01 is sold separately) and install the Memory Card to enable monitoring of a ladder program (I/O bit status monitor, address/instruction search, multiple I/O bit monitor, etc.) being executed in a CS/CJ-series PLC connected by a serial connection. It is also possible to display I/O comments created with the CX-Programmer.



**Note:** CS- and CJ-series PLCs connected via a 1:N NT Link to serial port A or B on an NS-series Programmable Terminal can be monitored.

#### Programming Console Function

(Using NS-EXT01-V2 □□□□ Ladder Monitor)

If a Programming Console is selected as the operating mode, a Programming Console is displayed on the Ladder Monitor screen. Operating methods are exactly the same as for a CS-/CJ-series Programming Console. Timer set values can be changed, bit addresses can be added or changed, and many other operations can be performed on-site, all from the screen of the NS-series PT. The functionality of the Ladder Monitor and Programming Console can be used for primary on-site response without a personal computer.

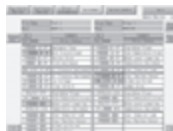


#### Programming Console Function

Programming Console functionality is displayed when Programming Console is selected as the operating mode.

#### Switch Box Function

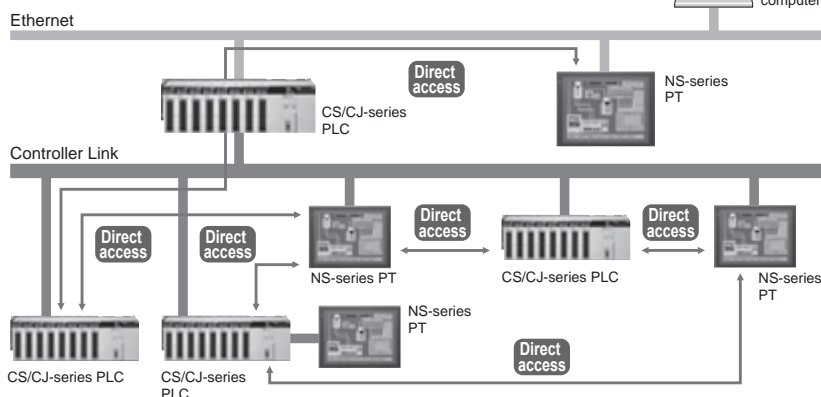
The Switch Box Function has been added to the NS-series Programmable Terminals. The Switch Box Function can be used to monitor the status of each bit in a word or a combination of user-selected bits organized like a ladder program section. The Switch Box Function makes it possible to perform basic troubleshooting on the factory floor even without a computer.



The Switch Box provides the following functions:

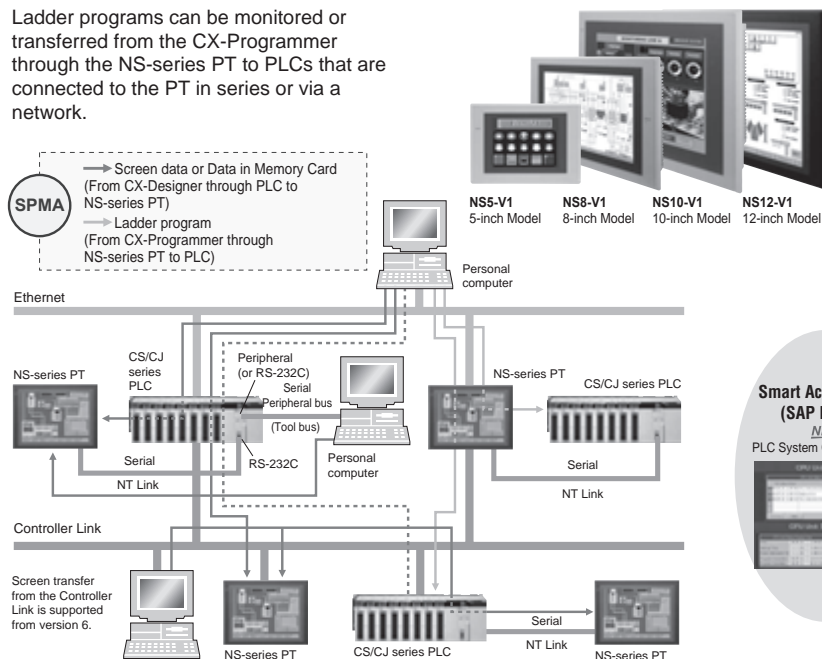
- Switching between Monitoring Contiguous or Noncontiguous Bits and Contiguous Words  
The I/O memory monitor function monitor words or combinations of specified bits. Bit/word comments are imported from the CX-Programmer.
- Register the Words or Bit Combinations To Be Monitored by Group  
Comments can be input for individual groups, e.g., so that the operating conditions of words or bits can be described in text.
- Same User Interface as the Switch Box Utility for Personal Computers  
The same displays can be monitors in the office on a personal computer and onsite at the NS-series PT, making discussions clearer.

#### Connect to Ethernet or, for High-speed Communications with PLCs, to Controller Link. PT Network Capabilities Are More Powerful than Ever Before.

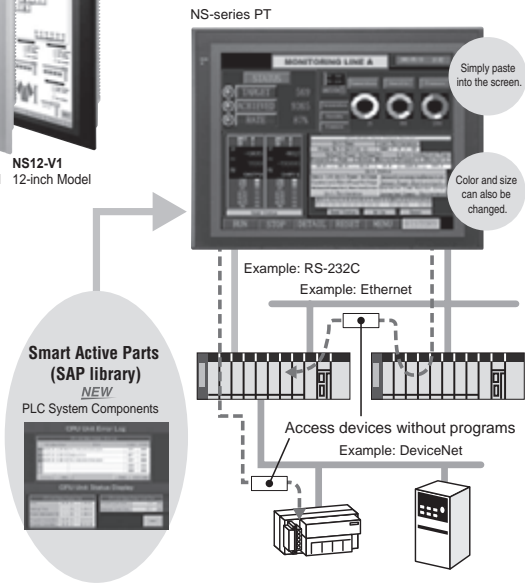


You may want to transfer screens to a PT through the PLC without changing computer connections or transfer a ladder program to the PLC through the PT by using the Ethernet or Controller Link.

Ladder programs can be monitored or transferred from the CX-Programmer through the NS-series PT to PLCs that are connected to the PT in series or via a network.



NS-series PTs provide Smart Active Parts (SAP library) enabling direct access to data in various devices.



## Multilingual Version to Develop for Various Demands

- Create Chinese or Korean screens on your Windows system.
- Support multiple languages with the same screen data.
- Create the source language labels and let suppliers handle the other languages.

NS Series: Easily Create Multilingual Screens on Your Windows System

### Multi-language Input with Japanese Windows

When Windows 2000 or XP is being used, Simplified Chinese, Traditional Chinese, Korean, and other language text can be input in NS-Designer. Select the desired language with Global IME to input a different language. You can also use this program together with RAKURAKU CHUUGOKUGO and RAKURAKU KANKOKUGO (Chinese and Korean input systems) to convert Japanese to Chinese and Korean.



For more information on this software, refer to the following site or send email to the following address [omronsoft@bolenscontrol.com](mailto:omronsoft@bolenscontrol.com) website.

### Label Switching to Select from Multiple Languages

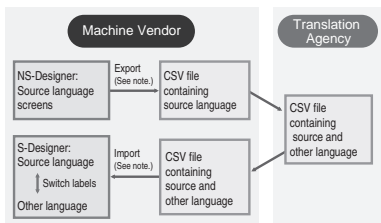
Up to 16 groups of labels (labels 0 to 15) can be registered for functional objects such as buttons, lamps, labels, and alarm settings. (Each label can correspond to a different language, for example, label 0 = Japanese, label 1 = Simplified Chinese, label 2 = Korean, label 3 = English, etc.) Once all of the labels have been input in each language with the multilingual input function, all of the labels can be switched to a different language at once just by specifying the corresponding label number from the PLC.



Example: The label switch function can be used to switch between English and Simplified Chinese.

## Use Screen Import/Export Functions to Separate Translation Work

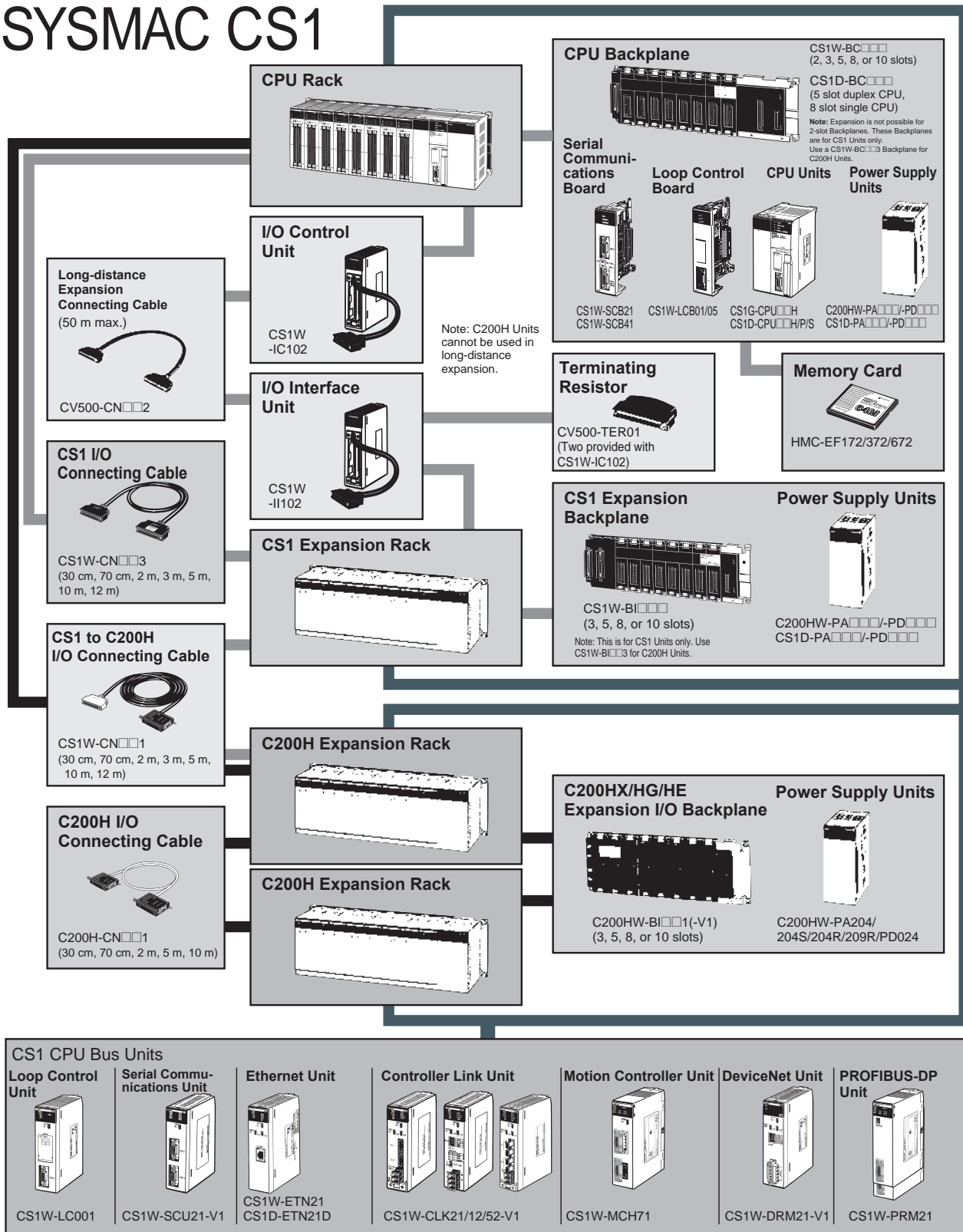
Property information for labels and other objects in screen data created using the NS-Designer can be exported to CSV files. These files can be edited in Excel and other programs. The screens can be created in the source language and then labels and other text exported to CSV files, which can be sent to translators for conversion to other languages. The translated CSV files can then be imported to automatically input the desired languages into labels.



Note: Refer to the operation manual for NS-Designer for information on importing and exporting.

# A Complete Lineup of Units for Optimal Control.

## SYSMAC CS1





## Basic I/O Units

### C200H Basic I/O Unit **P207**

Note: C200H Basic I/O Units and High-density I/O (Group-2) Units can also be used.



16 pts  
Input Unit:  
CS1W-ID211



32 pts  
Input Unit:  
CS1W-ID231



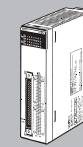
64 pts  
Input Unit:  
CS1W-ID261



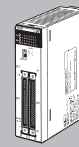
96 pts  
Input Unit:  
CS1W-ID291



16 pts  
Output Unit:  
CS1W-OD211



32 pts  
Output Unit:  
CS1W-OD231



64 pts  
Output Unit:  
CS1W-OD261



96 pts  
Output Unit:  
CS1W-OD291



32 inputs/32 outputs  
I/O Unit:  
CS1W-MD261



48 inputs/48 outputs  
I/O Unit:  
CS1W-MD291/561



16 pts  
AC Input Unit:  
CS1W-IA111/211



8 pts  
Triac Output Unit:  
CS1W-OA201



16 pts  
Triac Output Unit:  
CS1W-OA211



8 pts (independent)  
Relay Output Unit:  
CS1W-OC201



16 pts  
Relay Output Unit:  
CS1W-OC211



32 inputs/32 outputs  
TTL I/O Unit:  
CS1W-MD561  
(available soon)

### Interrupt Input Unit



16 pts  
CS1W-INT01

Interrupt function supported on CPU Rack only. (Two Units mountable on CPU Rack.)

### Analog Timer Unit



C200H-TM001

### High-speed Input Unit



16 pts  
CS1W-IDP01

### Safety Relay Unit



CS1W-SF200

## Special I/O Units

### CS1 Special I/O Unit

Process I/O Unit  
CS1W-P000(-V1)



Analog Input Unit  
CS1W-AD041-V1 /081-V1



Analog Output Unit  
CS1W-DA041 /08V/08C



Analog I/O Unit  
CS1W-MAD44



ID Sensor Units\*  
CS1W-V600C11 /-V600C12



Position Control Unit  
CS1W-NC000



Motion Control Unit  
CS1W-MC221/421



High-speed Counter Unit  
CS1W-CT021/041



SSI input unit  
CS1W-CTS21



### C200H Special I/O Unit



Temperature Sensor Units  
C200H-TS000



Temperature Control Units  
C200H-TC000  
C200H-TV000



PID Control Units  
C200H-PID00



Position Control Units\*  
C200HW-NC000



CAN(open) Unit  
C200HW-CORT21-V1



PROFIBUS-DP Master Unit  
C200HW-PRM21



PROFIBUS-DP I/O Link Unit  
C200HW-PRT21



High-speed Counter Units\*  
C200H-CT000



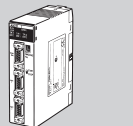
2-axis Motion Control Unit\*  
C200H-MC221



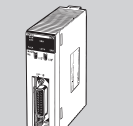
4-axis Motion Control Unit\*  
C200H-MC402E



ID Sensor Units\*  
C200H-IDS00



ASCII Units\*  
C200H-ASC00



GP-IB Interface Unit  
CS1W-GPI01



DeviceNet I/O Link Unit  
C200HW-DRT21



CompoBus/S Master Unit  
C200HW-SRM21-V1

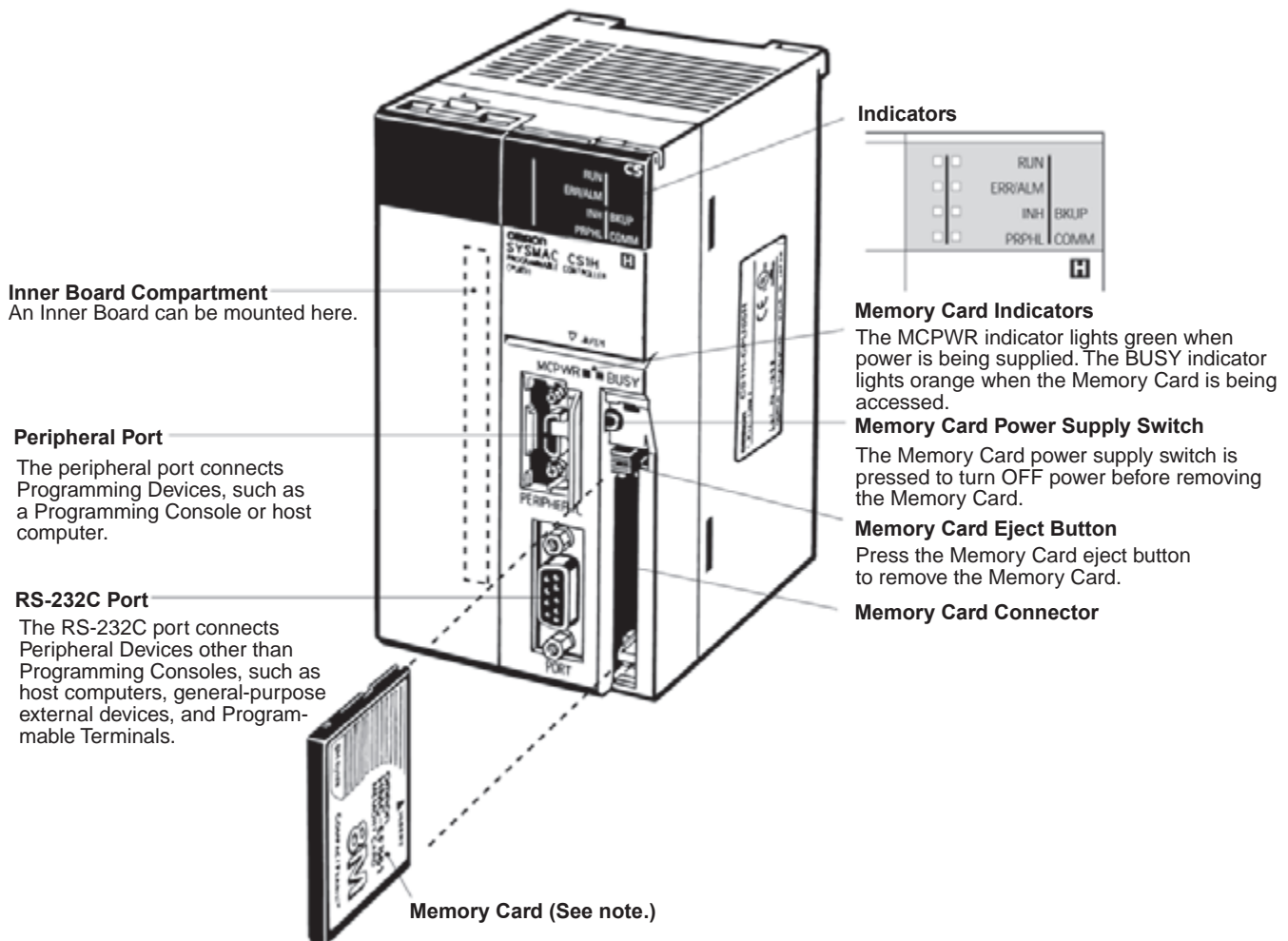
Note: HMC-372/672 Memory Cards cannot be used with CS1G-CPU00H, CS1H-CPU00H, CJ1G-CPU00H, or CJ1H-CPU00H CPU Units prior to Lot No. 02108 (manufactured prior to January 8, 2002, nor with NS-7-series PTs prior to Lot No. 0852 (manufactured prior to May 8, 2002). Check lot numbers before ordering.

The following restrictions exist in data transfers with the CPU Unit for bit and DM Area specifications for the C200H Special I/O Units marked with asterisks, as well as in data transfers programmed from these Units. Refer to CS-series PLC Operation manuals for details.


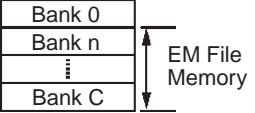
- Converting data for the CPU Unit using bit and DM Area specifications (source/destination area type and address designation).
- Exchanging data with the CPU Unit using instructions (PC READ, PC WRITE, etc.) in the C200H Special I/O Unit program.

CS1H/G-CPU□□H

# CS1-series



With the CS1 PLCs, Memory Cards and specified ranges of the EM Area can be used as file memory. File memory can be used to store the entire user program, I/O memory contents, and/or parameter area contents.

File memory	Memory type	Capacity	Model
Memory Cards 	Flash memory	30 MB	HMC-EF372
		64 MB	HMC-EF672
EM File Memory 	RAM	EM Area capacity of CPU Unit (Max. capacity for CS1H-CPU67: 832 KB).	From the specified bank in the EM area of I/O memory to the last bank (specified in PC Setup).

**Note:** Memory Card Adapter: HMC-AP001 (The Memory Card Adapter can be used to mount Memory Cards in PC card slots to use the Cards on a personal computer.)



## Specifications

## CPU Units

Model	I/O bits	Program capacity	Data memory capacity (See Note.)	LD instruction processing speed	Built-in ports	Options
CS1H-CPU67H CS1D-CPU67H CS1D-CPU67S CS1D-CPU67P	5,120 bits (Up to 7 Expansion Racks)	250 kSteps	448 kWords	0.02 $\mu$ s	Peripheral port and RS-232C port.	Memory Cards Inner Board such as Serial Communications Board, Loop Control Board (See note 1.)
CS1H-CPU66H		120 kSteps	256 kWords			
CS1H-CPU65H CS1D-CPU65H CS1D-CPU65S CS1D-CPU65P		60 kSteps	128 kWords			
CS1H-CPU64H		30 kSteps	64 kWords			
CS1H-CPU63H		20 kSteps				
CS1G-CPU45H	5,120 bits (Up to 7 Expansion Racks)	60 kSteps	128 kWords	0.04 $\mu$ s		
CS1G-CPU44H CS1D-CPU44S	1,280 bits (Up to 3 Expansion Racks)	30 kSteps	64 kWords			
CS1G-CPU43H	960 bits	20 kSteps				
CS1G-CPU42H CS1D-CPU42S	(Up to 2 Expansion Racks)	10 kSteps				

**Note:** The available data memory capacity is the sum of the Data Memory (DM) and the Extended Data Memory (EM).

**Note: 1.** A Loop Control Board cannot be mounted in CS1D-CPU□□D, use CS1D-CPU□□P instead.  
A Serial communications Board cannot be mounted in CS1D-CPU□□P.

## Common Specifications

Item	Specification
Control method	Stored program
I/O control method	Cyclic scan and immediate processing
Programming	Ladder diagram
Instruction length	1 to 7 steps per instruction
Ladder instructions	Approx. 400 (3-digit function codes)
Execution time	Basic instructions: 0.02 $\mu$ s min., Special instructions: 0.04 $\mu$ s min.
Function Blocks (CPU Ver. 3.0 or higher)	Languages supported for use in function block programming: Ladder program language and IEC 61131-3 Structured Text.
Number of tasks	288 (256 of which are also used as interrupt tasks) Cyclic tasks are executed each cycle and are controlled with TKON(820) and TKOF(821) instructions. The following 4 types of interrupt tasks are supported: Power OFF tasks: 1 max., Scheduled interrupt tasks: 2 max., I/O interrupt tasks: 32 max., External interrupt tasks: 256 max.
Interrupt types (not applicable for CS1D CPUs)	Scheduled Interrupts: Interrupts generated at a time scheduled by CPU Unit's built-in timer. I/O Interrupts: Interrupts from Interrupt Input Units. Power OFF Interrupts: Interrupts executed when CPU Unit's power is turned OFF. External I/O Interrupts: Interrupts from Special I/O Units, CS1 Special Units, or Inner Board.
CIO (Core I/O) Area (The CIO Area can be used as work bits if not used as shown here.)	I/O Area
	Link Area
	CS1 CPU Bus Unit Area
	Special I/O Unit Area
	Inner Board Area
	SYSMAC BUS Area

**Note:** A max. of 10 or 16 C200H Special I/O Units can be used depending on the CPU Unit. Some I/O Units are Special I/O Units.

Item	Specification	
CIO (Core I/O) Area, contd. (The CIO Area can be used as work bits if not used as shown here.)	I/O Terminal Area	512 (32 words): CIO 310000 to CIO 313115 (words CIO 3100 to CIO 3131) I/O Terminal bits are allocated to I/O Terminal Units (but not to Slave Racks) connected to SYSMAC BUS Remote I/O Master Units. (1 word per Terminal, 32 Terminals max.)
	C200H Special I/O Unit Area	8,196 (512 words): CIO 000000 to CIO 051115 (words CIO 0000 to CIO 0511) C200H Special I/O Unit bits are allocated to C200H Special I/O Units and allow access separate from I/O refreshing.
	DeviceNet/PROFIBUS-DP Area	1,600 (100 words): Outputs: CIO 005000 to CIO 009915 (words CIO 0050 to CIO 0099) Inputs: CIO 035000 to CIO 039915 (words CIO 0350 to CIO 0399) DeviceNet bits are allocated to Slaves according to DeviceNet remote I/O communications.
	PC Link Area	64 bits (4 words): CIO 027400 to CIO 025015 (words CIO 0247 to CIO 0250) When a PC Link Unit is used in a PC Link, use these bits to monitor PC Link errors and operating status of other CPU Units in PC Link.
Internal I/O Area	4,800 (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 to CIO 6143) These bits in 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 (words W000 to W511) Control programs only. (I/O from external I/O terminals is not possible.) <b>Note:</b> When using work bits in programming, use bits in Work Area first before using bits from other areas.	
Holding Area	8,192 bits (512 words): H00000 to H51115 (words H000 to H511) Holding bits are used to control execution of program, and maintain their ON/OFF status when PLC is turned OFF or operating mode is changed. Part of the Holding area is used for allocation of Function Block variables in CPU Ver. 3.0 and higher.	
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 (TR00 to TR15) Temporary bits are used to store 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 DM Area maintain their status when PLC is turned OFF or operating mode is changed. Internal Special I/O Unit DM Area: D20000 to D29599 (100 words × 96 Units). Used to set parameters. CS1 CPU Bus Unit DM Area: D30000 to D31599 (100 words × 16 Units). Used to set parameters. Inner Board DM Area: D32000 to D32099. Used to set parameters for Inner Boards.	
EM Area	32 kWords per bank, 13 banks max.: E0_00000 to EC_32767 max. (Not available on some CPU Units.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in EM Area maintain their status when PLC is turned OFF or operating mode is changed. The EM Area is divided into banks, and addresses can be set by either of following methods. Changing current bank using EMBC(281) instruction and setting addresses for current bank. Setting bank numbers and addresses directly. EM data can be stored in files by specifying number of first bank. (EM file memory)	
Data Registers	DR0 to DR15. Store offset values for indirect addressing. Data registers can be used independently in each task. One register is 16 bits (1 word).	
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).	
Task Flag Area	32 (TK0000 to TK0031). Task Flags are read-only flags that are ON when corresponding cyclic task is executable and OFF when corresponding task is not executable or in standby status.	
Trace Memory	4,000 words (500 data trace samples at the maximum sample size of 31 bits and 6 words)	
File Memory	Memory Cards: Compact flash memory cards can be used (MS-DOS format). EM file memory: Part of EM Area can be converted to file memory (MS-DOS format). CompactFlash Memory Cards with 15-MB, 30-MB, or 64-MB capacities can be used.	

## Function Specifications

Item	Specification
Parallel Processing Mode	The program can be executed simultaneously with peripheral servicing (CS1G/CS1H only).
Battery-free operation	Flash memory is provided as a standard feature and automatically backs up the user program and system parameters.
Constant cycle time	1 to 32,000 ms (Unit: 1 ms)
Cycle time monitoring	Possible (Unit stops operating if cycle is too long): 1 to 40,000 ms (Unit: 10 ms)
I/O refreshing	Cyclic refreshing, immediate refreshing, refreshing by IORF(097).
I/O memory holding when changing operating modes	Possible (Depends on ON/OFF status of IOM Hold Bit in Auxiliary Area.)
Load OFF	All outputs on Output Units can be turned OFF.
Input time constant setting	Time constants can be set for inputs from CS1 Basic I/O Units. The time constant can be increased to reduce influence of noise and chattering or it can be decreased to detect shorter pulses on inputs. (CS1 Basic I/O Units only)
Mode setting at power-up	Possible
Memory Card functions	Automatic reading programs from Memory Card (autoboot). Memory Card Storage Data User program: Program file format (binary) PC System Setup: Data file format (binary) I/O Memory: Data file format (binary), text format, CSV format Memory Card Read/Write User program instructions, Peripheral Devices (such as Programming Console), Host Link computer.
Filing	Memory Card data and EM (Extended Data Memory) Area can be handled as files.
Debugging	Force-set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed), instruction error tracing.
Online editing	One or more program blocks in user programs can be overwritten when CPU Unit is in PROGRAM or MONITOR mode. This function is not available for block programming areas.
Program protection	Overwrite protection: Set using DIP switch. Copy protection: Password set using Peripheral Device.
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 execution time and logic of each programming block.
Error log	Up to 20 errors are stored in error log. Information includes error code, error details, and time error occurred.
Serial communications	Built-in peripheral port: Peripheral Device (including Programming Console), Host Links, NT Links Built-in RS-232C port: Peripheral Device (excluding Programming Console), Host Links, no-protocol communications, NT Links Communications Board (sold separately): Protocol macros, Host Links, NT Links
Clock	Provided on all models. <b>Note:</b> Used to store time when power is turned ON and when errors occur.
Power OFF detection time	10 to 25 ms (not fixed)
Power OFF detection delay time	0 to 10 ms (user-defined, default: 0 ms)
Memory protection	Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of counter Completion Flags and present values. <b>Note:</b> If IOM Hold Bit in Auxiliary Area is turned ON, and PC Setup is set to maintain IOM Hold Bit status when power to PLC is turned ON, contents of CIO Area, Work Area, part of Auxiliary Area, timer Completion Flag and PVs, Index Registers, and Data Registers will be saved.
Sending commands to a Host Link computer	FIN commands can be sent to a computer connected via Host Link System by executing Network Communications Instructions from 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.
Eight-level communications (CPU Ver. 3.0 and higher)	Host Link communications can be used for remote programming and remote monitoring from devices on networks up to seven levels away (Controller Link Network, Ethernet Network, or other network).
Storing comments in CPU Unit	I/O comments can be stored in CPU Unit in Memory Cards, EM file memory, or the built-in Comment memory (CPU Ver. 3.0 and higher)
Program check	Program checks are performed at beginning of operation for items such as no END instruction and instruction errors. A Peripheral Device (excluding Programming Console) can also be used to check programs.
Control output signals	RUN output: The contacts will turn ON (close) while CPU Unit is operating. These terminals are provided only on C200HW-PA204R and C200HW-PA209R Power Supply Units.
Battery life	5 years at 25° C (Depending on the ambient operating temperature and communications conditions, 1.1 years min. Battery Set: CS1W-BAT01) <b>Note:</b> Use a replacement battery that is no more than 2 years old from the date of manufacture.
Self-diagnostics	CPU errors (watchdog timer), I/O verification errors, I/O bus errors, memory errors, and battery errors.
Other functions	Storage of number of times power has been interrupted, the times of the interrupts, and system operation time (in Auxiliary Area).

Specifications - Power Supply Units

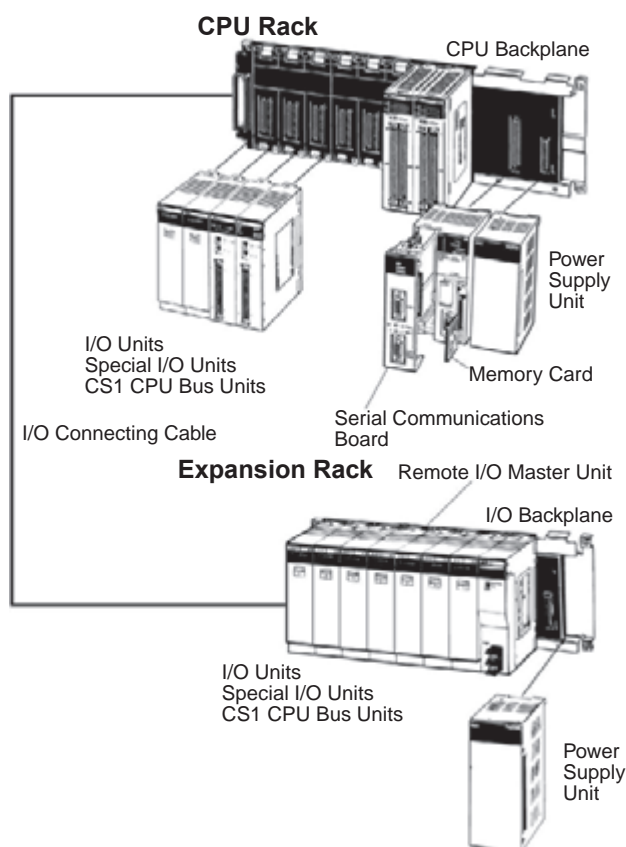
Item	Specifications					
Power Supply Unit	C200HW-PA204	C200HW-PA204S	C200HW-PA204R	C200HW-PA209R	C200HW-PD024	C200HW-PD106R
Supply voltage	100 to 120 V AC or 200 to 240 V AC, 50/60 Hz				24 V DC	100 V DC
Operating voltage range	85 to 132 V AC or 170 to 264 V AC				19.2 to 28.8 V DC	85 to 143 V DC
Power consumption	120 VA max.			180 VA max.	40 W max.	50 W max.
Inrush current	30 A max.			30 A max./100 to 120 V AC 40 A max./200 to 240 V AC	30 A max.	
Output capacity	4.6 A, 5 V DC (including CPU Unit power)			9 A, 5 V DC (including CPU Unit power)	4.6 A, 5 V DC (including CPU Unit power)	6 A, 5 V DC (including CPU Unit power)
	0.625 A, 26 V DC Total: 30 W	0.625 A, 26 V DC or 0.8 A, 24 V DC Total: 30 W	0.625 A, 24 V DC Total: 30 W	1.3 A, 26 V DC Total: 45 W	0.625 A, 26 V DC Total: 30 W	1 A, 26 V DC Total: 30 W
Output terminal	Not provided	24 V DC load current consumption Less than 0.3 A: +17%/-11% 0.3 A or greater: +10%/-11% (Lot No. 0197 or higher)	Not provided		Not provided	
RUN output (See Note 2.)	Not provided		Contact configuration: SPST-NO Switch capacity: 250 V AC, 2 A (resistive load) 250 V AC, 0.5 A (induction load), 24 V DC, 2 A	Contact configuration: SPST-NO Switch capacity: 240 V AC, 2 A (resistive load) 120 V AC, 0.5 A (inductive load) 24 V DC, 2 A (resistive load) 24 V DC, 2 A (inductive load)	Not provided	Contact configuration: SPST-NO Switch capacity: 250 V AC, 2 A (resistive load) 250 V AC, 0.5 A (induction load), 24 V DC, 2 A
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See Note 1.)				20 MΩ min. (at 500 V DC) between DC external and GR terminals (See Note 1.)	
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.				1,000 V AC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 10 mA max. (See Note 1.)	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.
	1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.					
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)					
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s <sup>2</sup> in X, Y, and Z directions for 80 minutes (Sweep time 8 min × 10 = total time 80 min.) CPU Unit mounted to a DIN rail: 2 to 55 Hz, 2.9 m/s <sup>2</sup> in X, Y, and Z directions for 20 minutes. According to JIS C0040 / IEC 60068-2-6					
Shock resistance	147 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions According to JIS C0041 / IEC 60068-2-27					
Ambient operating temperature	0 to 55° C					
Ambient operating humidity	10% to 90% (with no condensation)					
Atmosphere	Must be free from corrosive gases.					
Ambient storage temperature	-20 to 75° C (excluding battery)					
Grounding	Less than 100 Ω					
Enclosure	IP20, intended for panel mounting.					
Weight	All models are each 6 kg max.					
CPU Rack Dimensions (mm) (See note 3.)	2 slots:198.5 × 157 × 123 (W x H x D) 8 slots: 435 × 130 × 123 (W x H x D) 3 slots: 260 × 130 × 123 (W x H x D) 10 slots:505 × 130 × 123 (W x H x D) 5 slots: 330 × 130 × 123 (W x H x D)					
Product standards	Conforms to UL, CSA, cULus, cUL, NK, Lloyd's, and EC directives.					cULus

- Note:** 1. Disconnect the Power Supply Unit's LG terminal from the GR terminal when testing insulation and dielectric strength.  
2. Only when mounted to a Backplane.  
3. Depth is 153 mm for C200HW-PA209R.  
4. Enquire separately for general specifications of Process I/O Units.

## Specifications - Duplex Power Supply Units

Item	Specifications	
Power Supply Unit	CS1D-PA207R	CS1D-PD024
Supply voltage	100 to 120 V AC or 200 to 240 V AC, 50/60 Hz	24 V DC
Operating voltage range	85 to 132 V AC or 170 to 264 V AC	19.2 to 28.8 V DC
Power consumption	150 VA max.	40 W max.
Inrush current	30 A max./100 to 120 V AC 40 A max./200 to 240 V AC	30 A max.
Output capacity	7 A, 5 V DC (including CPU Unit power) 1.3 A, 26 V DC Total: 35 W	4.3 A, 5 V DC (including CPU Unit power) 0.56 A, 26 V DC Total: 28 W
Output terminal	Not provided	Not provided
RUN output (See Note 2.)	Contact configuration: SPST-NO Switch capacity: 240 V AC, 2 A (resistive load) 120 V AC, 0.5 A (inductive load) 24 V DC, 2 A (resistive load) 24 V DC, 2 A (inductive load)	Not provided
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See Note 2.)	20 MΩ min. (at 500 V DC) between DC external and GR terminals (See Note 2.)
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 2.) Leakage current: 10 mA max. 1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.	1,000 V AC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 10 mA max. (See Note 2.)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)	
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s <sup>2</sup> in X, Y, and Z directions for 80 minutes (Sweep time 8 min × 10 = total time 80 min.) CPU Unit mounted to a DIN rail: 2 to 55 Hz, 2.9 m/s <sup>2</sup> in X, Y, and Z directions for 20 minutes. According to JIS C0040 / IEC 60068-2-6	
Shock resistance	147 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions According to JIS C0041 / IEC 60068-2-27	
Ambient operating temperature	0 to 55°C	
Ambient operating humidity	10% to 90% (with no condensation)	
Atmosphere	Must be free from corrosive gases.	
Ambient storage temperature	-20 to 75°C (excluding battery)	
Grounding	Less than 100 Ω	
Enclosure	Mounted in a panel.	
Weight	All models are each 6 kg max.	

## Basic System Configuration



### CPU Rack

A CPU Rack consists of a CPU Unit, Power Supply Unit, CPU Backplane, Basic I/O Units, Special I/O Units, and CPU Bus Units. The Serial Communications Board and Memory Cards are optional.

**Note:** The Backplane depends on the type of CPU Rack, Expansion I/O Racks, and Slave Racks that are used.

### Expansion Racks

Both C200H and CS1 Expansion Racks can be used.

- C200H Expansion I/O Racks can be connected to CPU Racks, CS1 Expansion Racks, or other C200H Expansion I/O Racks.
- CS1 Expansion Racks can be connected to CPU Racks or other CS1 Expansion Racks.

An Expansion Rack consists of a Power Supply Unit, a CS1 or C200H Expansion I/O Backplane, Basic I/O Units, Special I/O Units, and a CS1 CPU Bus Units.

### Long-distance Expansion Racks

An I/O Control Unit and I/O Interface Units can be used to extend the normal limit of 12 m to 50 m for each of two series of CS1 Expansion Racks. The following Units can be mounted to Long-distance Expansion Racks: CS1 Basic I/O Units, CS1 Special I/O Units, and CS1 CPU Bus Units. (C200H Units cannot be mounted to Long-distance Expansion Racks.)

## CPU Rack

### Configuration



Name	Configuration	Remarks
	CPU Backplane	One of each Unit required for every CPU Rack. Refer to the following table for model number.
	CPU Unit	
	Power Supply Unit	Install as required. Refer to the following table for model number.
	Memory Card	
	Serial Communications Board	

### Products Used in CPU Racks

Name	Model	Specifications
	CS1H-CPU67H	I/O bits: 5,120, Program capacity: 250 kSteps Data Memory: 448 kWords (DM: 32 kWords, EM: 32 kWords x 13 banks)
	CS1H-CPU66H	I/O bits: 5,120, Program capacity: 120 kSteps Data Memory: 256 kWords (DM: 32 kWords, EM: 32 kWords x 7 banks)
	CS1H-CPU65H	I/O bits: 5,120, Program capacity: 60 kSteps Data Memory: 128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)
	CS1H-CPU64H	I/O bits: 5,120, Program capacity: 30 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)
	CS1H-CPU63H	I/O bits: 5,120, Program capacity: 20 kSteps Data Memory: 32 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)
	CS1G-CPU45H	I/O bits: 5,120, Program capacity: 60 kSteps Data Memory: 128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)
	CS1G-CPU44H	I/O bits: 1,280, Program capacity: 30 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 banks)
	CS1G-CPU43H	I/O bits: 960, Program capacity: 20 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)
	CS1G-CPU42H	I/O bits: 960, Program capacity: 10 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)
	CS1W-BC022	2 slots (Connection to Expansion Backplane is not possible.)
	CS1W-BC032	3 slots
	CS1W-BC052	5 slots
	CS1W-BC082	8 slots
	CS1W-BC102	10 slots

These Backplanes are for CS1 Units only. Use CS1W-BC□□3 Backplanes if C200H Units are to be installed.



Name	Model	Specifications
<b>Power Supply Units</b> 	C200HW-PA204	100 to 120 V AC or 200 to 240 V AC, Output capacity: 4.6 A, 5 V DC
	C200HW-PA204S	100 to 120 V AC or 200 to 240 V AC (0.8 A 24 V DC service power) Output capacity: 4.6 A, 5 V DC
	C200HW-PA204R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC
	C200HW-PD024	24 V DC, Output capacity: 4.6 A, 5 V DC
	C200HW-PA209R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC
I/O Control Unit	CS1W-IC102	Connects to CS1 Expansion Racks (two Terminating Resistors included). Must be used together with I/O Interface Units to connect Long-distance Expansion Racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.
<b>Memory Cards</b> 	HMC-EF372	Flash memory, 30 MB
	HMC-EF672	Flash memory, 64 MB
	HMC-AP001	Memory Card adapter
Serial Communications Boards	CS1W-SCB21-V1	2 x RS-232C ports, protocol macro function
	CS1W-SCB41-V1	1 x RS-232C port + 1 x RS-422/485 port, protocol macro function
Programming Consoles	CQM1-PRO01-E	An English Keyboard Sheet (CS1W-KS001-E) is required.
	C200H-PRO27-E	
Programming Console Connection Cables	CS1W-CN114	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)
	CS1W-CN224	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)
	CS1W-CN624	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)
CX-One	CX-ONE-AL##C-E <sup>*1</sup>	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.
Programming Device Connecting Cables (for peripheral port)	CS1W-CN118	Connects DOS computer, D-Sub 9-pin receptacle (Length: 0.1 m)
	CS1W-CN226	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m)
	CS1W-CN626	Connects DOS computer, D-Sub 9-pin (Length: 6.0 m)
	XW2Z-200S-CV	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m)
	XW2Z-500S-CV	Connects DOS computer, D-Sub 9-pin (Length: 5.0 m)
Programming Device Connecting Cable (for RS-232C port)	XW2Z-200S-V	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m) (For Host Link connection)
	XW2Z-500S-V	Connects DOS computer, D-Sub 9-pin (Length: 5.0 m) (For Host Link connection)
Battery Set	CS1W-BAT01	For CS1 Series only. Note: Use a replacement battery that is no more than 2 years old from the date of manufacture.

\*1 ## = Number of licences; 01, 03, 10


## Expansion Racks

### Expansion Rack Configuration

Rack	Configuration	Remarks
CS1 Expansion Rack	CS1 Expansion I/O Backplane	One of each Unit is required.
	Power Supply Unit	
	For connection to a CPU Backplane or CS1 Expansion I/O Backplane: CS1 I/O Connecting Cable	
	For connection to a C200H Expansion I/O Backplane: CS1 to C200H I/O Connecting Cable	
C200H Expansion I/O Rack	C200H Expansion I/O Backplane	One of each Unit is required. A CS1 Expansion Rack cannot be connected after a C200H Expansion I/O Rack.
	Power Supply Unit	
	For connection to a CPU Backplane or CS1 Expansion I/O Backplane: CS1 to C200H I/O Connecting Cable	
	For connection to a C200H Expansion I/O Backplane: C200H I/O Connecting Cable	

### Products Used in Expansion Racks

Name	Model	Specifications	Cable Length
CS1 Expansion I/O Backplanes	CS1W-BI032	3 slots	These Backplanes are for CS1 Units only. Use CS1W-BI□□3 Backplanes if C200H Units are to be installed.
	CS1W-BI052	5 slots	
	CS1W-BI082	8 slots	
	CS1W-BI102	10 slots	
C200H Expansion I/O Backplanes	C200HW-BI031	3 slots	
	C200HW-BI051	5 slots	
	C200HW-BI081-V1	8 slots	
	C200HW-BI101-V1	10 slots	
Power Supply Units	C200HW-PA204	100 to 120 V AC or 200 to 240 V AC Output capacity: 4.6 A, 5 V DC	
	C200HW-PA204S	100 to 120 V AC or 200 to 240 V AC (with power output terminal: 0.8 A, 24 V DC) Output capacity: 4.6 A, 5 V DC	
	C200HW-PA204R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC	
	C200HW-PA209R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC	
	C200HW-PD024	24 V DC	

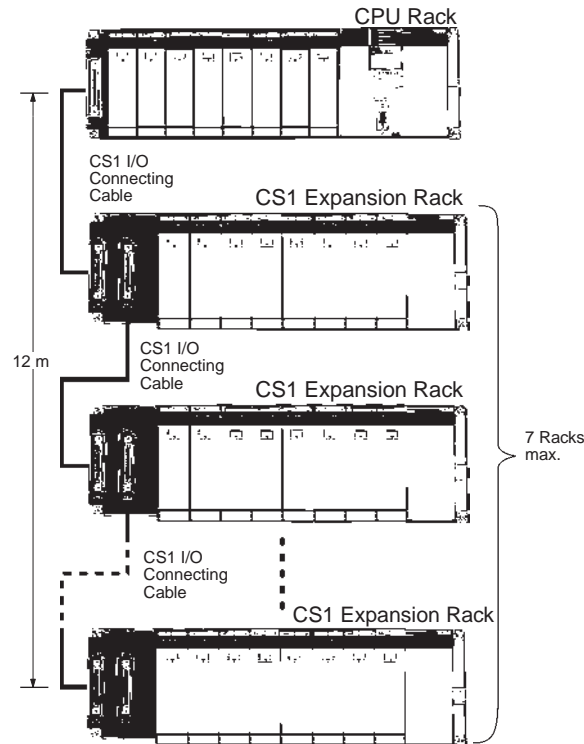
Name	Model	Specifications	Cable Length
I/O Interface Unit	CS1W-II102	Connects CS1 Expansion Racks. Must be used together with I/O Control Unit to connect Long-distance Expansion Racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.	---
CS1 I/O Connecting Cables	CS1W-CN313	<p>Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes.</p> <p>When using a CS1W-CN313 or CS1W-CN713 I/O Connecting Cable with a CS1□-CPU□□H CPU Unit, use only Cables produced on or after September 20, 2001 (production number 2091). Cables with no production number, a 6-digit production number, or produced before September 20, 2001, cannot be used.</p> <p><b>Reading the production number</b></p>  <p>Year (e.g., 1997=7) Month (1 to 9, X (10), Y (11), Z (12)) Day (01 to 31)</p>	0.3 m
	CS1W-CN713		0.7 m
	CS1W-CN223		2 m
	CS1W-CN323		3 m
	CS1W-CN523		5 m
	CS1W-CN133		10 m
	CS1W-CN133-B2		12 m
Long-distance Connecting Cables	CV500-CN312	<p>For Long-distance Expansion Racks</p> <p>Connects the I/O Control Unit to I/O Interface Units or connects one I/O Interface Unit to the next I/O Interface Unit.</p>	0.3 m
	CV500-CN612		0.6 m
	CV500-CN122		1 m
	CV500-CN222		2 m
	CV500-CN322		3 m
	CV500-CN522		5 m
	CV500-CN132		10 m
	CV500-CN232		20 m
	CV500-CN332		30 m
	CV500-CN432		40 m
	CV500-CN532		50 m
CS1-C200H I/O Connecting Cables	CS1W-CN311	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	0.3 m
	CS1W-CN711		0.7 m
	CS1W-CN221		2 m
	CS1W-CN321		3 m
	CS1W-CN521		5 m
	CS1W-CN131		10 m
	CS1W-CN131-B2		12 m
C200H I/O Connecting Cables	C200H-CN311	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	0.3 m
	C200H-CN711		0.7 m
	C200H-CN221		2 m
	C200H-CN521		5 m
	C200H-CN131		10 m



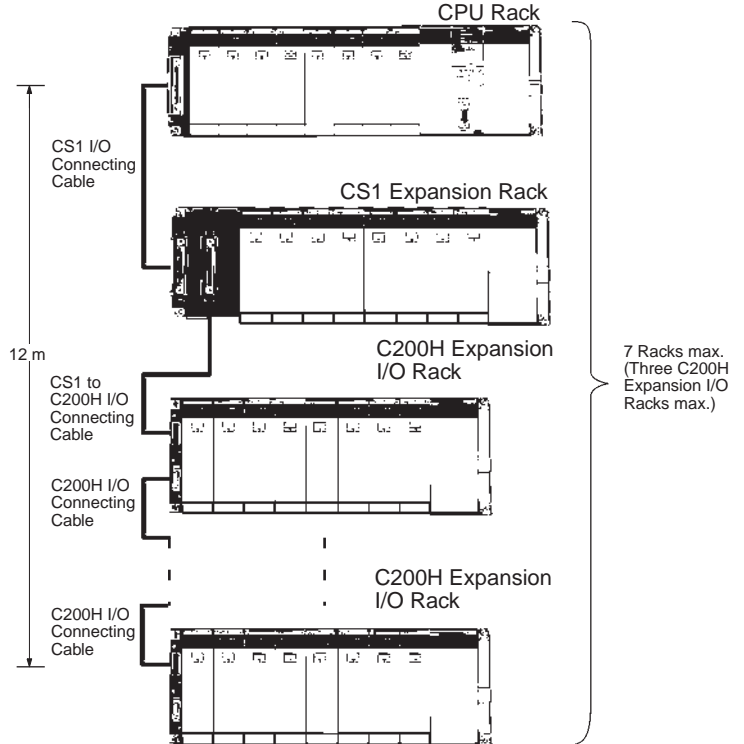
**Expansion Rack Patterns**

The following diagrams show the 5 possible patterns of Expansion Racks.

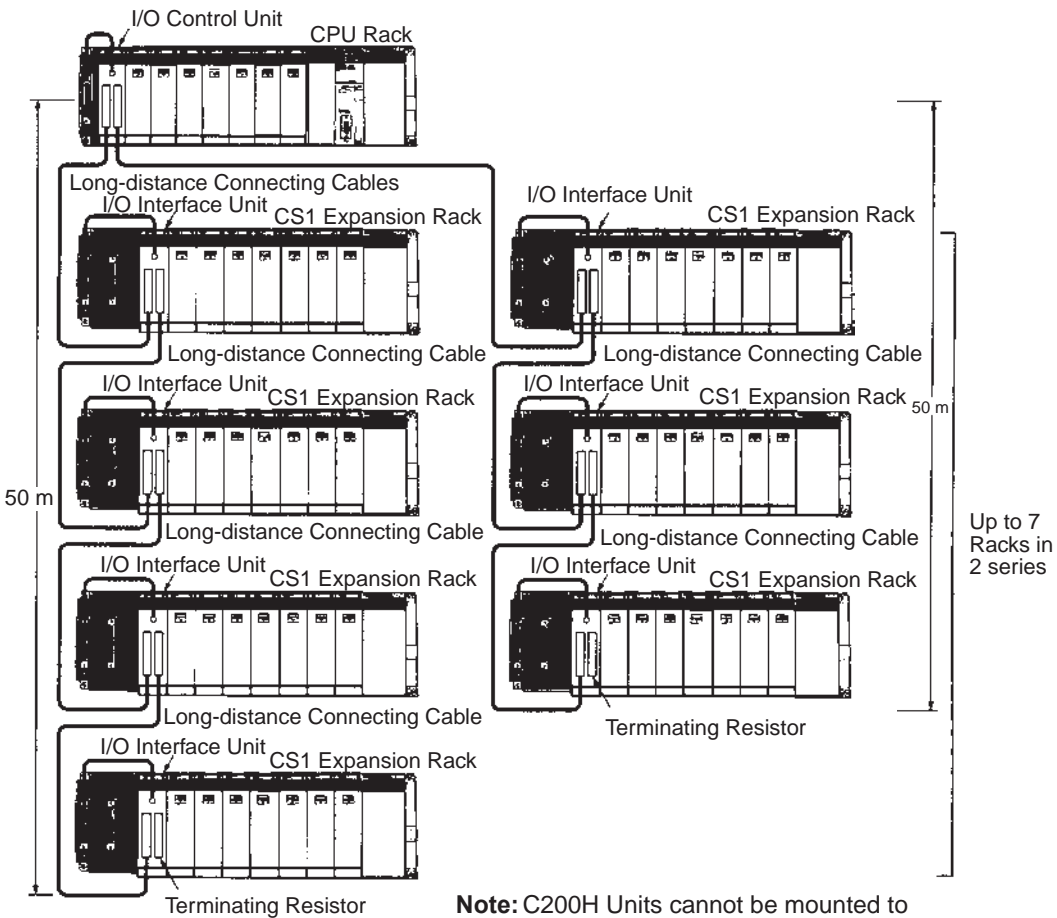
**CPU Rack with CS1 Expansion Racks**



**CPU Rack with CS1 Expansion Racks and C200H Expansion I/O Racks**

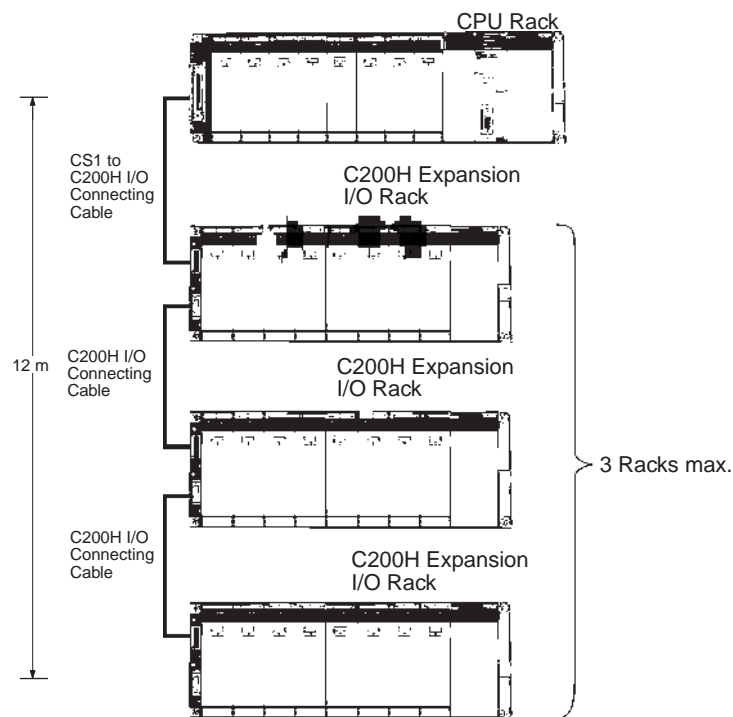


**CPU Rack with CS1 Long-Distance Expansion Racks**

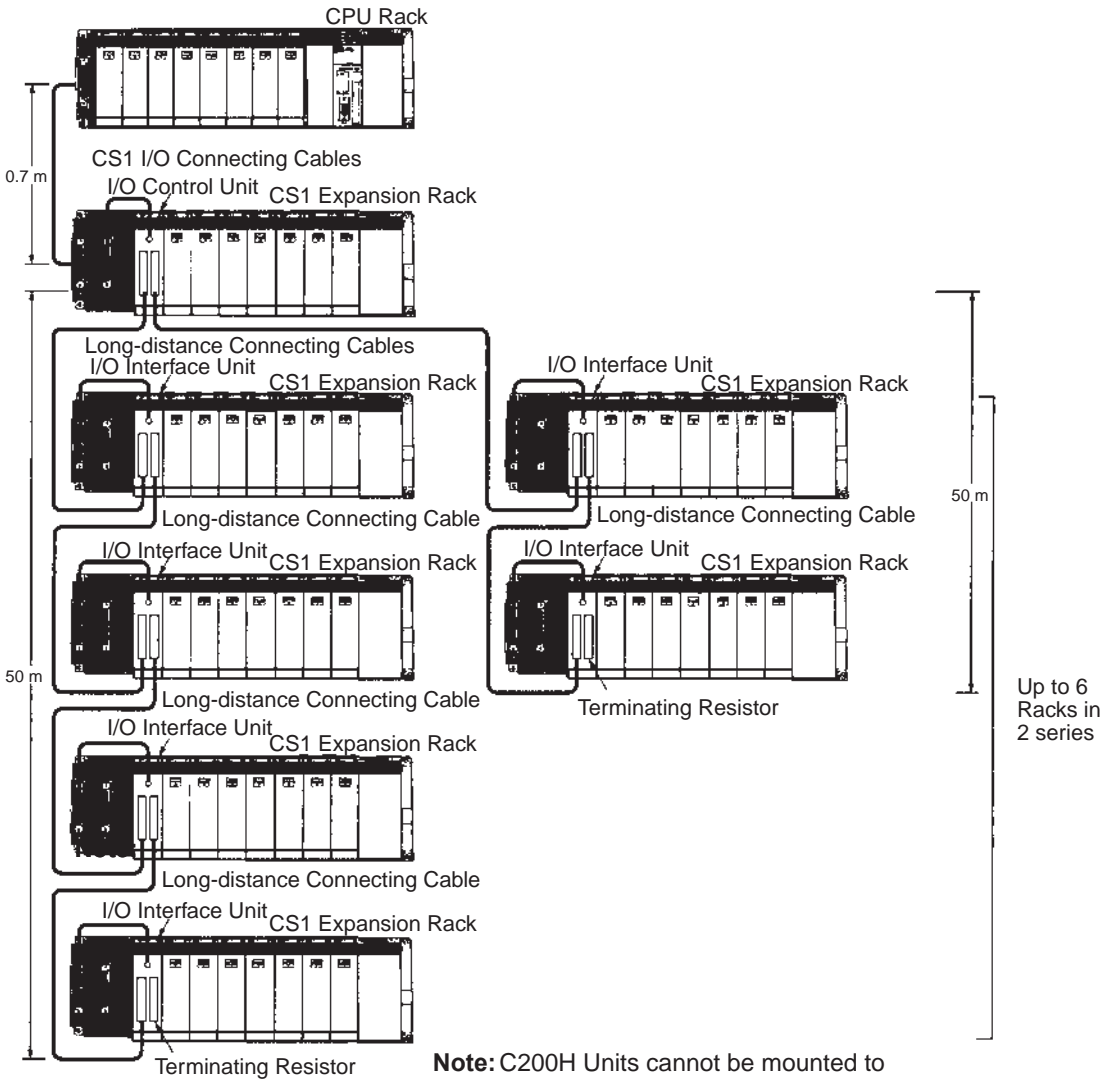


**Note:** C200H Units cannot be mounted to Long-distance Expansion Racks.

CPU Rack with C200H Expansion I/O Racks



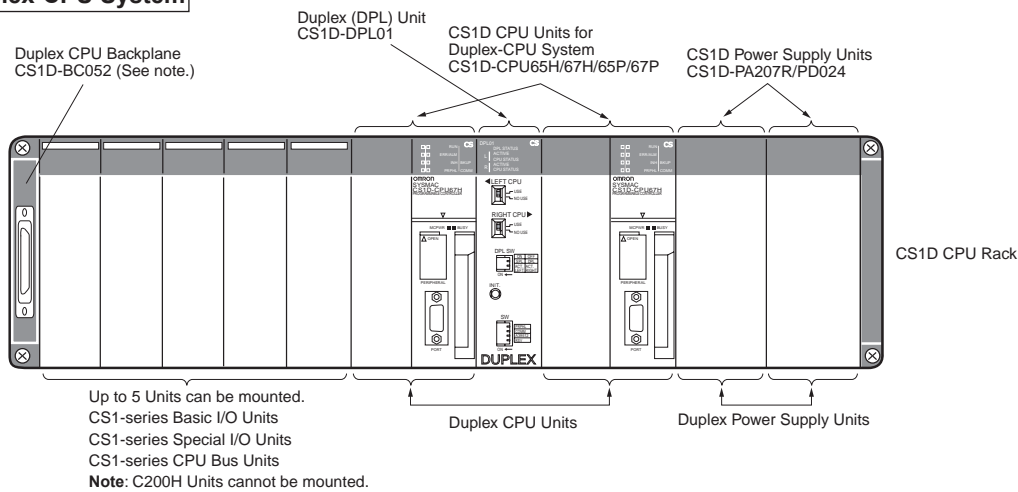
CPU Rack with CS1 Expansion Rack and CS1 Long-Distance Expansion Racks



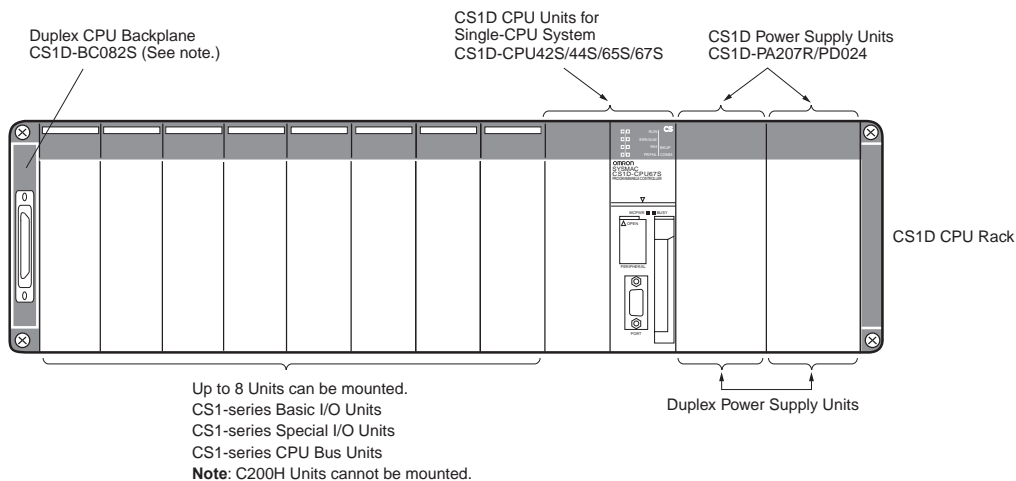
**Note:** C200H Units cannot be mounted to Long-distance Expansion Racks. (They can be mounted to the CS1 Expansion Rack with the I/O Control Unit mounted.)

## System Configuration (Duplex Systems)

### Duplex-CPU System



### Single-CPU System



### CPU Rack

A CPU Rack consists of a Duplex CPU Backplane to which CPU Units, Power Supply Units, a Duplex Unit, CS1-series Basic I/O Units, CS1-series Special I/O Units, and CS1-series CPU Bus Units are mounted. Memory Cards and Inner Boards to mount in the CPU Units are optional. (Inner Board cannot be mounted to the CS1D-CPU□□H/P) The CPU Units, Power Supply Units, Duplex CPU Backplane, and Duplex Unit are all designed specifically for CS1D PLCs.

**Note:** Different Backplanes are used for the CPU Rack and Expansion Racks. Be sure to use the correct Backplane.

### Expansion Racks

An Expansion Rack consists of an Expansion Backplane to which Power Supply Units, CS1-series Basic I/O Units, CS1-series Special I/O Units, and CS1-series CPU Bus Units are mounted.

The Power Supply Units and Expansion Backplane are designed specifically for CS1D PLCs.

CS1-series Expansion Backplanes and C200H Backplanes cannot be connected.

### Long-distance Expansion Racks

A Long-distance Expansion Rack consists of an Expansion Backplane to which an I/O Interface Unit, CS1-series Basic I/O Units, CS1-series Special I/O Units, and CS1-series CPU Bus Units are mounted. An I/O Control Unit is used to connect to the Long-distance Expansion Racks. Using Long-distance Expansion Rack increases the normal limit of 12 m for the Rack to 50 m.

### CS1D PLCs

With a CS1D Duplex-CPU System, two CPU Units can be mounted to the CPU Rack for Duplex Mode operation (Duplex Mode), or just one CPU Unit can be mounted for Simplex Mode operation. In either case, a Duplex Unit is required.

With a CS1D Single-CPU System, just one CPU Unit is mounted and a Duplex Unit is not required.

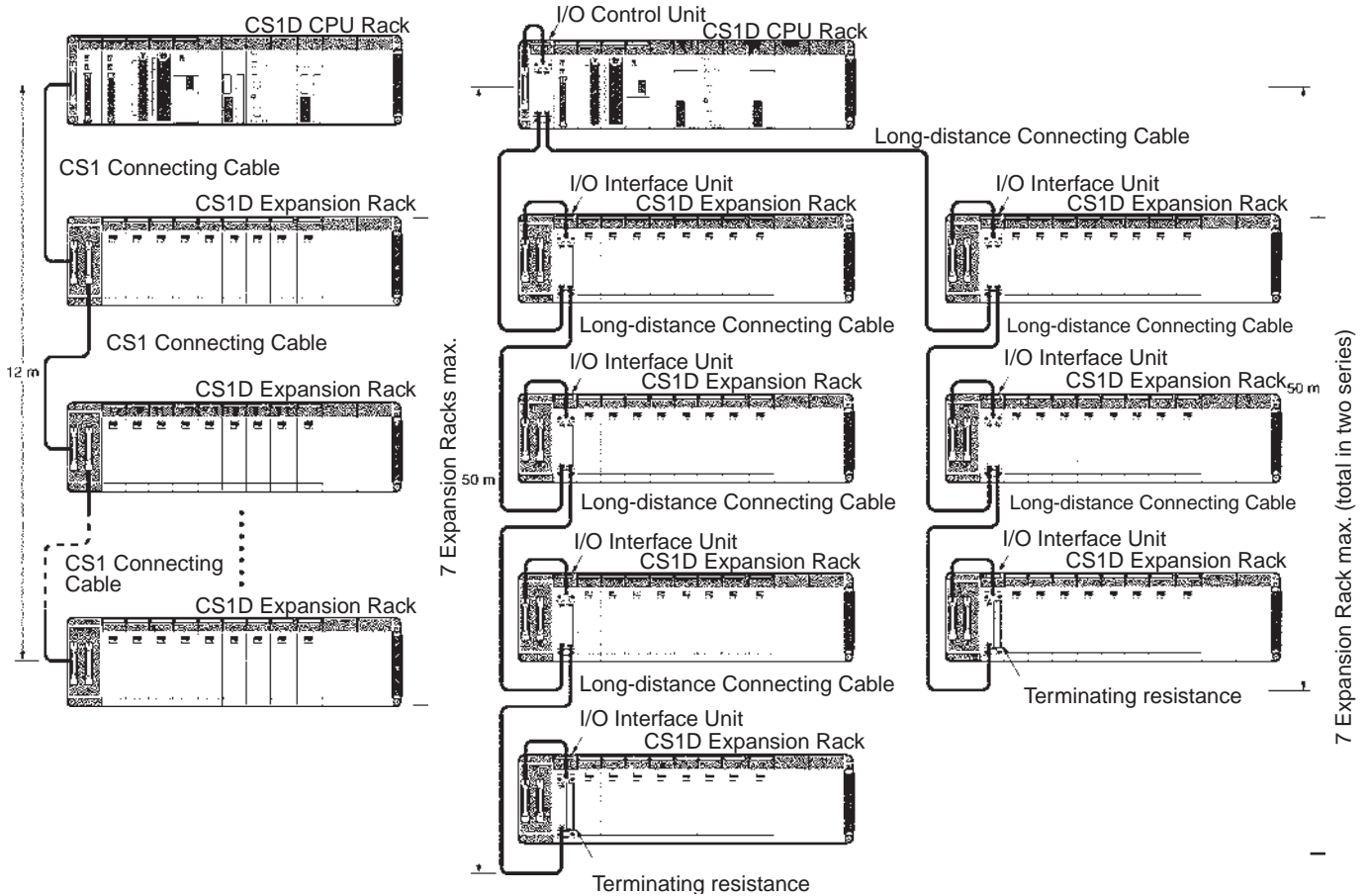
Also, two Power Supply Units can be mounted to any Rack to increase redundancy. (Racks can also be operated with only one Power Supply Unit.) With any of these combinations, there are no further restrictions if the system configuration, e.g., the same number of Expansion Racks can be used as with the other CS1-series PLCs.

**Note:** C200H Basic I/O Units, C200H Special I/O Units, and C200H CPU Bus Units cannot be mounted on any Rack.

## Expansion Patterns for CS1D PLCs

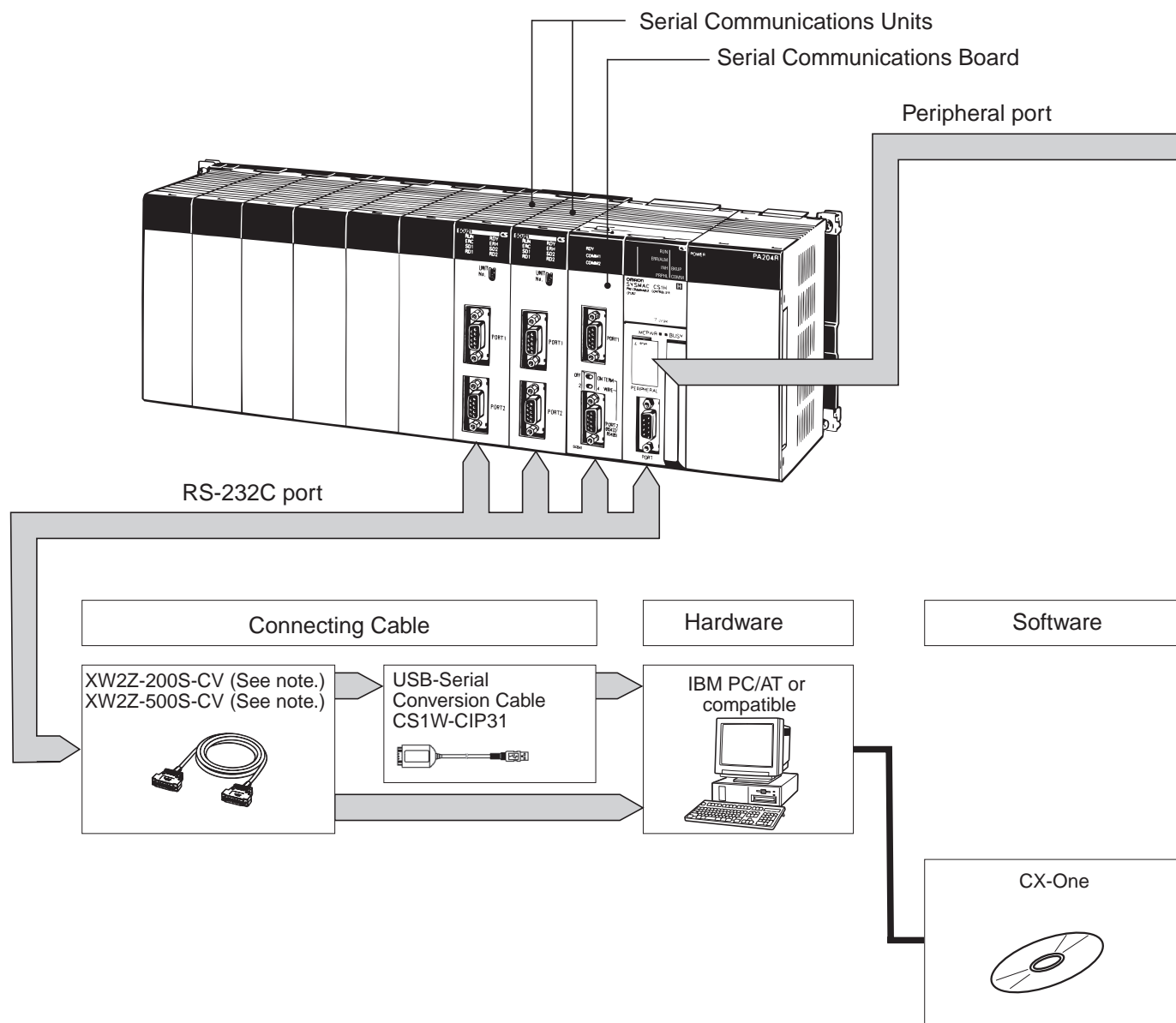
### CS1D CPU Rack + CS1D Expansion Rack

### CS1D CPU Rack + CS1D Long-distance Expansion Racks



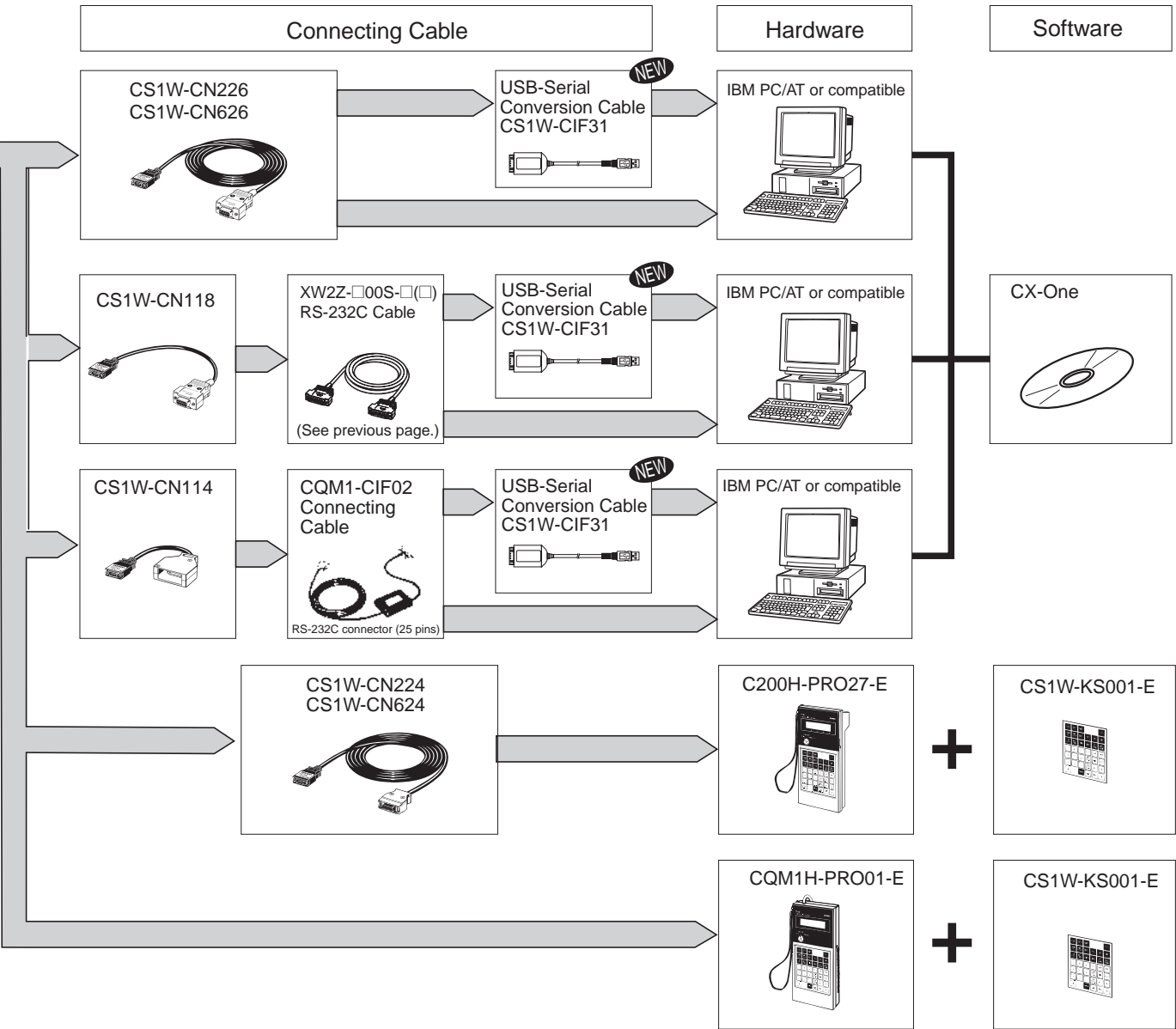
Name	Model	Specifications	Cable Length
Long-distance Connecting Cables	CV500-CN312	For Long-distance Expansion Racks	0.3 m
	CV500-CN612	Connects the I/O Control Unit to I/O Interface Units or connects one I/O Interface Unit to the next I/O Interface Unit.	0.6 m
	CV500-CN122		1 m
	CV500-CN222		2 m
	CV500-CN322		3 m
	CV500-CN522		5 m
	CV500-CN132		10 m
	CV500-CN232		20 m
	CV500-CN332		30 m
	CV500-CN432		40 m
	CV500-CN532		50 m
CS1-C200H I/O Connecting Cables	CS1W-CN311	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	0.3 m
	CS1W-CN711		0.7 m
	CS1W-CN221		2 m
	CS1W-CN321		3 m
	CS1W-CN521		5 m
	CS1W-CN131		10 m
	CS1W-CN131-B2		12 m
C200H I/O Connecting Cables	C200H-CN311	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	0.3 m
	C200H-CN711		0.7 m
	C200H-CN221		2 m
	C200H-CN521		5 m
	C200H-CN131		10 m

## Connections to Programming Devices



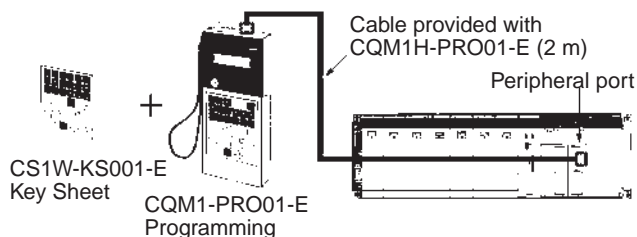
**Note:** Refer to the next page for details of cables for connecting to computers. Choose the appropriate cable for the communications mode.





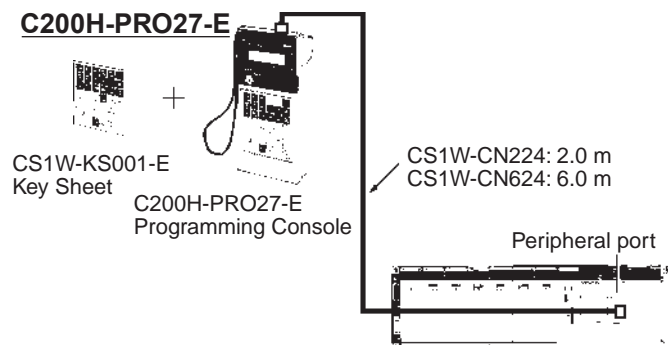
## Programming Consoles

### CQM1H-PRO01-E



Model	Cable	Cable length
CQM1H-PRO01-E	Not required.	---

### C200H-PRO27-E

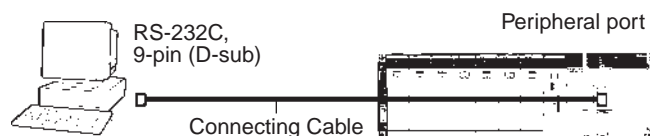


Model	Cable	Cable length
C200H-PRO27-E	CS1W-CN224	2.0 m
	CS1W-CN624	6.0 m

### Windows-based Programming Software: CX-Programmer

Name	Model	For	Specifications
CX-Pro-grammer	WS02-CXPC1-EV□□	For 1 license	OS: Windows 95/98 or Windows NT/Me/2000/XP
	WS02-CXPC1-EL03-V□□	For 3 licenses	
	WS02-CXPC1-EL10-V□□	For 10 licenses	

### Connecting to the Peripheral Port



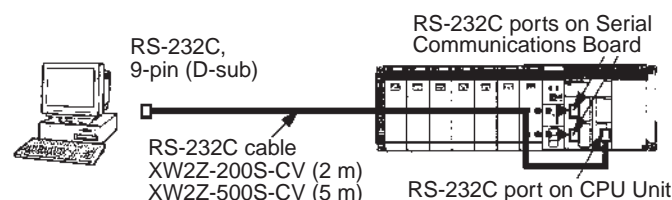
#### Peripheral Port Connecting Cables

Cable	Length	Computer connector
CS1W-CN226	2.0 m	D-sub, 9-pin, male
CS1W-CN626	6.0 m	

The following cables can be used for an RS-232C connection from the computer to the peripheral port.

Mode	Connecting cables		Length	Computer connector
Peripheral bus or Host Link	XW2Z-200S-CV or XW2Z-500S-CV	CS1W-CN118	2 or 5 m + 0.1 m	D-sub, 9-pin, male
Host Link	XW2Z-200S-V or XW2Z-500S-V			

### Connecting to the RS-232C Port



#### RS-232C Port Connecting Cables

Mode	Cable	Length	Computer connector
Peripheral bus or Host Link	XW2Z-200S-CV	2.0 m	D-sub, 9-pin, male
	XW2Z-500S-CV	5.0 m	

**Note:** Cables with model numbers ending in "CV" are antistatic.

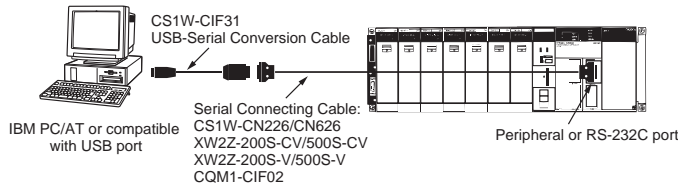
The following cables can be used for an RS-232C connection from the computer to an RS-232C port. (Unlike cables with model numbers ending in "-CV," however, these cables do not support peripheral bus connection and do not have anti-static specifications.)

Mode	Cable	Length	Computer connector
Host Link	XW2Z-200S-V	2.0 m	D-sub, 9-pin, male
	XW2Z-500S-V	5.0 m	

The following serial communications modes can be used to connect a computer with the CX-Programmer to a CS1 PLC.

Mode	Features
Peripheral bus	The faster mode, peripheral bus is generally used for CX-Programmer connections. Only 1:1 connections are possible. The baud rate is automatically detected with the CS1.
Host Link	A standard protocol for host computers. Slower than peripheral bus, but allows modem or optical adapter connections, or long-distance or 1:N connections via RS422A/485.

## Using a USB-Serial Conversion Cable to Connect to a Peripheral or RS-232C Port



### General Specifications of USB-Serial Conversion Cable

USB interface standard		Conforms to USB Specification 1.1.
DTE speed		115.2 Kbits/s
Connectors	On computer	USB (A plug connector, male)
	On PLC	RS-232C (D-sub, 9-pin, female)
Power supply		Bus power (supplied from upstream, 5 V DC)
Current consumption		35 mA
Operating environment	Ambient temperature	0 to 55 °C
	Ambient humidity	10% to 90% (with no condensation)
	Ambient atmosphere	No corrosive gases
Weight		50 g

### OS with Drivers for USB-Serial Conversion Cable

Windows 98, ME, 2000, or XP

### Peripheral Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number			Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	CS1W-CN226		0.5 m + 2.0 m	USB (A plug connector)
			CS1W-CN626		0.5 m + 6.0 m	
		CS1W-CIF31	XW2Z-200S-CV/ XW2Z-500S-CV	CS1W-CN118	0.5 m + (2.0 m or 5.0 m) + 0.1 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V/ XW2Z-500S-V		0.5 m + (2.0 m or 5.0 m) + 0.1 m	

### RS-232C Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number			Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	XW2Z-200S-CV		0.5 m + 2.0 m	USB (A plug connector)
			XW2Z-500S-CV		0.5 m + 5.0 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V (See note.)		0.5 m + 2.0 m	
			XW2Z-500S-V (See note.)		0.5 m + 5.0 m	

Connection in Tool Bus Mode is not possible. The connector does not have ESD measures.

### Applicable Software

CX-Programmer, CX-Simulator, CX-Protocol, CX-Motion, CX-Positioner, CS-Process, DeviceNet Configurator, PLC Reporter 32, CX-Designer, and NT Support Software for Windows (NTST) (See note.)

**Note:** There are restrictions to the COM port numbers that can be used for the NTST.

### Applicable Communications Middleware

FinsGateway and CX-Server

### Applicable PLCs and PTs

The OMRON PLCs and PTs supported by the applicable software can be used. These are listed below.

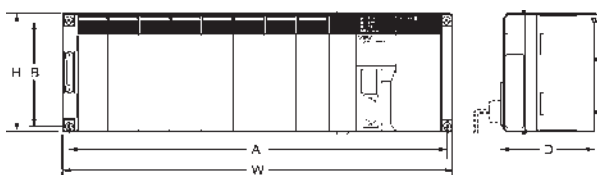
#### PLCs

CS Series, CJ Series, C Series (C200HS, C200HX/HG/HE, C200H, C1000H, C2000H, CQM1, CPM1, CPM1A, SRMT, CQM1H, and CPM2C), CVM1, and CV Series

#### PTs

NS Series and NT Series

## Dimensions

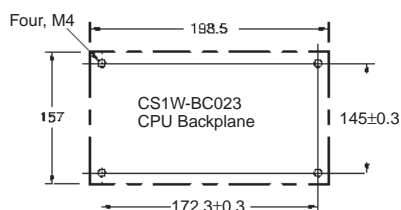


Unit: mm

Backplane	A	B	W	H	D
CS1W-BC022/023 (2 slots)	172.3	145	198.5	157	123
CS1W-BC032/033 (3 slots)	246	118	260	132	
CS1W-BC052/053 (5 slots)	316		330		
CS1W-BC082/083 (8 slots)	421		435		
CS1W-BC102/103 (10 slots)	491		505		
CS1D-BC052/082S (Duplex System)					

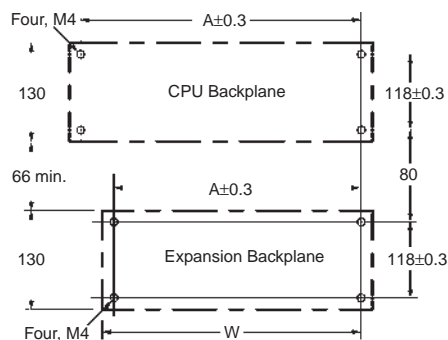
### Backplanes

#### CPU Backplane with 2 Slots



**Note:** Expansion Backplanes cannot be connected to 2-slot CPU Backplanes.

#### CPU Backplane with 3, 5, 8, or 10 Slots

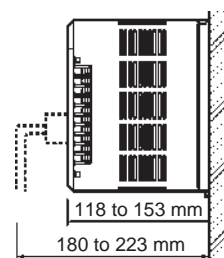


Unit: mm

Backplane	Model	A	W
CPU Backplanes	CS1W-BC022/023 (2 slots)	172.3	198.5
	CS1W-BC032/033 (3 slots)	246	260
	CS1W-BC052/053 (5 slots)	316	330
	CS1W-BC082/083 (8 slots)	421	435
	CS1W-BC102/103 (10 slots)	491	505
	CS1D-BC052/082S (Duplex System)		
CS1 Expansion Backplanes	CS1W-BI032/033 (3 slots)	246	260
	CS1W-BI052/053 (5 slots)	316	330
	CS1W-BI082/083 (8 slots)	421	435
	CS1W-BI102/103 (10 slots)	491	505
	CS1D-BI092 (Duplex System)		
C200H Expansion I/O Backplanes	C200HW-BI031 (3 slots)	175	189
	C200HW-BI051 (5 slots)	245	259
	C200HW-BI081-V1 (8 slots)	350	364
	C200HW-BI101-V1 (10 slots)	420	434

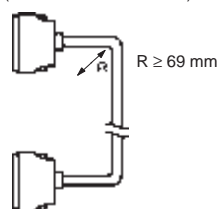
### Mounting Depth

The depth of all Racks is from 118 to 153 mm depending on the Units that are mounted. Additional depth is required to connect Peripheral Devices and Cables. Be sure to allow sufficient mounting depth.

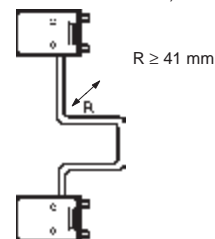


**Note:** I/O Connecting Cables require sufficient space to maintain the min. bending radius.

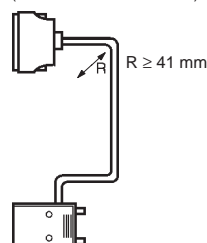
CS1 I/O Connecting Cable  
(Cable diameter: 8.6 mm)



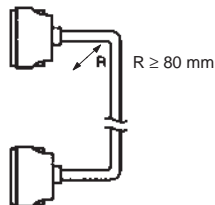
C200H I/O Connecting Cable  
(Cable diameter: 5.1 mm)



CS1 to C200H I/O Connecting Cable  
(Cable diameter: 5.1 mm)



Long-distance Connecting Cable  
(Cable diameter: 10 mm)



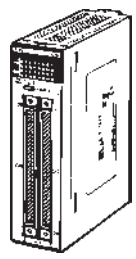
I/O Allocations

I/O Allocations

In CS1 PLCs, part of the I/O memory is allocated to each Unit. Units are divided into the following 3 groups for allocations.

- Basic I/O Units
- Special I/O Units
- CS1 CPU Bus Units

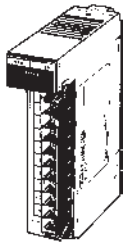
Basic I/O Units



CS1 Basic I/O Units



C200H Basic I/O Units



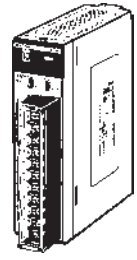
C200H Group-2 High-density I/O Units  
(See Note 2.)

Allocations

CIO Area:  
CIO 0000 to CIO 0319 (See Note 1.)  
(Memory is allocated in word units in order of mounting position in the Racks.)

- Note
1. The Rack's first word setting can be changed from the default setting (CIO 0000) to any word from CIO 0000 to CIO 9999. The first word setting can be changed only with a Programming Device other than a Programming Console.
  2. The unit number setting on the front of C200H Group-2 High-density I/O Units is ignored. Words are allocated to these Units based on their location in the Rack.

Special I/O Units



CS1 Special I/O Units



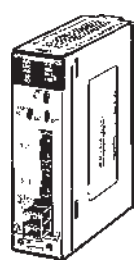
C200H Special I/O Units  
(See Note 2.)

Allocations

Special I/O Unit Area:  
CIO 2000 to CIO 2959  
(Each Unit is allocated ten words based on its unit number.)

- Note
1. Although there are 96 unit number settings, a maximum of 80 Units can actually be mounted to a PLC because that is the maximum number of slots possible.
  2. Some Units classified as I/O Units (namely C200H High-density I/O Units) are actually treated as Special I/O Units.

CS1 CPU Bus Units



CS1 CPU Bus Units

Allocations

CS1 CPU Bus Unit Area:  
CIO 1500 to CIO 1899  
(Each Unit is allocated 25 words based on its unit number.)

Allocations to Basic I/O Unit Groups

Basic I/O Units include CS1 Basic I/O Units, C200H Basic I/O Units, and C200H Group-2 High-density I/O Units.

Allocated words in the CIO Area: CIO 0000 to CIO 0319

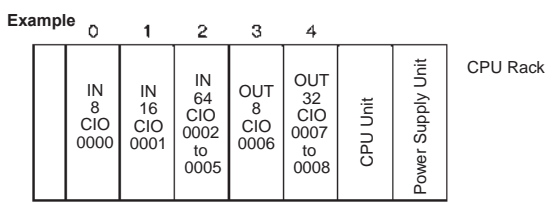
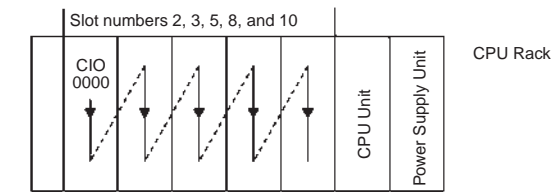
Basic I/O Units can be mounted to the CPU Rack, CS1 Expansion Racks, and C200HX/HG/HE Expansion I/O Racks.

**Note:** CS1 Basic I/O Units cannot be mounted to C200HX/HG/HE Expansion I/O Racks.

Allocation Methods

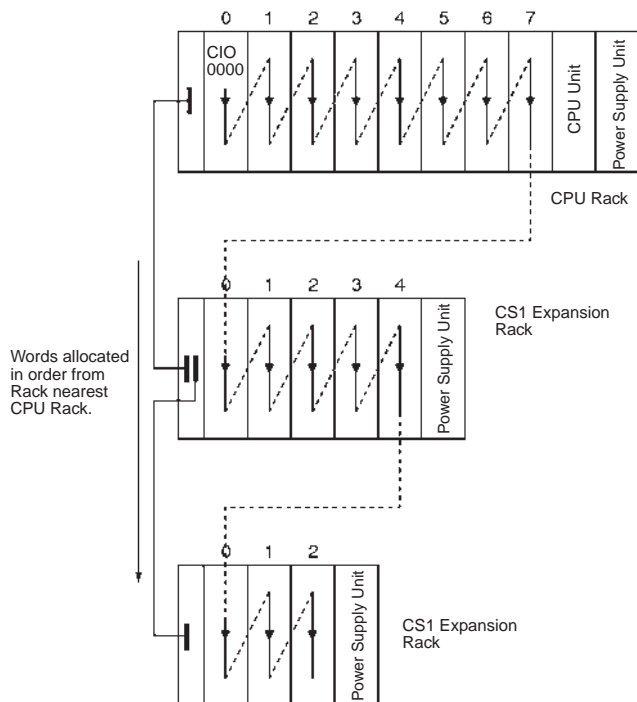
1. CPU Rack

Basic I/O Units on the CPU Rack are allocated words left to right; Units are allocated as many words as required in word units. With CPU Ver. 2.0 and higher it is possible to specify start addresses per rack or per slot.



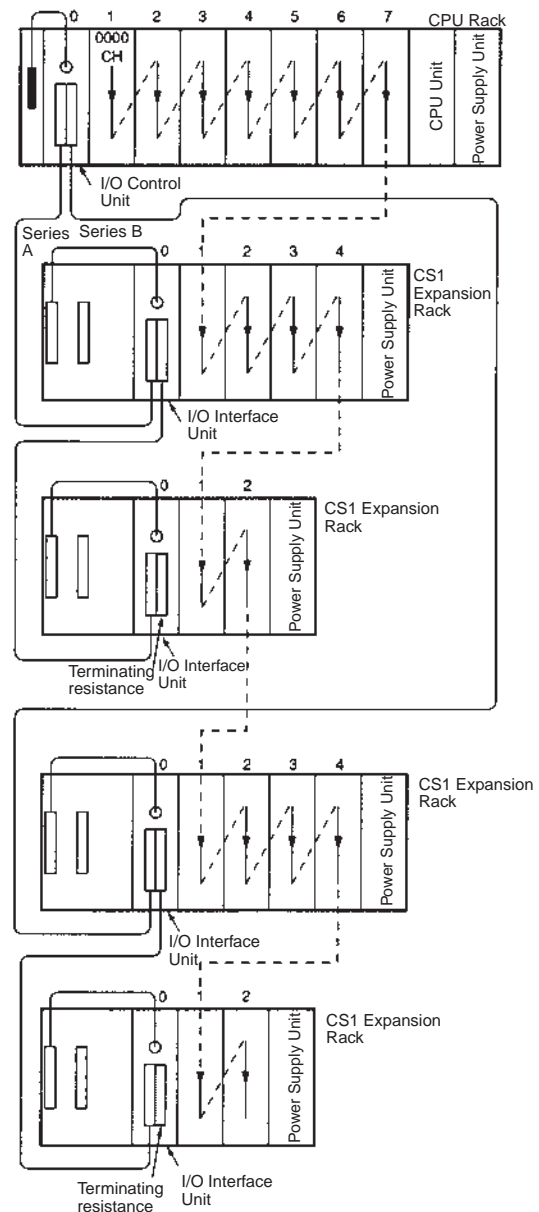
## 2. Allocations to CS1 Expansion and C200H Expansion I/O Racks

I/O allocations to Basic I/O Units continue from the CPU Rack to the Expansion Racks. Words are allocated from left to right and each Unit is allocated as many words as it requires in word units, just like Units in the CPU Rack.



## 3. CS1 Long-distance Expansion Racks

Words are allocated to series A and then series B. Otherwise, allocations are the same as for other Racks.





### Allocations to Special I/O Units

Special I/O Units include CS1 Special I/O Units and C200H Special I/O Units.

Each of these Units is allocated ten words in the Special I/O Unit Area (CIO 2000 to CIO 2959).

Special I/O Units can be mounted to the CPU Rack, CS1 Expansion Racks, and C200H Expansion I/O Racks. (See note.)

**Note:** CS1 Special I/O Units cannot be mounted to C200H Expansion I/O Racks.

Each Unit is allocated 10 words in the Special I/O Unit Area, as shown in the following table.

Unit number	Words allocated
0	CIO 2000 to CIO 2009
1	CIO 2010 to CIO 2019
2	CIO 2020 to CIO 2029
...	...
15	CIO 2150 to CIO 2159
...	...
95	CIO 2950 to CIO 2959

**Note:** Special I/O Units are ignored during I/O allocation to Basic I/O Units. Slots containing Special I/O Units are treated as empty slots.

### Allocations to CS1 CPU Bus Units

Each CS1 CPU Bus Unit is allocated 25 words in the CS1 CPU Bus Unit Area (CIO 1500 to CIO 1899).

CS1 CPU Bus Units can be mounted to the CPU Rack or CS1 Expansion Racks.

Each Unit is allocated 25 words in the CPU Bus Unit Area, as shown in the following table.

Unit number	Words allocated
0	CIO 1500 to CIO 1524
1	CIO 1525 to CIO 1549
2	CIO 1550 to CIO 1574
...	...
15	CIO 1875 to CIO 1899

**Note:** CS1 CPU Bus Units are ignored during I/O allocation to Basic I/O Units. Slots containing CS1 CPU Bus Units are treated as empty slots.

## Current Consumption

The amount of current/power that can be supplied to the Units mounted in a Rack is limited by the capacity of the Rack's Power Supply Unit. The system must be designed so that the total current consumption of the Units does not exceed the maximum current for each voltage group and the total power consumption does not exceed the maximum for the Power Supply Unit.

### CPU Racks and Expansion Racks

The following table shows the maximum currents and power that can be supplied by Power Supply Units on CPU Racks and Expansion Racks (both CS1 Expansion Racks and C200H Expansion I/O Racks).

**Note:** 1. When calculating current/power consumption in a CPU Rack, be sure to include the power required by the CPU Backplane and CPU Unit themselves.  
2. Likewise, be sure to include the power required by the Expansion Backplane itself when calculating current/power consumption in an Expansion Rack.

Power Supply Unit	Max. Current Consumption			Max. Total Power Consumption
	5-V group	26-V group	24-V group	
C200HW-PA204	4.6 A	0.6 A	None	30 W
C200HW-PA204S	4.6 A	0.6 A	0.8 A	30 W
C200HW-PA204R	4.6 A	0.6 A	None	30 W
C200HW-PD204	4.6 A	0.6 A	None	30 W
C200HW-PA209R	9.0 A	1.3 A	None	45 W
C200HW-PD106R	6.0 A	1.0 A	None	30 W
CS1D-PA207R	7.0 A	1.3 A	None	35 W
CS1D-PD024	4.3 A	0.56 A	None	28 W

Be sure both Condition 1 and Condition 2 are met.

#### Condition 1: Maximum Current Supply

- Current required at 5 V DC by all Units (A)  $\leq$  Max. Current shown in table
- Current required at 26 V DC by all Units (B)  $\leq$  Max. Current shown in table
- Current required at 24 V DC by all Units (C)  $\leq$  Max. Current shown in table

#### Condition 2: Maximum Total Current Supply

- $A \times 5 \text{ V DC} + B \times 26 \text{ V DC} + C \times 24 \text{ V DC} \leq$  Max. Power shown in table

### Example Calculations

In this example, the following Units are mounted to a CPU Rack with a C200HW-PA204S Power Supply Unit.

Unit	Model	Quantity	5- V DC	26- V DC	24- V DC
CPU Backplane (8 slots)	CS1W-BC083	1	0.11 A	---	---
CPU Unit	CS1H-CPU67-EV1	1	1.10 A	---	---
Input Units	C200H-ID216	2	0.10 A	---	---
	CS1W-ID291	2	0.20 A	---	---
Output Units	C200H-OC221	2	0.01 A	0.075 A	---
Special I/O Unit	C200H-NC213	1	0.30 A	---	---
CPU Bus Unit	CS1W-CLK21	1	0.50 A	---	---
Service Power Supply Unit (24 V DC)		0.3 A used	---	---	0.3 A
<b>Total current/power consumption</b> 13.15+3.9+7.2 = 24.25 (30 W)			2.63 A (4.6) $\times$ 5 V = 13.15W	0.15 A ( 0.6A) $\times$ 26 V = 3.9 W	0.3 A ( 0.8A) $\times$ 24 V = 7.2 W

## Current Consumption Tables

### 5- V DC Voltage Group

Name	Model	Consumption (A)
CPU Units (These values include current consumption by a Programming Console.)	CS1H-CPU67H	0.82 (See note.)
	CS1D-CPU67H	
	CS1D-CPU67S	
	CS1H-CPU66H	0.82 (See note.)
	CS1H-CPU65H	0.82 (See note.)
	CS1D-CPU65H	
	CS1D-CPU65S	
	CS1H-CPU64H	0.82 (See note.)
	CS1H-CPU63H	0.82 (See note.)
	CS1G-CPU45H	0.78 (See note.)
	CS1G-CPU44H	0.78 (See note.)
	CS1D-CPU44S	
	CS1G-CPU43H	0.78 (See note.)
	CS1G-CPU42H	0.78 (See note.)
	CS1D-CPU42S	
Duplex Process CPU Units	CS1D-CPU67P	1.04
Loop Control Boards	CS1W-LCB01	0.22 (See note.)
	CS1W-LCB05	0.22 (See note.)
Serial Communication Boards	CS1W-SCB21-V1	0.28 (See note.)
	CS1W-SCB41-V1	0.36 (See note.)
CPU Backplanes (for CS1 Units only)	CS1W-BC022	0.11
	CS1W-BC032	0.11
	CS1W-BC052	0.11
	CS1W-BC082	0.11
	CS1W-BC102	0.11
CPU Backplanes	CS1W-BC023	0.11
	CS1W-BC033	0.11
	CS1W-BC053	0.11
	CS1W-BC083	0.11
	CS1W-BC103	0.11
I/O Control Unit	CS1W-IC102	0.92
CS1 Expansion Backplanes (for CS1 Units only)	CS1W-BI032	0.23
	CS1W-BI052	0.23
	CS1W-BI082	0.23
	CS1W-BI102	0.23
CS1 Expansion Backplanes	CS1W-BI033	0.23
	CS1W-BI053	0.23
	CS1W-BI083	0.23
	CS1W-BI103	0.23
I/O Interface Unit	CS1W-II102	0.23
C200H Expansion I/O Backplanes	C200HW-BI031	0.15
	C200HW-BI051	0.15
	C200HW-BI081-V1	0.15
	C200HW-BI101-V1	0.15
CS1 Duplex Backplane	CS1D-BC052	Total
CS1 Duplex Unit	CS1D-DPL01	0.55
CS1D Single CPU Backplane	CS1D-BC082S	0.17
CS1D Expansion Backplane	CS1D-BI092	0.28

**Note:** Add 0.15 A per port when the NT-AL001-E is connected.

### Basic I/O Units

Category	Name	Model	Consumption (A)
C200H Input Units	DC Input Units	C200H-ID211	0.01
		C200H-ID212	0.01
	AC Input Units	C200H-IA121	0.01
		C200H-IA122	0.01
		C200H-IA122V	0.01
		C200H-IA221	0.01
		C200H-IA222	0.01
		C200H-IA222V	0.01
C200H Input Units	AC/DC Input Units	C200H-IM211	0.01
		C200H-IM212	0.01
	B7A Interface Units	C200H-B7A11	0.10
		C200H-B7A12	0.10
	Interrupt Input Unit	C200HS-INT01	0.02
C200H Group-2 High-density Input Units	DC Input Units	C200H-ID216	0.10
		C200H-ID217	0.12
		C200H-ID218	0.10
		C200H-ID219	0.12
		C200H-ID111	0.12

Category	Name	Model	Consumption (A)
CS1 Input Units	DC Input Units	CS1W-ID211	0.10
		CS1W-ID231	0.15
		CS1W-ID261	0.15
		CS1W-ID291	0.20
	AC Input Units	CS1W-IA111	0.11
		CS1W-IA211	0.11
	Interrupt Input Unit	CS1W-INT01	0.10
	High-speed Input Unit	CS1W-IDP01	0.10
	Safety Relay Unit	CS1W-SF200	0.10
C200H Output Units	Relay Output Units	C200H-OC221	0.01
		C200H-OC222	0.01
		C200H-OC222N	0.008
		C200H-OC225	0.05
		C200H-OC226N	0.03
		C200H-OC223	0.01
		C200H-OC224	0.01
		C200H-OC224N	0.01
	Transistor Output Units	C200H-OD411	0.14
		C200H-OD213	0.14
		C200H-OD214	0.14
		C200H-OD216	0.01
		C200H-OD211	0.16
		C200H-OD217	0.01
		C200H-OD212	0.18
		C200H-OD21A	0.16
	B7A Interface Units	C200H-B7A01	0.10
		C200H-B7A02	0.10
	Triac Output Units	C200H-OA223	0.18
		C200H-OA222V	0.20
		C200H-OA224	0.27
CS1 Output Units	Relay Output Units	CS1W-OC201	0.10
		CS1W-OC211	0.13
	Transistor Output Units	CS1W-OD211	0.17
		CS1W-OD212	0.17
		CS1W-OD231	0.27
		CS1W-OD232	0.27
		CS1W-OD261	0.39
		CS1W-OD262	0.39
		CS1W-OD291	0.48
		CS1W-OD292	0.48
	Triac Output Units	CS1W-OA201	0.23 max. (0.07+0.02× No. of points ON)
		CS1W-OA211	0.406 max. (0.07+0.021×No. of points ON)
C200H Group-2 High-density Output Units	Transistor Output Units	C200H-OD218	0.27
		C200H-OD21B	0.48
		C200H-OD219	0.48
CS1 I/O Units	DC Input/Transistor Output Units	CS1W-MD261	0.27
		CS1W-MD262	0.27
		CS1W-MD291	0.35
		CS1W-MD292	0.35
	TTL I/O Unit	CS1W-MD561	0.27
C200H I/O Units	B7A Interface Units	C200H-B7A21	0.10
		C200H-B7A22	0.10
	Analog Timer Unit	C200H-TM001	0.06

**Note:** This table may contain Units that are no longer in production

## Special I/O Units

Category	Name	Model	Consumption (A)
C200H High-density I/O Units (Special I/O Units)	DC Input Unit	C200H-ID215	0.13
	TTL Input Unit	C200H-ID501	0.13
	Transistor Output Unit	C200H-OD215	0.22
	TTL Output Unit	C200H-OD501	0.22
	TTL I/O Unit	C200H-MD501	0.18
	DC Input Transistor Output Unit	C200H-MD215	0.18
C200H Special I/O Units	Temperature Control Units	C200H-MD115	0.18
		C200H-TD001	0.33
		C200H-TD002	0.33
		C200H-TD003	0.33
		C200H-TD101	0.33
		C200H-TD102	0.33
	Heat/Cool Temperature Control Units	C200H-TD103	0.33
		C200H-TV001	0.33
		C200H-TV002	0.33
		C200H-TV003	0.33
		C200H-TV101	0.33
		C200H-TV102	0.33
	Temperature Sensor Units	C200H-TV103	0.33
		C200H-TS001	0.45
		C200H-TS002	0.45
		C200H-TS101	0.45
		C200H-TS102	0.45
		C200H-TS103	0.45
C200H Special I/O Units	PID Control Units	C200H-TS001	0.45
		C200H-TS002	0.45
		C200H-TS101	0.45
	Cam Positioner Unit	C200H-TS102	0.45
		C200H-TS103	0.45
		C200H-TS104	0.45
	ASCII Units	C200H-PID01	0.33
		C200H-PID02	0.33
		C200H-PID03	0.33
	Analog Input Units	C200H-CP114	0.30
		C200H-ASC02	0.20
		C200H-ASC11	0.25
	Analog Output Units	C200H-ASC21	0.30
		C200H-ASC31	0.30
		C200H-ASC32	0.30
	Analog I/O Units	C200H-AD001	0.55
		C200H-AD002	0.45
		C200H-AD003	0.10
	High-speed Counter Units	C200H-DA001	0.65
		C200H-DA002	0.60
		C200H-DA003	0.10
	Motion Control Unit	C200H-DA004	0.10
		C200H-MAD01	0.10
		C200H-CT001-V1	0.30
	Position Control Units	C200H-CT002	0.30
		C200H-CT021	0.45
		C200H-MC221	0.65 (w/Teaching Box: 0.85)
	ID Sensor Units	C200HW-MC402-E	0.60
		C200HW-NC113	0.30
		C200HW-NC213	0.30
	Fuzzy Logic Unit	C200HW-NC413	0.50
		C200H-IDS01-V1	0.25
		C200H-IDS21	0.25
	Voice Unit	C200H-FZ001	0.30
		C200H-OV001	0.30
		C200H-DRM21-V1	0.25
	DeviceNet Master Unit	C200HW-DRT21	0.25
		C200HW-CORT21-V1	0.25
		C200HW-PRM21	0.60
	CANopen Unit	C200HW-PRT21	0.25
		C200HW-SRM21-V1	0.15
		C200H-LK401	0.35
	PROFIBUS-DP Master Unit		
	PROFIBUS-DP I/O Link Unit		
	CompoBus/S Master Unit		
	PC Link Unit		

Category	Name	Model	Consumption (A)
CS1 Special I/O Unit	Analog Input Unit	CS1W-AD0□1-V1	0.13
		CS1W-AD161	0.15
		CS1W-DA0□□	0.13
	Analog Output Unit	CS1W-MAD44	0.20
		CS1W-PTS01-V1	0.15
		CS1W-PTS11	0.12
	Isolated Thermocouple Input Unit	CS1W-PTS51	0.25
		CS1W-PTS55	0.18
		CS1W-PTS02	0.15
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS12	0.12
		CS1W-PTS52	0.25
		CS1W-PTS56	0.18
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
		CS1W-PTW01	0.15
		CS1W-PTW02	0.15
	Isolated Two-wire Transmission Device Input Unit	CS1W-PDC01	0.15
		CS1W-PDC11	0.12
		CS1W-PDC55	0.18
	Isolated DC Input Unit	CS1W-PPS01	0.20
		CS1W-PPS02	0.15
		CS1W-PPS03	0.12
	Isolated Pulse Input Unit	CS1W-PPS01	0.20
		CS1W-PPS02	0.15
		CS1W-PPS03	0.12
	Isolated Control Output Unit	CS1W-PPS01	0.20
		CS1W-PPS02	0.15
		CS1W-PPS03	0.12
	Power Transducer Input Unit	CS1W-PPS01	0.20
		CS1W-PPS02	0.15
		CS1W-PPS03	0.12
	100-mV DC Input Unit	CS1W-PPS01	0.20
		CS1W-PPS02	0.15
		CS1W-PPS03	0.12
	Motion Control Units	CS1W-MC221	0.60 (w/Teaching Box: 0.80 A)
		CS1W-MC421	0.70 (w/Teaching Box: 1.00 A)
		CS1W-MC422	0.70 (w/Teaching Box: 1.00 A)
	Position Control Units	CS1W-NC113/ 133	0.25
		CS1W-NC213/ 233	0.36
		CS1W-NC413/ 433	0.36
	High-speed Counter Units	CS1W-CT021	0.45
		CS1W-CT041	0.45
		CS1W-CT061	0.45
	SSI Input Unit	CS1W-CTS21	0.32
		CS1W-HCP22-V1	0.80
		CS1W-HCA12-V1	0.75
	Customizable Counter Units	CS1W-HCA22-V1	0.75
		CS1W-HIO01-V1	0.60
		CS1W-HIO02-V1	0.60
	GP-IB Interface Unit	CS1W-GPI01	0.26
		CS1W-GPI02	0.26
		CS1W-GPI03	0.26
	RFID Sensor Unit	CS1W-V600C11	0.26
		CS1W-V600C12	0.32
		CS1W-V600C13	0.32

## CS1 CPU Bus Units

Category	Name	Model	Consumption (A)
CS1 CPU Bus Units	Loop Control Unit	CS1W-LC001	0.36
		CS1W-MCH71	0.8
		CS1W-MCH72	0.8
	Motion Control Unit	CS1W-MCH71	0.8
		CS1W-MCH72	0.8
		CS1W-MCH73	0.8
	Controller Link Units	CS1W-CLK52-V1	0.65
		CS1W-CLK21-V1	0.33
		CS1W-CLK12-V1	0.52
	SYSMAC LINK Unit	CS1W-SLK21	0.48
		CS1W-SLK11	0.47
		CS1W-SLK01	0.47
	Serial Communications Unit	CS1W-SCU21	0.29 (See Note.)
		CS1W-SCU01	0.29 (See Note.)
		CS1W-SCU02	0.29 (See Note.)
	Ethernet Unit	CS1W-ETN□□, -ETN21D	0.40
		CS1W-ETN01	0.40
		CS1W-ETN02	0.40
	DeviceNet Unit	CS1W-DRM21-V1	0.29
		CS1W-DRM21	0.40
		CS1W-DRM21	0.40
	PROFIBUS-DP Master Unit	CS1W-PRM21	0.40
		CS1W-PRM21	0.40
		CS1W-PRM21	0.40

**Note:** Add 0.15 A per port when the NT-AL001-E is connected.

**Note:** This table may contain Units that are no longer in production

## 26-V Current Consumption

Category	Name	Model	Consumption (A)
C200H Output Units	Relay Output Units	C200H-OC221	0.075 for 8 points ON at the same time
		C200H-OC222	
		C200H-OC223	
		C200H-OC224	
		C200H-OC225	
	Transistor Output Units	C200H-OC222N	0.09 for 8 points ON at the same time
		C200H-OC226N	
		C200H-OC224N	
CS1 Output Units	Relay Output Units	C200H-OD216	0.075 for 8 points ON at the same time
		C200H-OD217	
C200H Special I/O Units	Relay Output Units	CS1W-OC201	0.006 for each point ON at the same time
		CS1W-OC211	
	Analog Input Unit	C200H-AD003	0.10
	Analog Output Units	C200H-DA003	0.20
		C200H-DA004	0.25
	Analog I/O Unit	C200H-MAD01	0.20
CS1 Special I/O Units	ID Sensor Units	C200H-IDS01-V1	0.12
		C200H-IDS21	0.12
	Analog Input Unit	CS1W-AD0□1-V1	0.09
		CS1W-AD161	0.06
	Analog Output Units	CS1W-DA041	0.18
		CS1W-DA08V	0.18
		CS1W-DA08C	0.25
	Analog I/O Unit	CS1W-MAD44	0.20
		CS1W-PTS01	0.15
	Isolated Thermocouple Input Unit	CS1W-PTS11	0.08
		CS1W-PTS55	0.06
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	0.15
		CS1W-PTS12	0.07
		CS1W-PTS56	0.06
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
		CS1W-PTW01	0.16
	Isolated Two-wire Transmission Device Input Unit	CS1W-PDC01	0.12
		CS1W-PDC11	
	Isolated DC Input Unit	CS1W-PDC55	0.06
		CS1W-PPS01	0.16
	Isolated Pulse Input Unit	CS1W-PMV01	0.12
		CS1W-PMV02	
	Power Transducer Input Unit	CS1W-PTR01	0.08
		CS1W-PTR02	
	100-mV DC Input Unit	CS1W-PTR02	
	Customizable Counter Unit	CS1W-HCA□2	0.15
	RFID Sensor Unit	CS1W-V600C□	0.12

**Note:** This table may contain Units that are no longer in production

# CS1 Unit Descriptions

Unit		Classification	Model	Page
I/O Units	Input Units	CS1 Basic I/O Unit	CS1W-ID2□□	300
			CS1W-IA□□11	301
		C200H Basic I/O Unit	C200H-ID□□11	300
			C200H-IA□□11	301
			C200H-IM21□	301
		C200H Special I/O Unit	C200H-ID501	300
	Output Units	CS1 Basic I/O Unit	CS1W-OA2□	301
			CS1W-OC□□□	301
			CS1W-OD2□□	301
		C200H Basic I/O Unit	C200H-OA22□(□)	301
			C200H-OC22□(□)	301
			C200H-OD□□□	301
		C200H Group-2 High Density Units	C200H-OD2□□	301
		C200H Special I/O Unit	C200H-OD501	301
I/O Units	CS1 Basic I/O Unit	CS1W-MD□□□	302	
	C200H Special I/O Unit	C200H-MD□□□	302	
High-speed Input Unit		CS1 Basic I/O Unit	CS1W-IDP01	302
Interrupt Input Unit		CS1 Basic I/O Unit	CS1W-INT01	313
		C200H Basic I/O Unit	C200H-INT01	313
Analog Timer Unit		C200H Special I/O Unit	C200H-TM001	315
Safety Relay Unit		CS1 Basic I/O Unit	CS1W-SF200	316
Analog I/O Units	Input Units	CS1 Special I/O Unit	CS1W-AD□□□(-V1)	318
		C200H Special I/O Unit	C200H-AD003	318
	Output Units	CS1 Special I/O Unit	CS1W-DA041/08V/08C	320
		C200H Special I/O Unit	C200H-DA00□	320
	Analog I/O Units	CS1 Basic I/O Unit	CS1W-MAD44	322
		C200H Special I/O Unit	C200H-MAD01	322
Loop Control Unit		CS1 CPU Bus Unit	CS1W-LC001	323
Loop Control Board		Inner Board	CS1W-LCB01/05	323
Duplex Process CPU			CS1D-CPU65P/67P	323
Process I/O Units		CS1 Special I/O Unit	CS1W-PI□□0□	326
Temperature Sensor Units		CS1 Special I/O Unit	CS1W-PTS□□	336
		C200H Special I/O Unit	C200H-TS□□□	336
Temperature Control Units		C200H Special I/O Unit	C200H-TC□□□	337
Position Control Units		CS1 Special I/O Unit	CS1W-NC□□□3	338
		C200H Special I/O Unit	C200HW-NC□□□3	338
Motion Control Unit		CS1 Special I/O Unit	CS1W-MC□□21	339
		C200H Special I/O Unit	C200HW-MC402-E	341
		CS1 CPU Bus Unit	CS1W-MCH71	343
High-speed Counter Units		CS1 Special I/O Unit	CS1W-CT0□□1	345
			CS1W-CTS21	347
		C200H Special I/O Unit	C200H-CT021	345
ID Sensor Units		CS1 Special I/O Unit	CS1W-V600C1□	354
		C200H Special I/O Unit	C200H-IDS01-V1	354
ASCII Units		C200H Special I/O Unit	C200H-ASC□□1	350
Serial Communications Boards/Unit	Serial Communications Boards	Inner Board	CS1W-SCB□□1-V1	351
	Serial Communications Unit	CS1 CPU Bus Unit	CS1W-SCU21-V1	351
RS-232C/RS-422 Conversion Unit		---	NT-AL001	353
GP-IB Interface Unit		---	CS1W-GPI01	355
Ethernet Unit		CS1 CPU Bus Unit	CS1W-ETN21, CS1D-ETN21D	357
Controller Link Boards/ Unit	Controller Link Unit	CS1 CPU Bus Unit	CS1W-CLK□□□-V1	359
	Controller Link Boards	Personal computer ISA board	3F8F7-CLK□□□-V1	359
PROFIBUS-DP Units	PROFIBUS-DP Master Unit	CS1 CPU Bus Unit	CS1W-PRM21	361
	PROFIBUS-DP I/O Link Unit	C200H Special I/O Unit	C200HW-PRT21	362
DeviceNet and Compo-Bus/S Units	DeviceNet Unit	CS1 CPU Bus Unit	CS1W-DRM21-V1	363
	I/O Link Unit	C200H Special I/O Unit	C200HW-DRT21	365
	CompoBus/S Master Unit	C200H Special I/O Unit	C200HW-SRM21-V1	368
CANopen/User-defined CAN Unit		C200H Special I/O Unit	C200HW-CORT21-V1	366

## CS1-series

## Basic I/O Units

## I/O Units



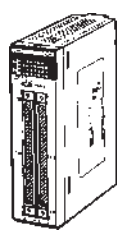
Input Unit  
CS1W-ID211  
16 points



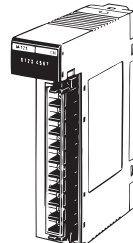
Input Unit  
CS1W-ID231  
32 points



Input Unit  
CS1W-ID261  
64 points



Input Unit  
CS1W-ID291  
96 points



Input Unit  
C200H-ID211  
8 points



Input Unit  
C200H-ID212  
16 points

Output Units  
CS1W-OD211  
16 points

Output Units  
CS1W-OD231  
32 points

Output Units  
CS1W-OD261  
64 points

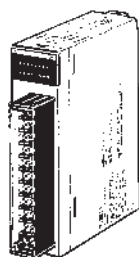
Output Units  
CS1W-OD291  
96 points

Output Units  
C200H-OD211  
5/8 points

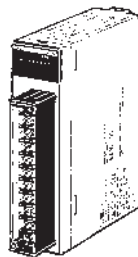
Output Units  
C200H-OD212  
16 points

I/O Units  
CS1W-MD261  
32/32 points

I/O Units  
CS1W-MD291  
48/48 points

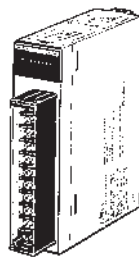


AC Input Units  
CS1W-IA11  
16 points



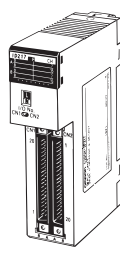
Triac Output Unit  
CS1W-OA201  
8 points

Triac Output Unit  
CS1W-OA211  
16 points



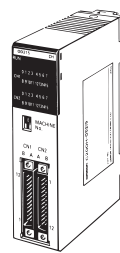
Relay Output Unit  
CS1W-OC201  
8 independent points

Relay Output Unit  
CS1W-OC211  
16 points



Input Unit  
C200H-ID311  
32/64 points

Output Units  
C200H-OD311  
32/64 points



Input Unit  
C200H-ID312  
32 points

Output Units  
C200H-OD312  
32 points

I/O Units  
C200H-MD312  
16/16 points

## DC Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
CS1 Basic I/O Unit	24 V DC	16 pts	Removable terminal block	CS1W-ID211	Input current: 7 mA
	24 V DC	32 pts	Connector	CS1W-ID231	Input current: 6 mA
	24 V DC	64 pts		CS1W-ID261	
	24 V DC	96 pts		CS1W-ID291	Input current: approx. 5 mA
C200H Basic I/O Unit	12 to 24 V DC	8 pts	Removable terminal block	C200H-ID211	Input current: 10 mA
	12 to 24 V DC	16 pts	Removable terminal block	C200H-ID212	Input current: 7 mA
C200H Group-2 I/O Units	24 V DC	32 pts	Connector	C200H-ID216	Input current: 4.1 mA
	24 V DC	64 pts		C200H-ID217	
	24 V DC	32 pts		C200H-ID218	Input current: 6 mA
	24 V DC	64 pts		C200H-ID219	
	12 V DC	64 pts		C200H-ID111	Input current: 4.1 mA
C200H Special I/O Unit	24 V DC	32 pts		C200H-ID215	Input current: 4.1 mA

## TTL Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
C200H Special I/O Unit	5 V DC	32 pts	Connector	C200H-ID501	Pulse-catch inputs



## AC Input Units (and 100 V DC)

Classification	Input voltage	Inputs	Connections	Model	
CS1 Basic I/O Units	100 to 120 V AC, or 100 to 120 V DC	16 pts	Removable terminal block	CS1W-IA111	
	200 to 240 V AC	16 pts		CS1W-IA211	
C200H Basic I/O Units	100 to 120 V AC	8 pts		C200H-IA121	
		16 pts		C200H-IA122	
	200 to 240 V AC	8 pts		C200H-IA122V	
				C200H-IA221	
		16 pts		C200H-IA222	
				C200H-IA222V	

## AC/DC Input Units

Classification	Input voltage	Inputs	Connections	Model
C200H Basic I/O Units	12 to 24 V AC/ V DC	8 pts	Removable terminal block	C200H-IM211
	24 V AC/ V DC	16 pts		C200H-IM212

## Relay Output Units

Classification	Outputs	Connections	Model
CS1 Basic I/O Units	8 pts (independent)	Removable terminal block	CS1W-OC201
	16 pts		CS1W-OC211
C200H Basic I/O Units	8 pts		C200H-OC221
	12 pts		C200H-OC222
	12 pts		C200H-OC222N
	16 pts		C200H-OC225
	16 pts		C200H-OC226N
	5 pts		C200H-OC223
	8 pts		C200H-OC224
	8 pts		C200H-OC224N

## Transistor Output Units

Classification	Outputs	Max. switching capacity	Connections	Model
CS1 Basic I/O Units	16 pts	12 to 24 V DC, 0.5 A/pt, 8 A/Unit sinking	Removable terminal block	CS1W-OD211
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, short circuit protection, alarm		CS1W-OD212
	32 pts	12 to 24 V DC, 0.5 A/pt, 5 A/Unit, sinking	Connector	CS1W-OD231
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, short circuit protection, alarm		CS1W-OD232
	64 pts	12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sinking		CS1W-OD261
		24 V DC, 0.3 A/pt, 6.4 A/Unit, sourcing, short circuit protection, alarm		CS1W-OD262
	96 pts	12 to 24 V DC, 0.1 A sinking, 7.2 A/Unit		CS1W-OD291
		12 to 24 V DC, 0.1 A sourcing, 7.2 A/Unit		CS1W-OD292
C200H Basic I/O Units	8 pts	12 to 48 V DC, 1 A sinking	Removable terminal block	C200H-OD411
	8 pts	24 V DC, 2.1 A, sinking		C200H-OD213
	8 pts	24 V DC, 0.8 A, sourcing, short circuit protection		C200H-OD214
	8 pts	5 to 24 V DC, 0.3 A, sourcing		C200H-OD216
	12 pts	24 V DC, 0.3 A, sinking		C200H-OD211
	16 pts	24 V DC, 0.3 A, sinking		C200H-OD212
	12 pts	5 to 24 V DC, 0.3 A, sourcing		C200H-OD217
	16 pts	24 V DC, 1.0 A, sourcing, short circuit protection		C200H-OD21A
	16 pts	24 V DC, 0.3 A, sinking		C200H-OD212
C200H Group-2 I/O Units	32 pts	16 mA at 4.5 V to 100 mA at 26.4 V, sinking	Connector	C200H-OD218
	32 pts	500 mA at 24 V DC, sourcing, short circuit protection		C200H-OD21B
	64 pts	16 mA at 4.5 V to 100 mA at 26.4 V, sinking		C200H-OD219
C200H Special I/O Unit	32 pts	16 mA at 4.5 V to 100 mA at 26.4 V, sinking 128-pt dynamic outputs possible		C200H-OD215

## TTL Output Unit

Classification	Outputs	Max. switching capacity	Connections	Model
C200H Special I/O Unit	32 pts	5 V DC, 35 mA 128-pt dynamic outputs possible	Connector	C200H-OD501

## Triac Output Units

Classification	Outputs	Max. switching capacity	Connections	Model
CS1 Basic I/O Units	8 pts	250 V AC, 1.2 A, 50/60 Hz	Removable terminal block	CS1W-OA201
	16 pts	250 V AC, 0.5 A, 50/60 Hz		CS1W-OA211
C200H Basic I/O Units	8 pts	250 V AC, 1.2 A, 50/60 Hz		C200H-OA223
	12 pts	250 V AC, 0.3 A, 50/60 Hz		C200H-OA222V
	12 pts	250 V AC, 0.5 A, 50/60 Hz		C200H-OA224

## Mixed I/O Units

Name	Classification	Inputs/Outputs	Input voltage	Max. switching capacity	Connections	Model	Remarks
DC Input/ Transistor Output Units	CS1 Basic I/O Units	32 inputs/ 32 outputs	24 V DC	12 to 24 V DC, 0.3 A, sinking	Connector	CS1W-MD261	---
		32 inputs/ 32 outputs		24 V DC, 0.3 A, sourcing, load short protection, alarm		CS1W-MD262	---
		48 inputs/ 48 outputs	24 V DC	12 to 24 V DC, 0.1 A, sinking		CS1W-MD291	---
		48 inputs/ 48 outputs		12 to 24 V DC, 0.1 A, sourcing		CS1W-MD292	---
	C200H Special I/O Units	16 inputs/ 16 outputs	24 V DC	16 mA at 4.5 V to 100 mA at 26.4 V DC, sinking		C200H-MD215	Pulse-catch inputs, 128-pt dynamic outputs possible
		16 inputs/ 16 outputs	12 V DC	24 V DC, 50 mA, sinking		C200H-MD115	

**Note:** In addition to the normal I/O functions, C200H High-density I/O Units (Special I/O Units) provide the following functions.

- Dynamic I/O (except for OD501/OD215): In stead of normal static inputs and normal static outputs, dynamic outputs and dynamic inputs are used to increase I/O capacity to 128 inputs and 128 outputs through the use of strobe signal outputs. These functions can be used to reduce wiring to devices with more digits, such as displays and keyboards.
- Pulse-catch Inputs (except OD501/OD215): Eight of the inputs can be set as pulse-catch inputs to reliably capture short pulses from devices like photomicroswitches.

## TTL I/O Unit

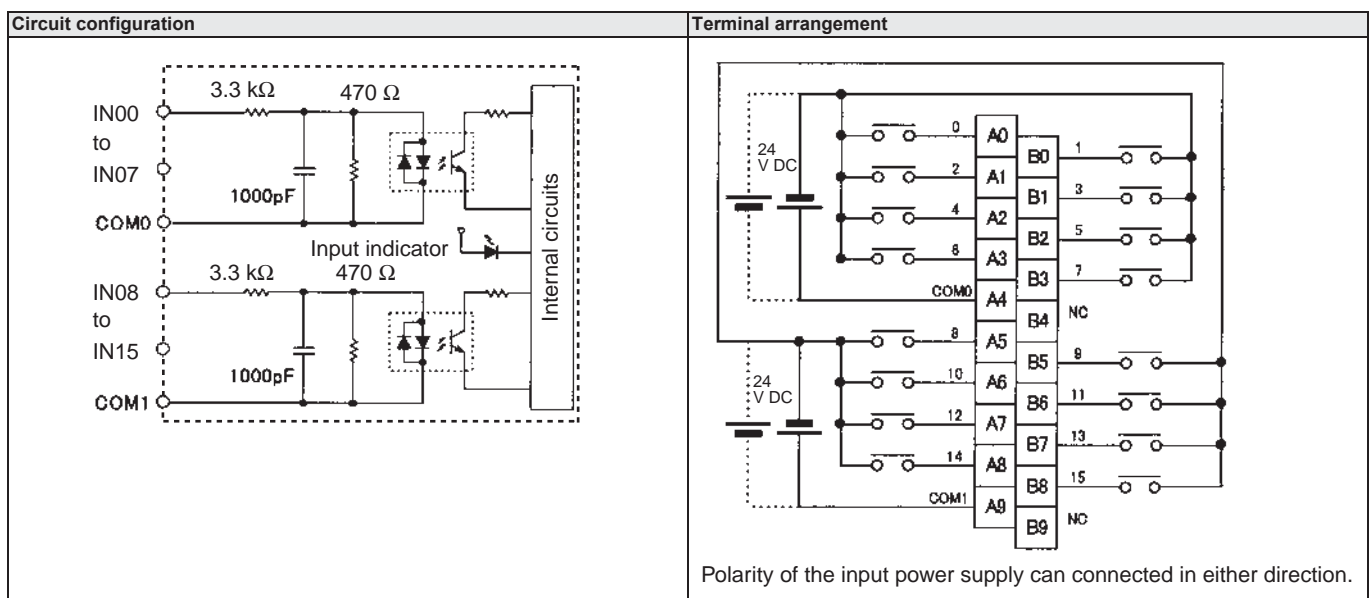
Name	Classification	Inputs/ Outputs	Input voltage	Max. switching capacity	Connections	Model	Remarks
TTL I/O Unit	CS1 Basic I/O Units	32 inputs + 32 outputs	5 V DC	5 V DC, 35 mA	Connector	CS1W-MD561	---
	C200H Special I/O Units	16 inputs/ 16 outputs				C200H-MD501	Pulse-catch, 128-pt dynamic outputs possible

## High-speed Input

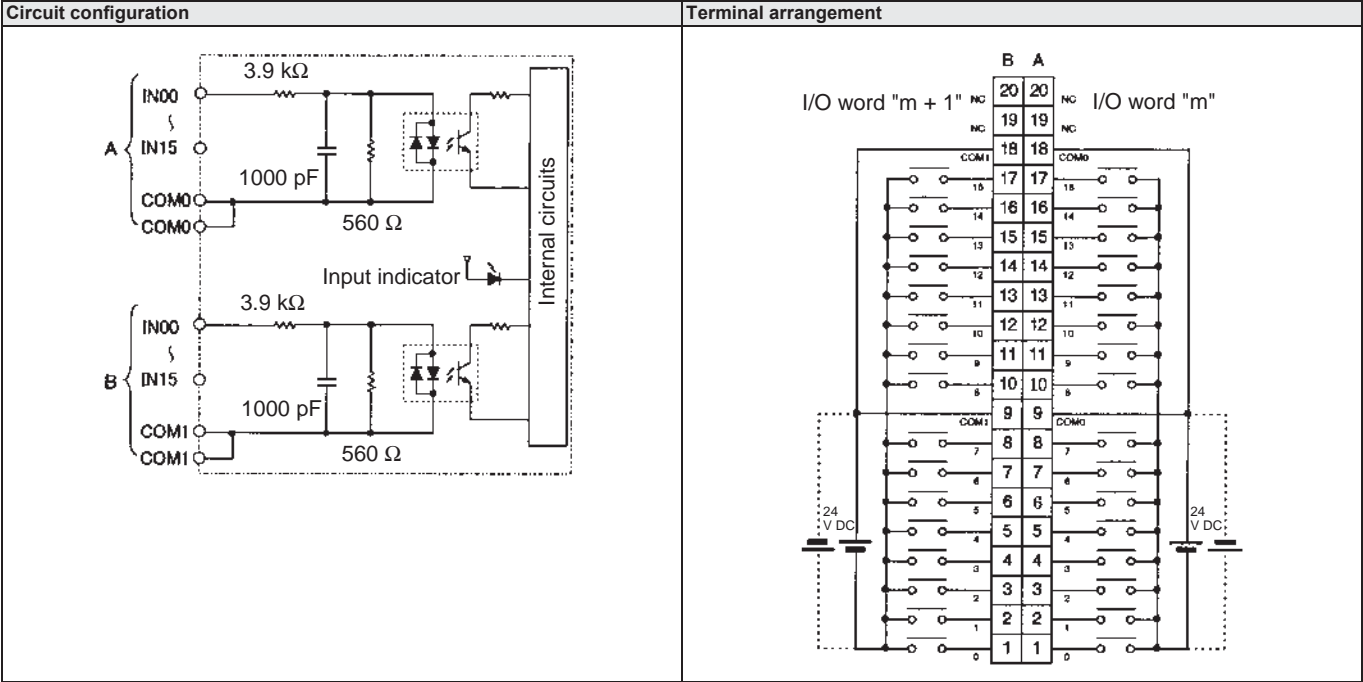
Name	Classification	Inputs	Max. switching capacity	Model
Pulse-catch Input Unit	CS1 Basic I/O Units	16 pts	24 V DC, 7 mA	CS1W-IDP01

## Circuit Configuration and Terminal Arrangement

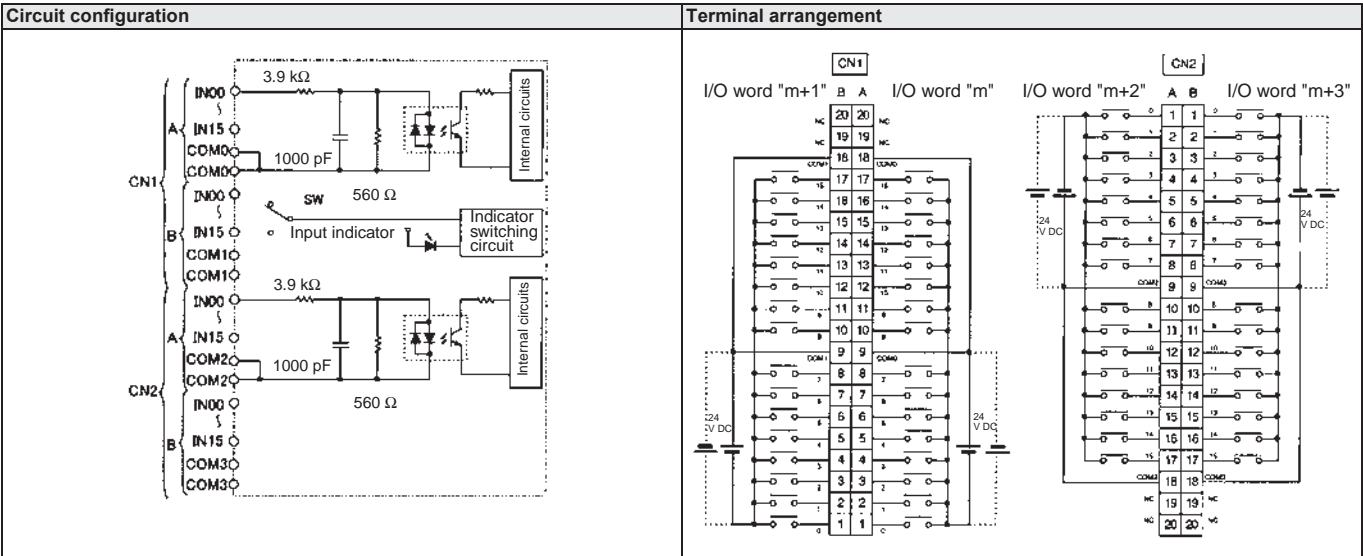
### CS1W-ID211



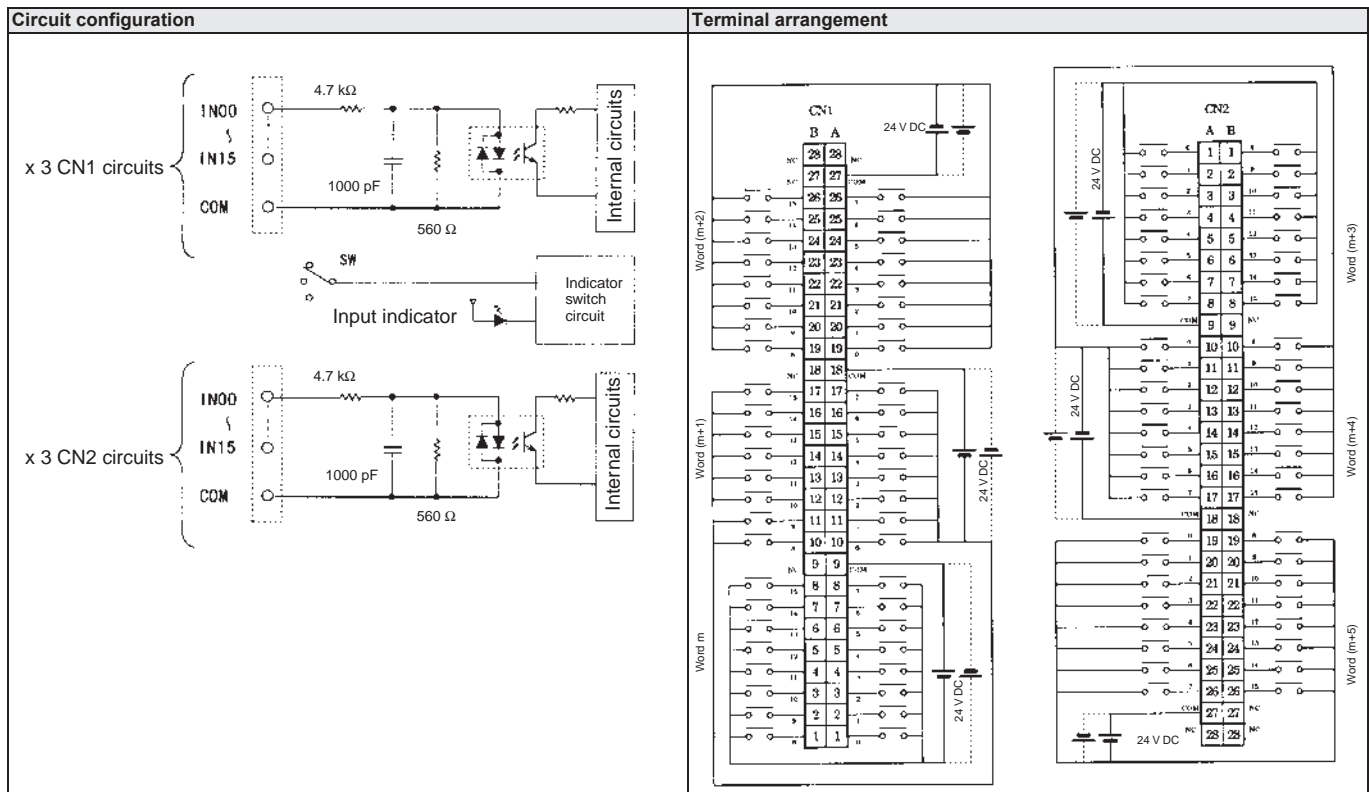
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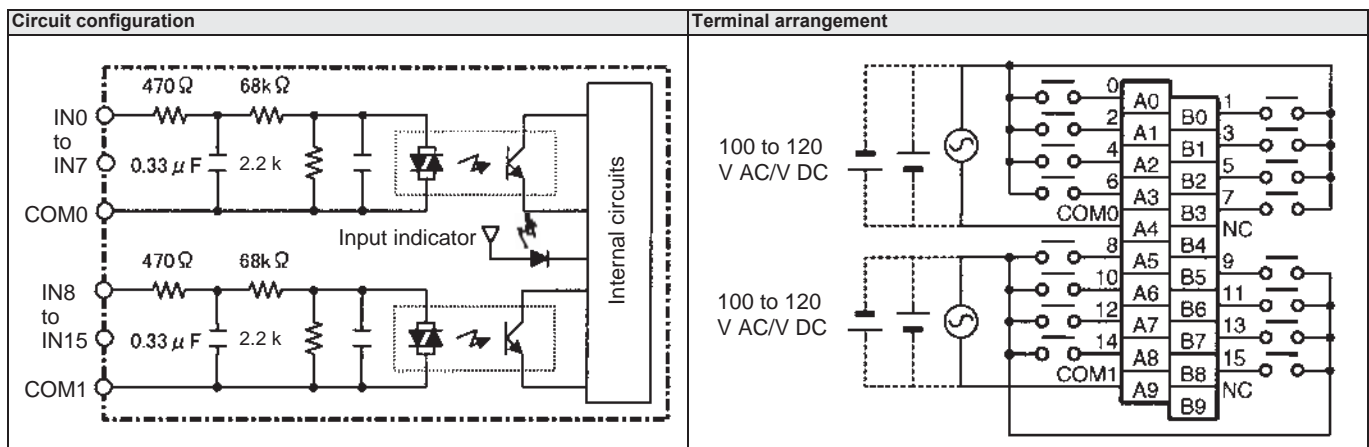
CS1W-ID261



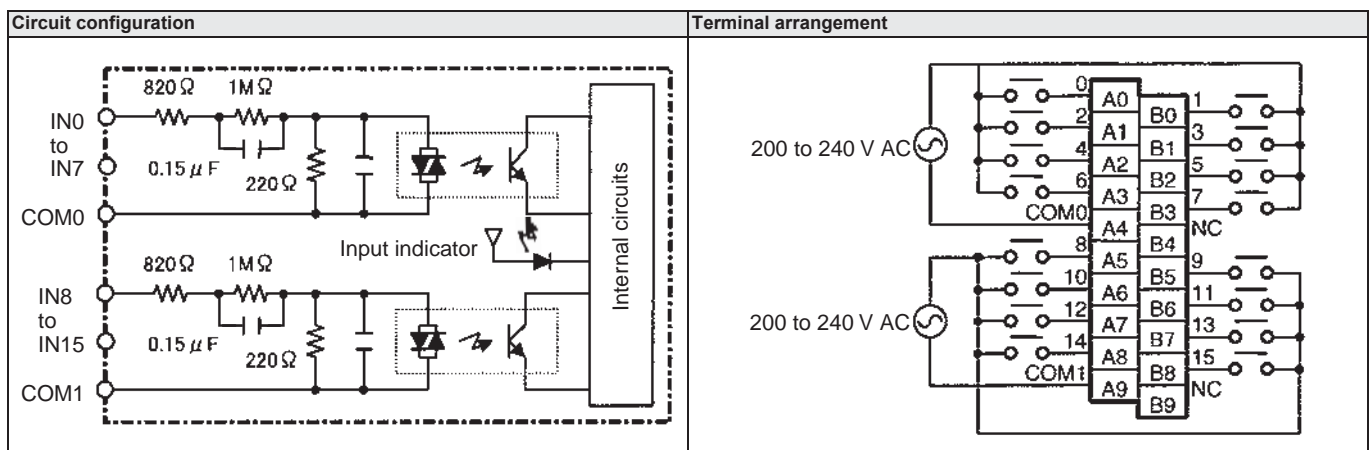
CS1W-ID291



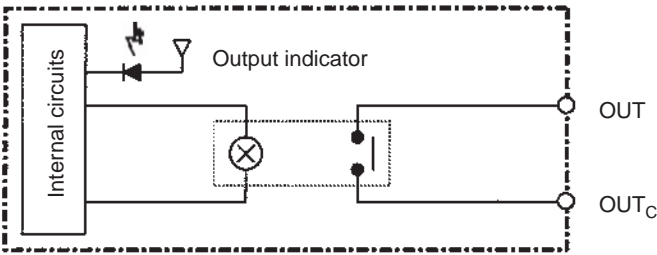
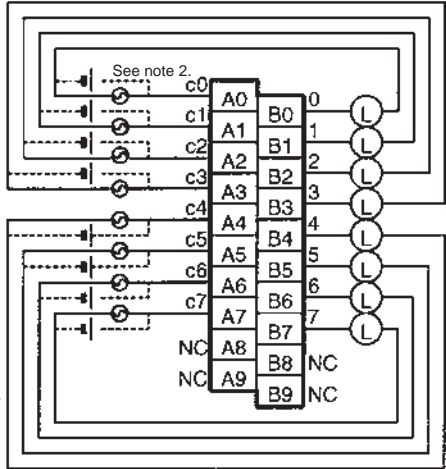
CS1W-IA111



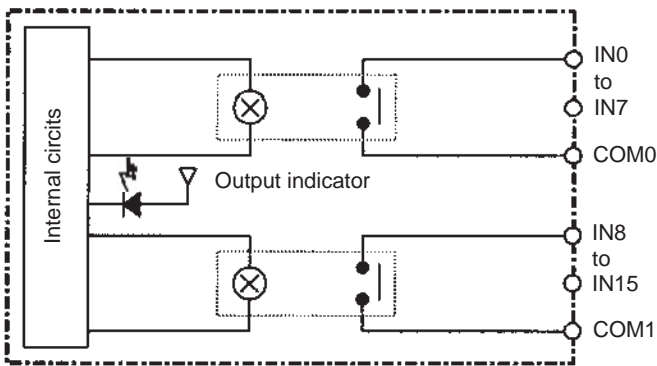
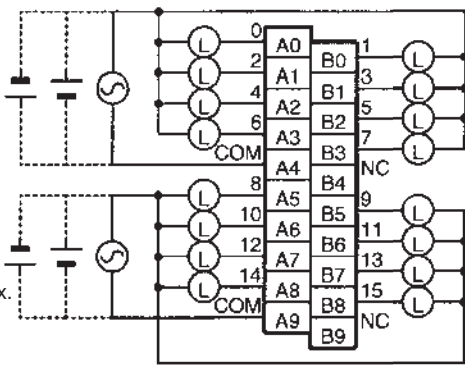
CS1W-IA211



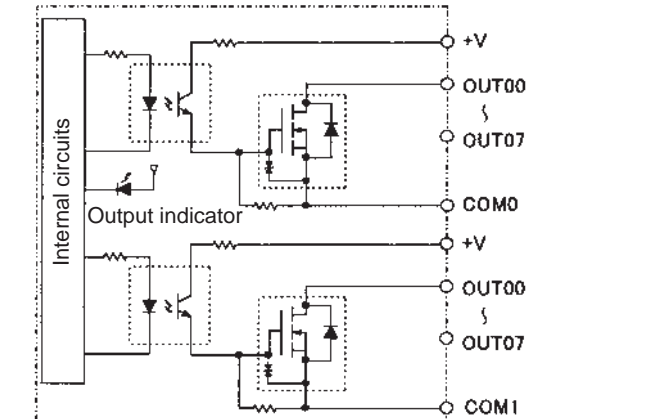
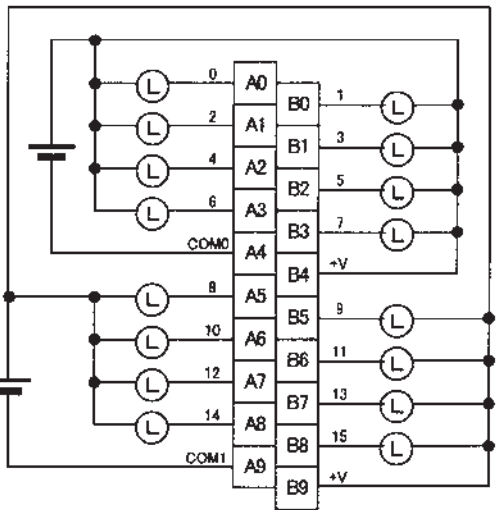
CS1W-OC201

Circuit configuration	Terminal arrangement
 <p>Internal circuits</p> <p>Output indicator</p> <p>OUT</p> <p>OUT<sub>C</sub></p>	 <p>See note 2.</p> <p>2 A 250 V AC, 2 A 24 V DC, 0.1 A 120 V DC max.</p> <p><b>Note:</b> There are no restrictions in the polarity when connecting a DC power supply.</p>

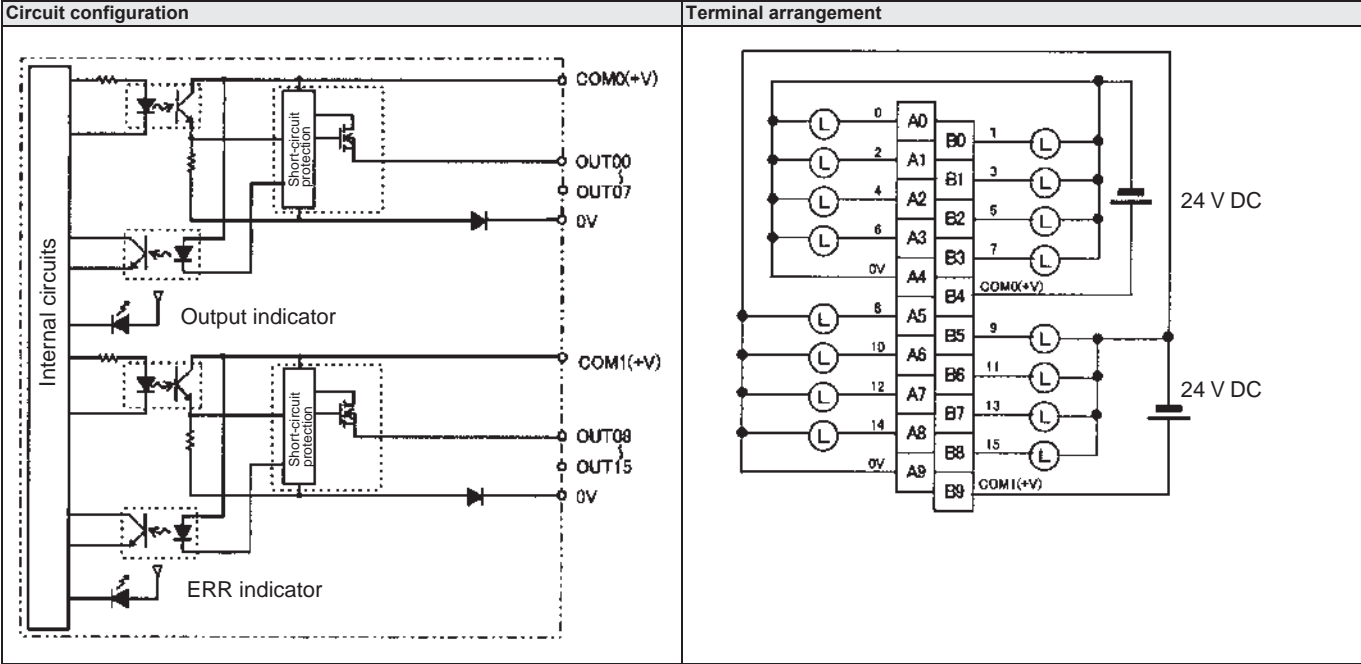
CS1W-OC211

Circuit configuration	Terminal arrangement
 <p>Internal circuits</p> <p>Output indicator</p> <p>IN0 to IN7</p> <p>COM0</p> <p>IN8 to IN15</p> <p>COM1</p>	 <p>2 A 250 V AC, 2 A 24 V DC, 0.1 A 120 V DC max.</p>

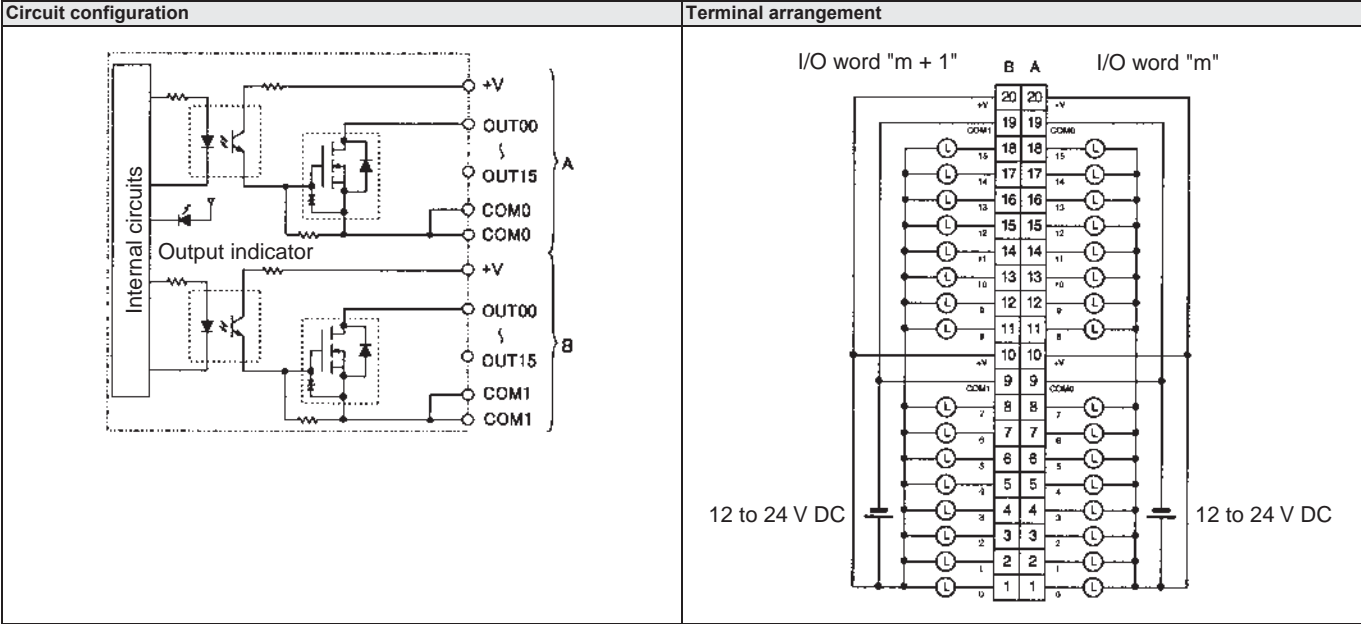
CS1W-OD211

Circuit configuration	Terminal arrangement
 <p>Internal circuits</p> <p>Output indicator</p> <p>+V</p> <p>OUT00</p> <p>OUT07</p> <p>COM0</p> <p>+V</p> <p>OUT00</p> <p>OUT07</p> <p>COM1</p>	 <p>12 to 24 V DC</p> <p>12 to 24 V DC</p>

CS1W-OD212

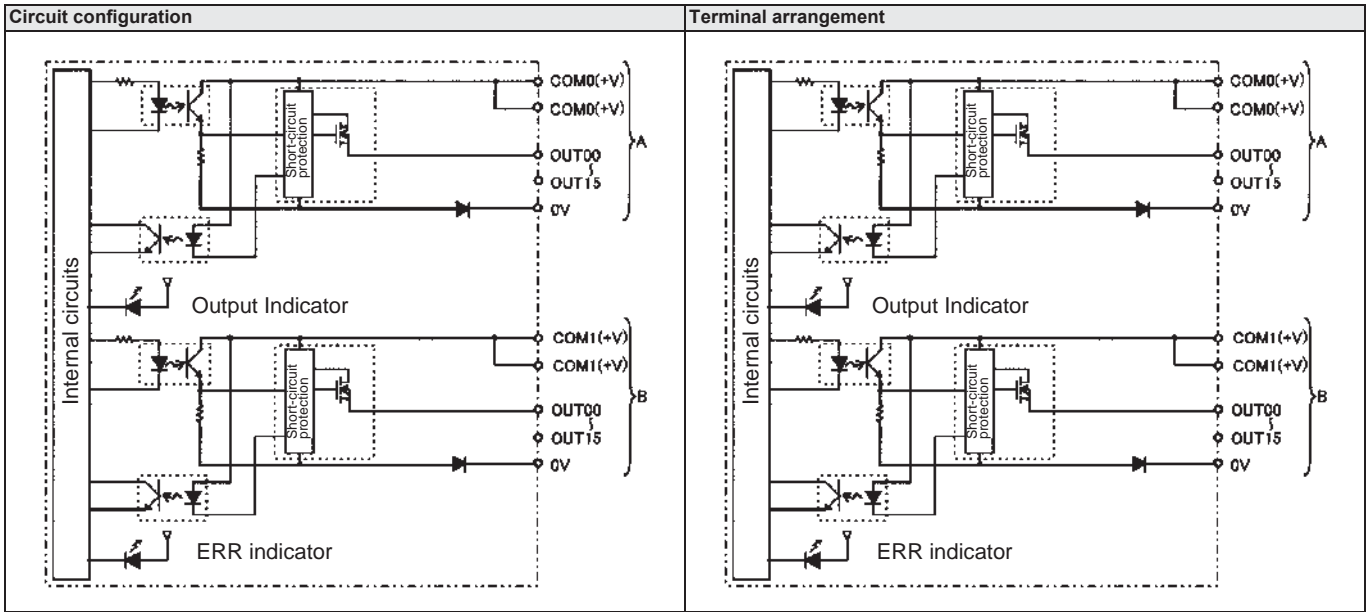


CS1W-OD231

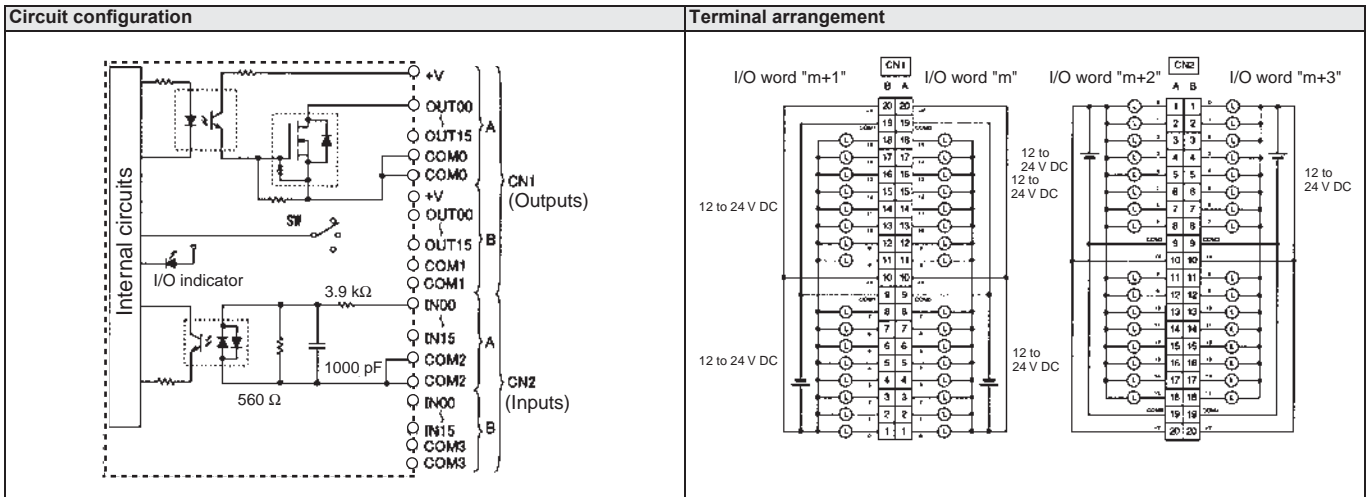




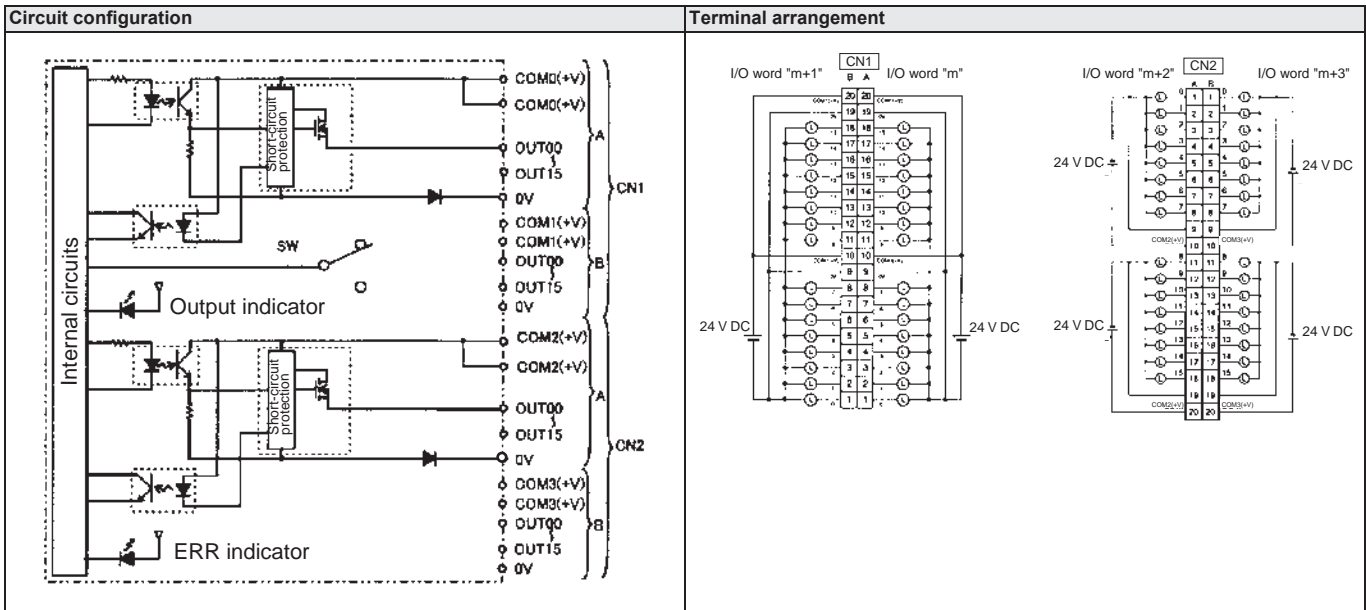
CS1W-OD232



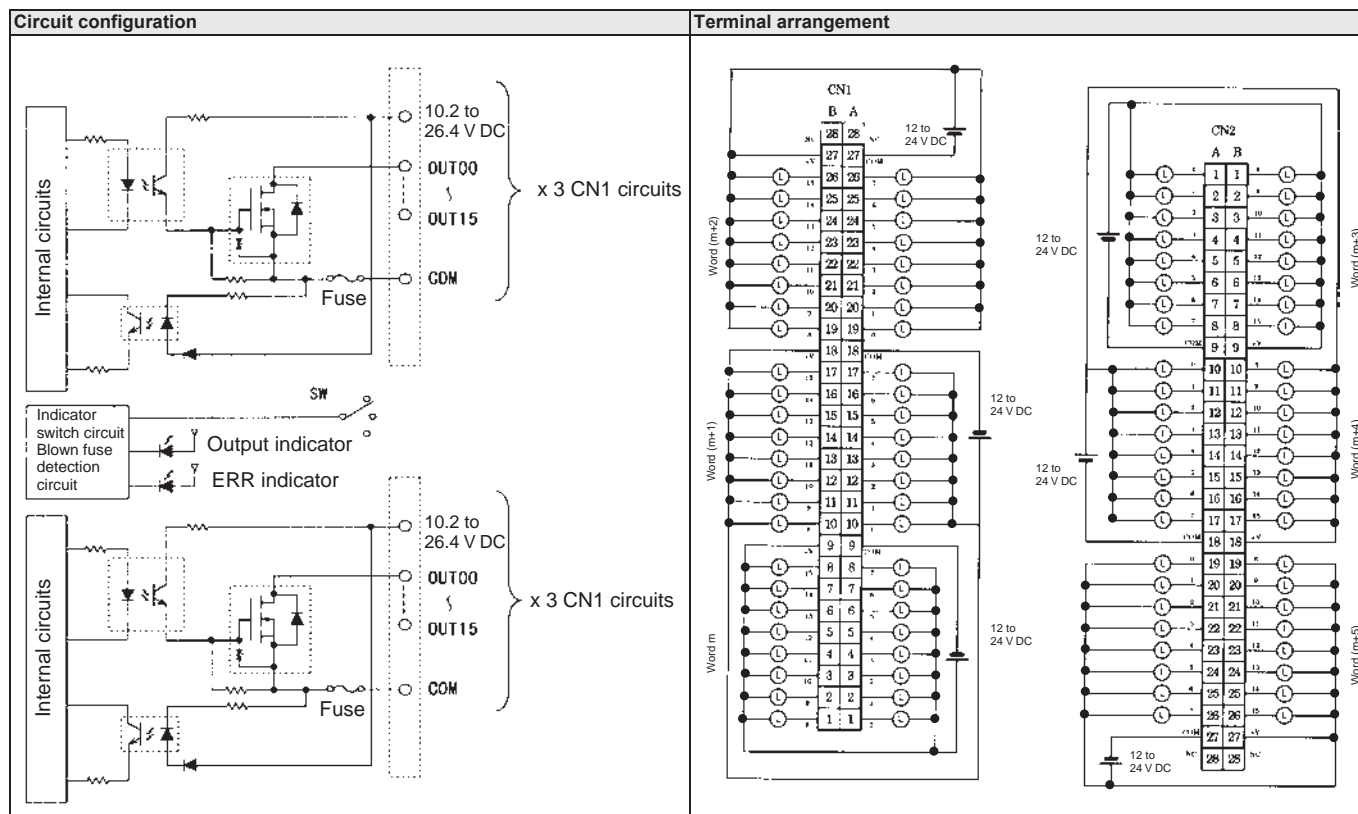
CS1W-OD261



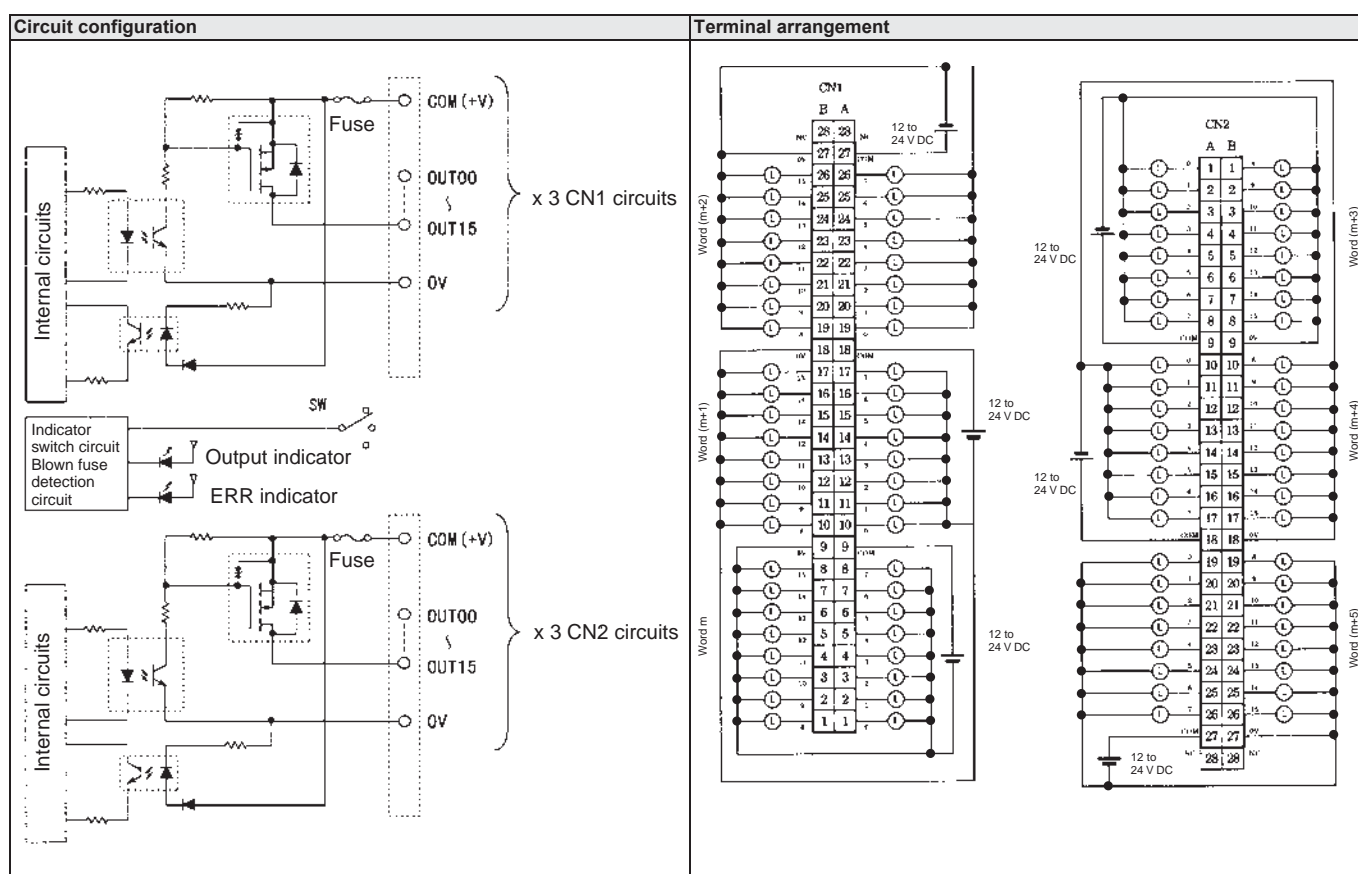
CS1W-OD262



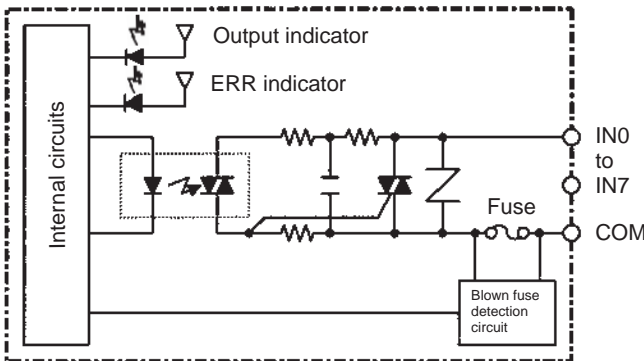
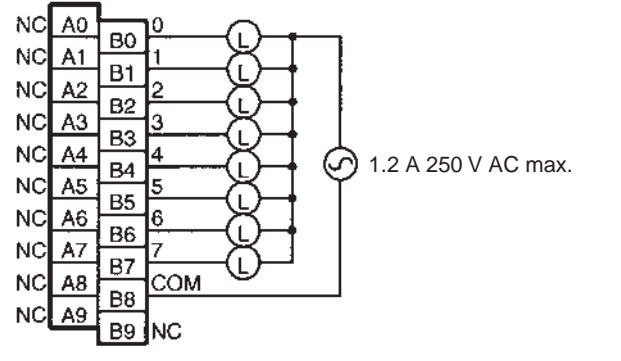
# CS1W-OD291



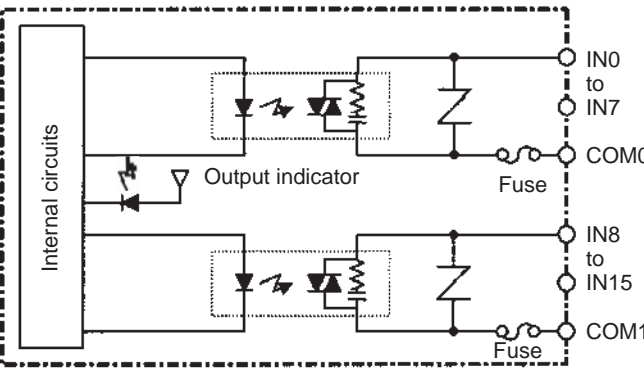
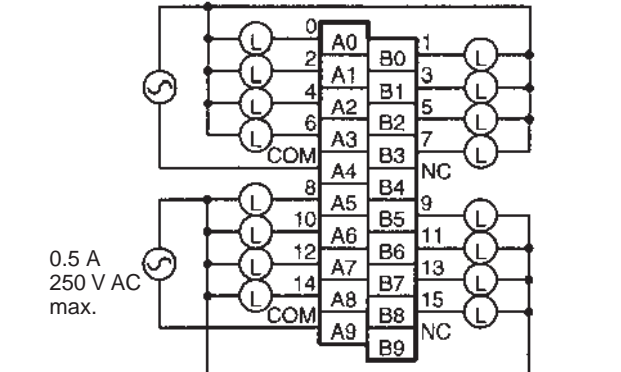
# CS1W-OD292



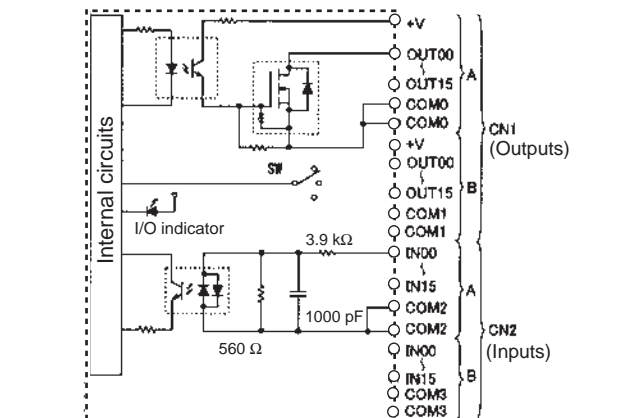
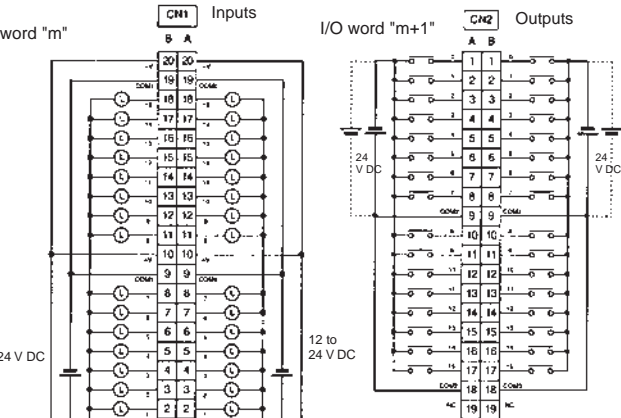
CS1W-OA201

Circuit configuration	Terminal arrangement
	

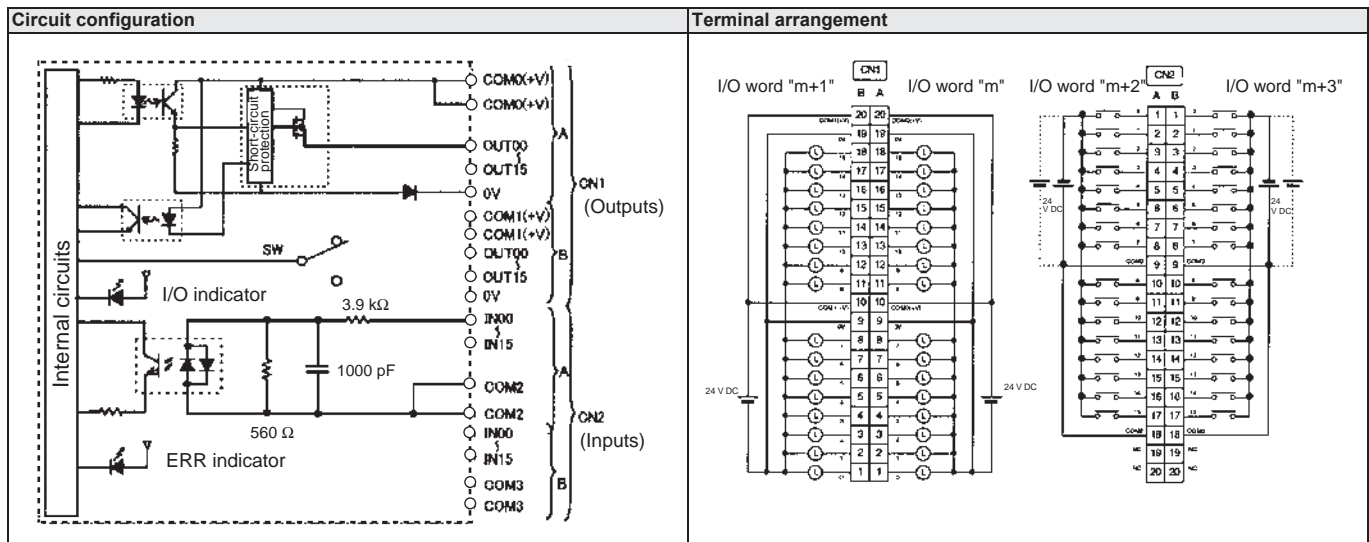
CS1W-OA211

Circuit configuration	Terminal arrangement
	

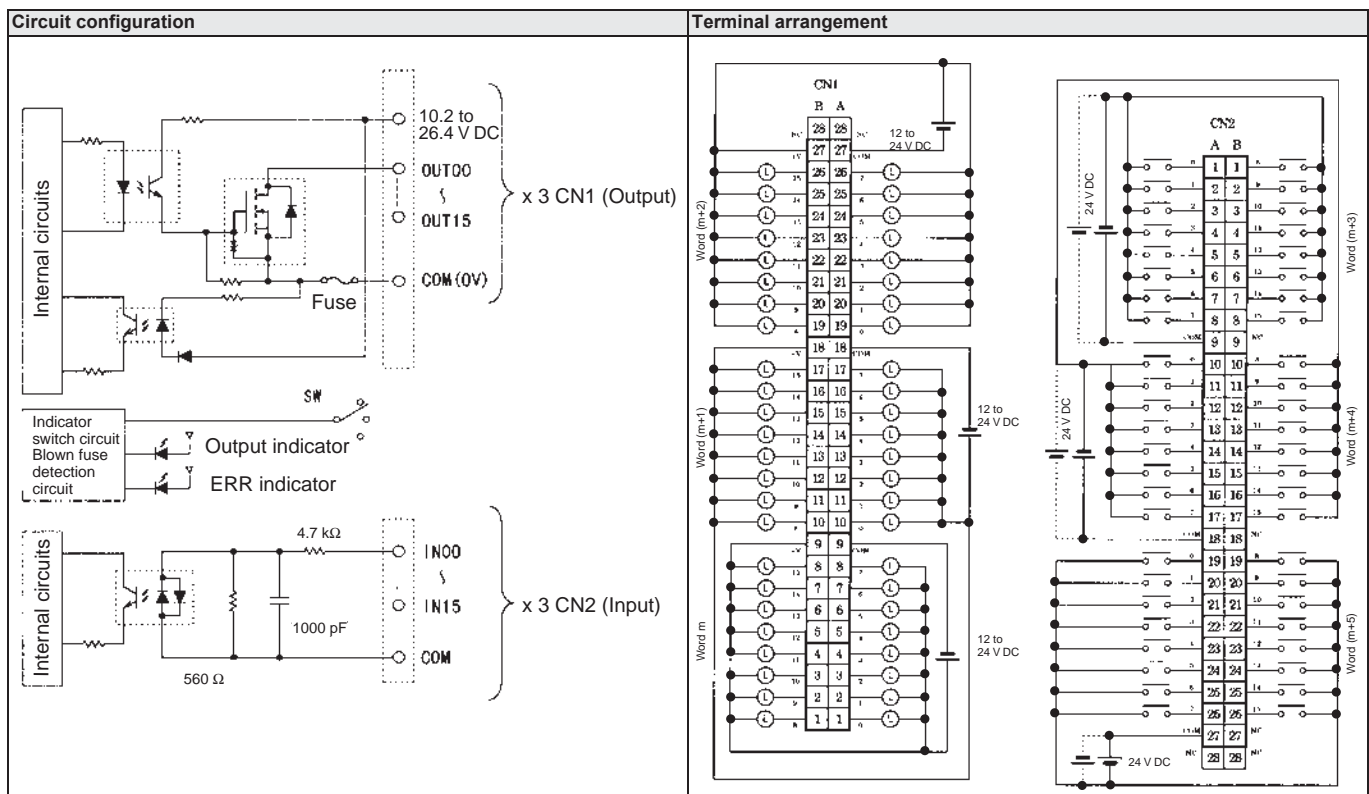
CS1W-MD261

Circuit configuration	Terminal arrangement
	

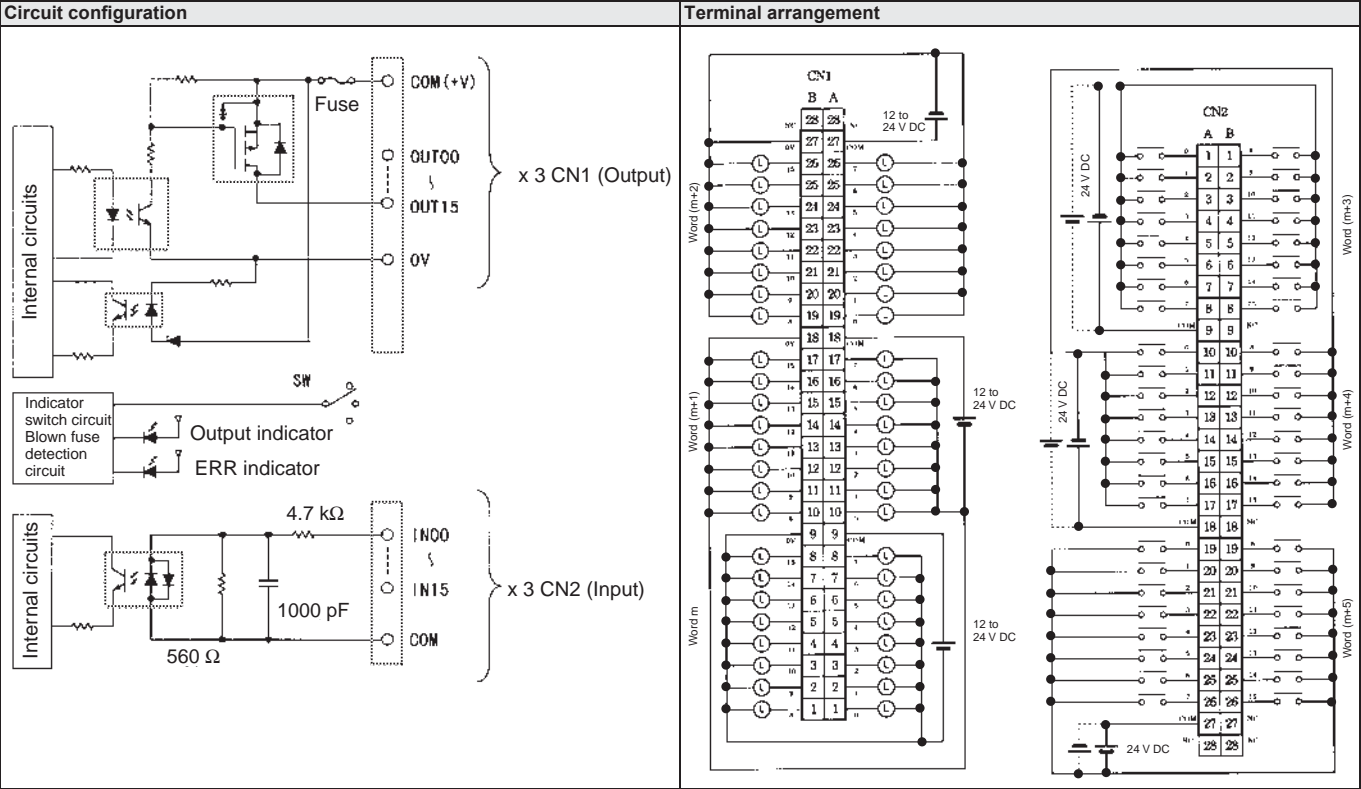
CS1W-MD262



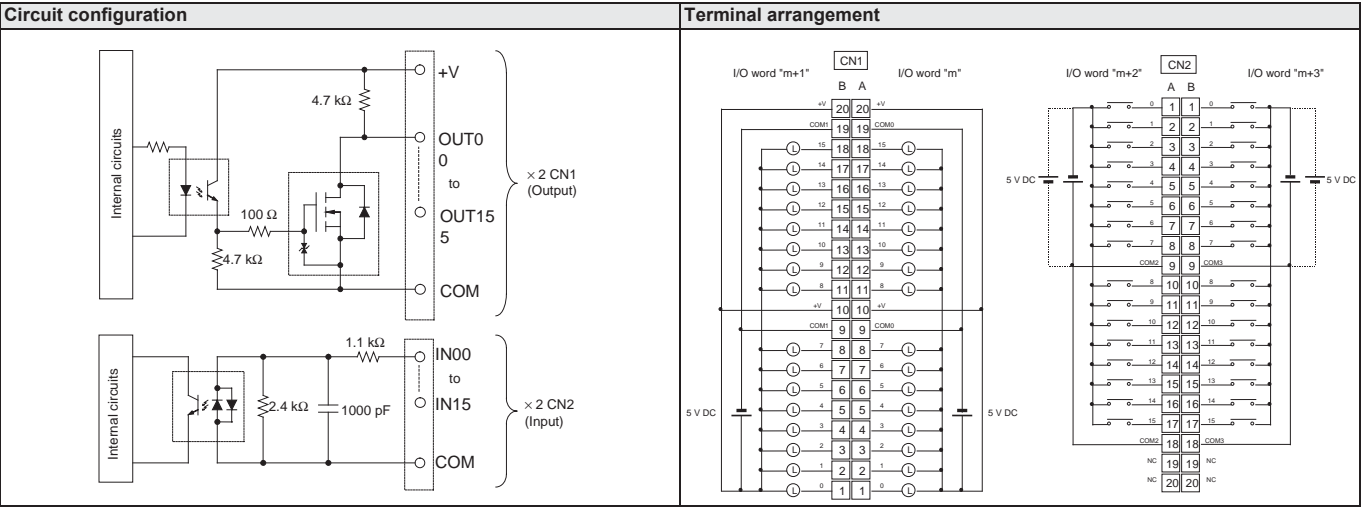
CS1W-MD291



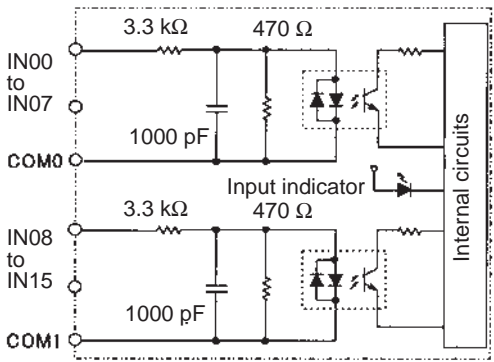
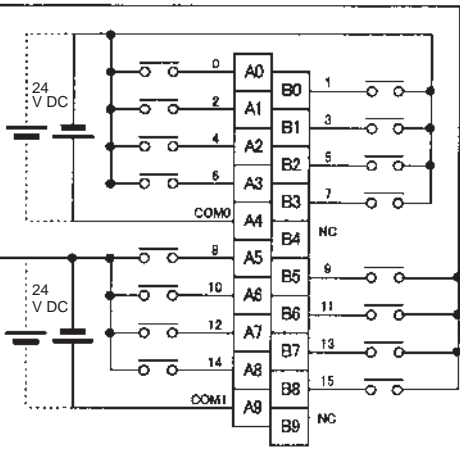
CS1W-MD292



CS1W-MD561



CS1W-IDP01

Circuit configuration	Terminal arrangement
	 <p>*1 Polarity of the input power supply can be connected in either direction. *2 Terminal numbers A0 to A9 and B0 to B9 are used in this manual, but they are not printed the Unit.</p>

CS1W-INT01, C200HS-INT01

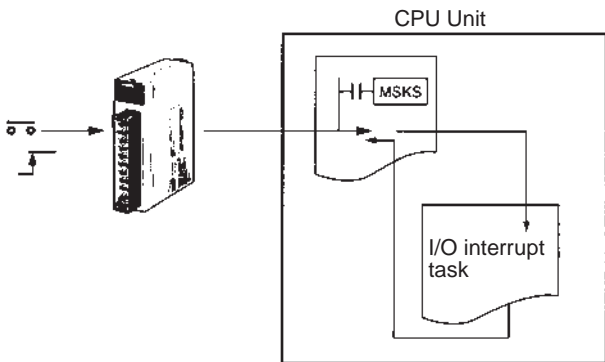
# Interrupt Input Units

## Triggers interrupt task execution in the CPU

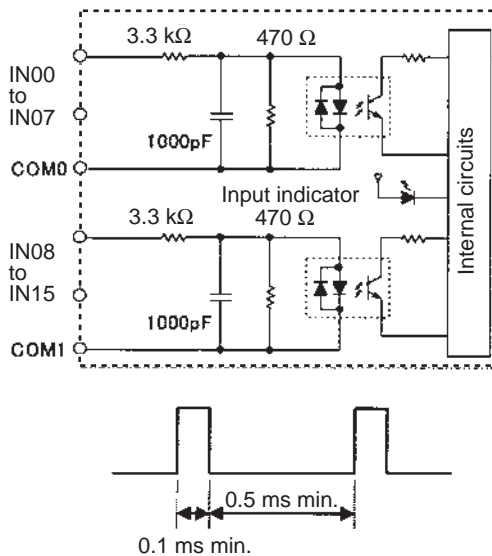
- When the CPU Unit receives an Input from the Interrupt Input, the CPU Unit immediately suspends execution of the Cyclic Task (Regular Program) and executes the I/O Interrupt Task (CS1G/CS1H Only). The Interrupt Input Unit operates as a regular Input Unit in the CS1D PLCs.
- Mount the Interrupt Input Unit in the CPU Rack.
- Up to 2 CS1W-INT01 or 4 C200HS-INT01 Interrupt Input Units can be mounted.



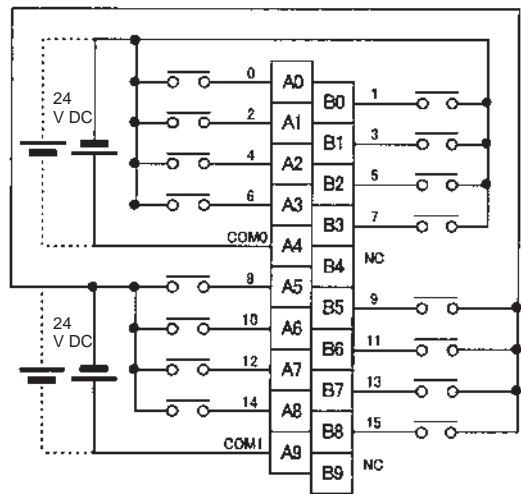
## System Configuration



## Circuit Configuration (CS1W-INT01)



## Terminal Arrangement (CS1W-INT01)



Polarity of the input power supply can be connected in either direction.



## Specifications

Classifications	Input voltage	Inputs	Input pulse width	Connections	Allocations	Model
CS1W Basic I/O Unit	24 V DC	16 pts	ON: 0.1 ms min. OFF: 0.5 ms min.	Removable terminal block	16 bits (CIO 0319 to CIO 2000)	CS1W-INT01
C200H Basic I/O Unit	12 to 24 V DC	8 pts	ON: 0.2 ms max. OFF: 0.5 ms max.		8 bits	C200HS-INT01

**Note:** The interrupt function can be used with the CPU backplane (except CS1D) only.

C200H-TM001

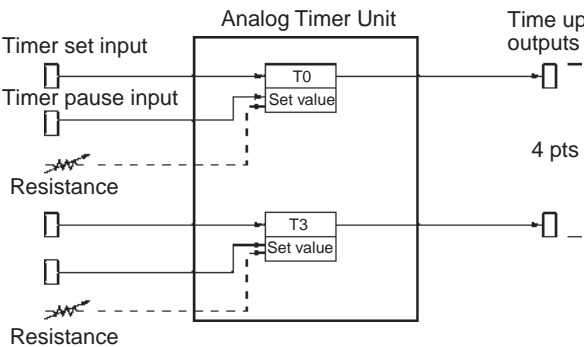
# Analog Timer Unit

## Easy On-site timer Adjustments

- Provides four timers easily adjusted on-site via front-panel adjustments or external variable resistors: No Programming Device required. Using timer pause inputs enables Usage as accumulative timer.



## System Configuration



## Specifications

Classification	Timers	Setting range	Time setting method	CPU Unit bits	Allocations (CIO 0319 to CIO 2000)	Model
C200H Basic I/O Unit	4 pts	0.1 to 1.0 s, 1 to 10 s, 2 to 60 s, 1 to 10 min	Internal or external variable resistor	Timer set input, timer pause input, and time up output	16 bits	C200H-TM001

CS1W-SF200

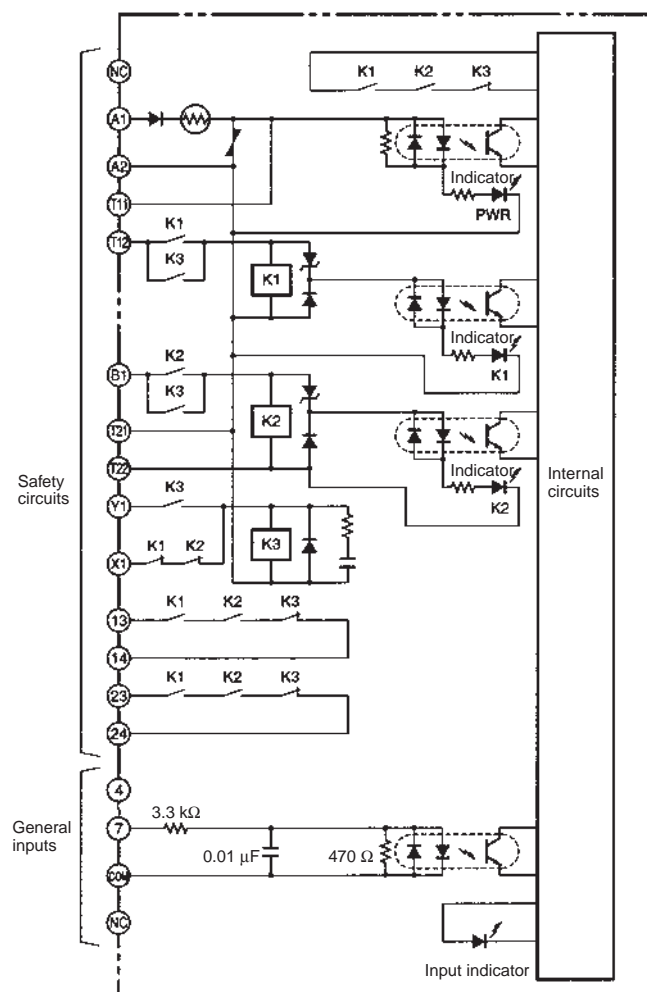
# Safety Relay Unit

## Reduced Wiring and Space for Safety Circuits

- This Safety Relay Unit mounts as an I/O Unit and provides both safety relays and inputs for monitoring.
- Safety relays and monitor inputs in 1 Unit to reduce wiring and space.
- Safety relays operate with separate power supply from PLC.
- Monitor safety circuit output, K1/K2 relay, or power status from PLC.
- Four general-purpose inputs provided.
- Safety standards: EN954-1 and EN60204-1



## Internal Connections



## Specifications

### General

Item	Specifications
Contact resistance	100 mΩ (5 V DC, 1 A, voltage drop method)
Operating time	300 ms max. (not including bounce)
Response time	10 ms max. (time from input OFF to main contact OFF, not including bounce)
Insulation resistance (See note.)	20 MΩ min. (at 500 V DC) for following: Safety circuits-safety outputs, General inputs-safety outputs, Different poles of safety outputs, and safety circuits-general inputs
Withstand voltage (See note.)	2,500 V AC, 50/60 Hz for 1 min for following: Safety circuits-safety outputs, General inputs-safety outputs, Different poles of safety outputs 500 V AC, 50/60 Hz for 1 min for Safety circuits-general inputs
Durability	Mechanical: 5,000,000 min. (7,200 time/hr) Electrical: 100,000 min. (1,800 time/hr)
Weight	300 g

**Note:** Measured while mounted to PLC.

### Ratings of Safety Circuits

Item	Specification
Power	Supply voltage
	24 V DC
	Fluctuation $-15\%$ / $+10\%$ of supply voltage
Inputs	Consumption
	24 V DC: 1.7 W max.
Switching	Current
	75 mA max.
Rated load	Rated load
	250 V AC, 5 A
Rated ON current	5 A

### Ratings of General Inputs

Item	Specifications
Power voltage	24 V DC
Fluctuation	$-15\%$ / $+10\%$ of supply voltage
Input impedance	3.3 kΩ
Input current	7 mA typ. (24 V DC)
ON voltage/current	14.4 V DC min./3 mA min.
OFF voltage/current	5 V DC max./1 mA max.
ON/OFF response	8 ms max. (Set to 1 to 32 in PC Setup)
Circuits	4 points, 1 common
ON points	100% simultaneously ON

# Analog I/O Selection Guide

Classification	Model	I/O capacity	Isolation between I/O points*	I/O ranges/types	Conversion time	Remarks	Page
Analog Input Units	CS1W-AD041-V1	4 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V, 4 to 20 mA	0.25 ms/pt	---	318
	CS1W-AD081-V1	8 inputs				2 x 34-pin MIL connectors	318
	CS1W-AD161	16 inputs					
	CS1W-PTW01	4 inputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	Built-in power supply for 2-wire transmission device, measured value alarms (HH, H, L, LL), other features	326
	CS1W-PDC11	4 inputs	No	4 to 20mA, 0 to 20mA, 0 to 10V, +/-10V, 0 to 5V, +/-5V, 1 to 5V, 0 to 1.25V, +/-1.25V	20 ms/4 pts, 10 ms/2 pts	Process value alarms (HH,H,L,LL) Rate-of-change calculation and alarm Input disconnection detection Top, bottom, valley hold Accumulated value output Variable range zero-span adjustment	326
	CS1W-PDC55	8 inputs		4 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V	250 ms/8 pts	Measured value alarms (H, L) and other features	326
	CS1W-PTR01	No		-1 mA to 1 mA, 0 to 1 mA	200 ms/8 pts	Motor overdrive prevention, measured value alarms (H, L), other features	326
	CS1W-PTR02			-100 mV to 100 mV, 0 to 100 mV	1 ms/pt max.	Measured value alarms (H, L), other features	326
	C200H-AD003			1 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA		---	318
Analog Output Units	CS1W-DA041	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V, 4 to 20 mA	1 ms/pt	---	320
	CS1W-DA08V	8 outputs		1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V			
	CS1W-DA08C	8 outputs		4 to 20 mA			
	C200H-DA003	8 outputs	No	1 to 5 V, 0 to 10 V, -10 to 10 V	1 ms/pt max.	---	320
	C200H-DA004	4 to 20 mA					
Analog I/O Unit	CS1W-MAD44	4 inputs and 4 outputs	No	Inputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V	1 ms/pt	---	322
	C200H-MAD01	2 inputs and 2 outputs		Inputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, $\pm 10$ V	1 ms/pt max.		
Temperature Sensor Input Units	CS1W-PTS11	4 inputs	Yes	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, $\pm 100$ mV	20 ms/4 pts 10 ms/2 pts	Measured value alarms (HH, H, L, LL), input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range, other features.	
	CS1W-PTS12			Pt100 $\Omega$ (JIS, IEC), JPt100 $\Omega$ , Pt50 $\Omega$ , Ni508.4 $\Omega$			
	CJ1W-PTS51			B, J, K, R, S, T, L	250 ms/4 pts	Measured value alarms (H, L), input disconnection alarm, and other features	336
	CJ1W-PTS52	Pt100 (IEC, JIS), JPt100		250 ms/8 pts			
	CJ1W-PTS55	B, J, K, R, S, T, L		250 ms/4 pts			
	CJ1W-PTS56	Pt100 (IEC, JIS), JPt100		250 ms/8 pts			
	C200H-TS001	4 inputs	No	K, J	4.8 s max.	---	336
	C200H-TS002			K, L			
	C200H-TS101			JPt100			
C200H-TS102	5 inputs			Pt100			

**Note:** Inputs are isolated from PLC signals for all Units.

CS1W-AD□□1-V1, C200H-AD003

# Analog Input Units

## Convert Analog Signals to Binary Data

- Wire burnout detection
- Peak-hold function
- Moving average filter function
- Offset gain setting

**Note:** Analog Input Terminals are also available as remote I/O terminals for DeviceNet, PROFIBUS-DP or CompoBus/S.



## Function

Converts input signals such as 1 to 5 V or 4 to 20 mA to binary values between 0000 and 0FA0 Hex and stores the results in the allocated words each cycle. The ladder diagram can be used to transfer the data

to the DM Area or the SCALING instructions (e.g., SCL(194)) can be used to scale the data to the desired ranges.

## Terminal Arrangement

### CS1W-AD041-V1

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (-)	B2	A2	Input 1 (-)
AG	B3	A3	AG
Input 4 (+)	B4	A4	Input 3 (+)
Input 4 (-)	B5	A5	Input 3 (-)
N.C.	B6	A6	N.C.
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
N.C.	B9	A9	N.C.
N.C.	B10	A10	N.C.
		A11	N.C.

### CS1W-AD081-V1

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (-)	B2	A2	Input 1 (-)
AG	B3	A3	AG
Input 4 (+)	B4	A4	Input 3 (+)
Input 4 (-)	B5	A5	Input 3 (-)
Input 6 (+)	B6	A6	Input 5 (+)
Input 6 (-)	B7	A7	Input 5 (-)
AG	B8	A8	AG
Input 8 (+)	B9	A9	Input 7 (+)
Input 8 (-)	B10	A10	Input 7 (-)
		A11	N.C.

## CS1W-AD161

CN2 Inputs 9 to 16

Input 9+	1	2	Input 10+
Current mode 9	3	4	Current mode 10
Input 9-	5	6	Input 10-
AG	7	8	AG
Input 11+	9	10	Input 12+
Current mode 11	11	12	Current mode 12
Input 11-	13	14	Input 12-
AG	15	16	AG
Input 13+	17	18	Input 14+
Current mode 13	19	20	Current mode 14
Input 13-	21	22	Input 14-
AG	23	24	AG
Input 15+	25	26	Input 16+
Current mode 15	27	28	Current mode 16
Input 15-	29	30	Input 16-
AG	31	32	AG
NC	33	34	NC

CN1 Inputs 1 to 8

Input 1+	1	2	Input 2+
Current mode 1	3	4	Current mode 2
Input 1-	5	6	Input 2-
AG	7	8	AG
Input 3+	9	10	Input 4+
Current mode 3	11	12	Current mode 4
Input 3-	13	14	Input 4-
AG	15	16	AG
Input 15+	17	18	Input 6+
Current mode 5	19	20	Current mode 6
Input 5-	21	22	Input 6-
AG	23	24	AG
Input 7+	25	26	Input 8+
Current mode 7	27	28	Current mode 8
Input 7-	29	30	Input 8-
AG	31	32	AG
NC	33	34	NC

## Specifications

Model			CS1W-AD041-V1	CS1W-AD081-V1	C200HW-AD003	CS1W-AD161
Classification			CS1 Special I/O Units		C200 Special I/O Units	CS1 Special I/O Units
Unit number			0 to 95	0 to 95	0 to F	0 to 94
Inputs			4 pts	8 pts	8 pts	16 pts
Signal range	Voltages	1 to 5 V	Yes			
		0 to 10 V	Yes			
		0 to 5 V	Yes	Yes	---	Yes
		−10 to 10 V	Yes			
	Currents	4 to 20 mA	Yes			
		0 to 20 mA	---			
Signal range settings			4 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	16 settings (one for each point)
Resolution			1/8000	1/8000	1/4000	1/8000
Conversion speed			0.25 ms/pt max.	0.25 ms/pt max.	1 ms/pt. max	0.25 ms/pt
Overall accuracy (at 25 °C)			Voltage: ±0.2% Current: ±0.4%			Voltage: ±0.2% Current: ±0.2%
Connections			Terminal block			2 x 34 point MIL connectors
Features	Wire burnout detection		Yes			
	Peak-hold function		Yes			
	Mean function		Yes			

**Note:** Process I/O Units with individually isolated channels are also available for analog I/O. Refer to page 326.

CS1W-DA0□□, C200H-DA0□

# Analog Output Units

## Convert Binary Data to Analog Signals

- Output limit
- Upper/Lower limit alarms
- Offset gain adjustment

**Note:** The functions provided depend in the model used.  
Analog Output Terminals are also available as remote I/O terminals for DeviceNet, PROFIBUS-DP or CompoBus/S.



## Function

Binary data in the allocated words is converted to analog signals such as 1 to 5 V or 4 to 20 mA for output. All that is required in the ladder diagram is to place the data in the allocated words.

## Terminal Arrangement

### CS1W-DA08V/08C

N.C.	B1	A1	N.C.
Output 2 (+)	B2	A2	Output 1 (+)
Output 2 (-)	B3	A3	Output 1 (-)
Output 4 (+)	B4	A4	Output 3 (+)
Output 4 (-)	B5	A5	Output 3 (-)
Output 6 (+)	B6	A6	Output 5 (+)
Output 6 (-)	B7	A7	Output 5 (-)
Output 8 (+)	B8	A8	Output 7 (+)
Output 8 (-)	B9	A9	Output 7 (-)
N.C.	B10	A10	N.C.
		A11	N.C.

### CS1W-DA041

N.C.	B1	A1	N.C.
Output voltage 2 (+)	B2	A2	Output voltage 1 (+)
Output 2 (-)	B3	A3	Output 1 (-)
Output current 2 (+)	B4	A4	Output current 1 (+)
N.C.	B5	A5	N.C.
N.C.	B6	A6	N.C.
Output voltage 4 (-)	B7	A7	Output voltage 3 (+)
Output 4 (-)	B8	A8	Output 3 (-)
Output current 4 (+)	B9	A9	Output current 3 (+)
N.C.	B10	A10	N.C.
		A11	N.C.



## Specifications

Model			CS1W-DA041	CS1W-DA08V	CS1W-DA08C	C200H-DA003	C200H-DA004
Classification			CS1 Special I/O Units			C200H Special I/O Units	
Unit numbers			0 to 95	0 to 95	0 to 95	0 to F	0 to F
Outputs			4 pts	8 pts	8 pts	8 pts	8 pts
Signal range	Voltages	1 to 5 V	Yes	Yes	---	Yes	---
		0 to 10 V	Yes	Yes	---	Yes	---
		0 to 5 V	Yes	Yes	---	---	---
		−10 to 10 V	Yes	Yes	---	Yes	---
	Currents	4 to 20 mA	Yes	---	Yes	---	Yes
		0 to 20 mA	---	---	---	---	---
Signal range settings			4 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)
Resolution			1/4000	1/4000	1/4000	1/4000	1/4000
Conversion speed			1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.
Overall accuracy (at 25 °C)			Voltage: ±0.3%FS Current: ±0.5%FS	±0.3% FS	±0.5% FS	±0.3% FS	±0.5% FS
Connections			Terminal block	Terminal block	Terminal block	Terminal block	Terminal block
Features	Output hold function		---	Yes	Yes	Yes	Yes

**Note:** Process I/O Units with individually isolated channels are also available for analog I/O. Refer to page 326.

CS1W-MAD44, C200H-MAD01

# Analog I/O Units

## Analog Inputs and Outputs combined in One Unit

- Moving average filter function
- Peak hold function
- Wire burnout detection
- Output hold function
- Ratio conversions



## Function

One Unit performs both analog input and analog output operations. The Unit can also be used for ratio and bias processing, which can be performed on analog inputs to output the results as analog outputs.

## Terminal Arrangement (CS1W-MAD44)

Output 2 (+)	B1	A1	Output 1 (+)
Output 2 (-)	B2	A2	Output 1 (-)
Output 4 (+)	B3	A3	Output 3 (+)
Output 4 (-)	B4	A4	Output 3 (-)
N.C.	B5	A5	N.C.
Input 2 (+)	B6	A6	Input 1 (+)
Input 2 (-)	B7	A7	Input 1 (-)
AG	B8	A8	AG
Input 4 (+)	B9	A9	Input 3 (+)
Input 4 (-)	B10	A10	Input 3 (-)
		A11	N.C.

## Specifications

Model			C200H-MAD01	CS1W-MAD44
Classification			C200H Special I/O Unit	CS1 Special I/O Unit
Unit numbers			0 to F	0 to 95
Inputs			2 pts	4 pts
Outputs			2 pts	4 pts
Input signal ranges	Voltages	1 to 5 V	Yes	Yes
		0 to 5 V	---	Yes
		0 to 10 V	Yes	Yes
		−10 to 10 V	Yes	Yes
		4 to 20 mA	Yes	Yes
Output signal ranges	Currents	1 to 5 V	Yes	Yes
		0 to 5 V	---	Yes
		0 to 10 V	Yes	Yes
		−10 to 10 V	Yes	Yes
		4 to 20 mA	Yes	---
Resolution			1/4000 (inputs/outputs)	1/4000 (inputs/outputs)
Conversion speed			1.0 ms/pt max (inputs/outputs)	1.0 ms/pt max (inputs/outputs)
Overall accuracy	Inputs		Voltage: ±0.2% Current: ±0.4%	Voltage: ±0.2% Current: ±0.4%
	Outputs		Voltage: ±0.3% Current: ±0.5%	Voltage: ±0.3%
Connections			Terminal block	Terminal block
Features	Mean function		Yes	Yes
	Peak hold		Yes	Yes
	Wire burnout detection		Yes	Yes
	Output hold		Yes	Yes
	Ratio conversion		Yes	Yes

CS1W-LC001, CS1W-LCB01/05, CS1D-CPU□□P

# Loop Control Unit

**Integrate Process Control and Monitoring functions with PLC sequence control. With easy-to-use DCS-style function block configuration, complex control systems can be set up in minutes.**

- The control system can be scaled to match the controlled system, from a few loops that replace a Controller to hundreds of loops that perform large-scale process control.
- A variety of control programs can be created by selecting from more than 70 kinds of function blocks suitable for loop control, such as PID calculations, Segment Programs, and square root calculations.
- The CX-Process Tool, included in CX-One, can be used for easy programming.
- A Tuning Screen can be opened in the CX-Process Tool to change parameters while monitoring the status.
- Duplex systems are available for applications that require high reliability.
- The NS Face Plate Auto Builder software can be used to automatically create a touch panel for NS-series PTs from a function block screen.

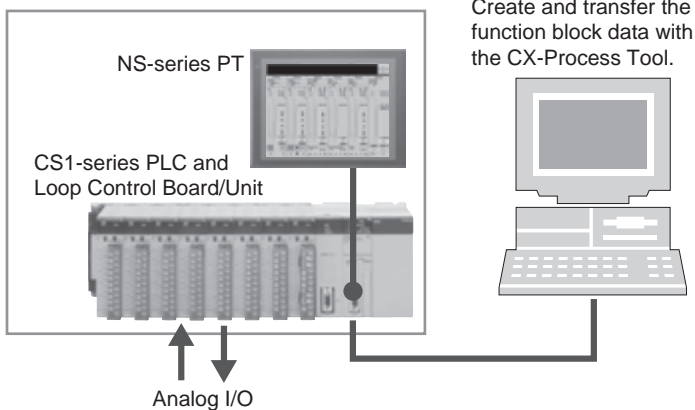


## Function

The CS1-series Loop Control Boards and Units are packed with DCS functions and can use function block programs, which are ideal for process control. Graphical programming can be used, so function blocks can be pasted into a window and connected with the mouse.

A wide variety of control methods can be executed, from regular PID control to cascade control and feed-forward control.

## System Configuration



The diagram illustrates a control system for a steam-heated reactor. It is divided into three main functional areas: **control**, **Function blocks**, and **Process**.

**control Section:** This section is divided into three columns: **Analog Input Unit**, **Analog Output Unit**, and **Loop Control Board/Unit**. The **Analog Input Unit** receives temperature signals from the reactor and heat exchanger. The **Analog Output Unit** sends control signals to the **Loop Control Board/Unit**. The **Loop Control Board/Unit** contains two PID controllers (PID1 and PID2) and a **Split conversion** block. PID1 controls the reactor temperature, and PID2 controls the heat exchanger temperature. The **Split conversion** block splits the output of PID1 into two signals, MV1 and MV2, which are sent to the reactor and heat exchanger respectively.

**Function blocks Section:** This section shows the internal structure of the PID controllers. It includes two **Basic PID** blocks and two **Segment Linearizer** blocks. The **Basic PID** blocks have inputs for PV, SP, PVE, RSP, MIE, and MVE, and outputs for Y1 and Y2. The **Segment Linearizer** blocks have inputs for X1 and Y1, and outputs for X2 and Y2. The **Isolated-type AO4 terminal** block has inputs for X1, X2, X3, and X4, and outputs for Y1, Y2, Y3, and Y4.

**Process Section:** This section shows the physical process being controlled. It includes a **Reactor**, a **Heat exchanger**, a **Pump**, a **Steam** inlet, a **Cold water** inlet, and a **Drain**. The reactor is heated by steam, and the heat exchanger transfers heat from the reactor to the cold water. The pump circulates the cold water through the heat exchanger and back to the reactor. The drain is used to remove excess water from the system.

## Specifications

Item		Specification		
Name		Loop Control Board		Loop Control Unit (See note 1.)
Unit type		CS-series Inner Board		CS-series CPU Bus Unit
Model		CS1W-LCB01 Standard Inner Board	CS1W-LCB05 Advanced Inner Board	CS1D-LCB05D Duplex Inner Board (See note 3.)
Applicable PLCs		CS1G/H-CPU□□F	CS1G/H-CPU□□H	CS1D-CPU□□P (Duplex compatible)
Mounting location		CPU Unit's Inner Board slot		
Max. number of Boards/Units		1 Board max. per CPU Unit		
Data exchange with CPU Unit	Allocation of specific words in a data area	User Link Table function: A function block's ITEM data can be allocated to specified words in a CPU Unit data area (CIO, WR, HR, DM, or EM bank 0).		
	Allocation of all data	HMI Interface function: The ITEM data of a Control Block, Operation Block, or External Controller Block can be allocated to a specified EM bank. (The default EM bank is bank 0.)		
Setting switches		None		
Indicators		Three LED indicators: Running, Ready, and Comm. port sending/receiving		
Front panel connectors		One RS-232C port (for connection of an ES100X External Controller)		
Data Backup		Super capacitor backs up all function block data (including sequence tables and step ladder program instructions).		
Backup time of backup capacitor or battery		24 hrs at 25° C (The backup time is shorter at higher temperatures.)		
Data stored in flash memory		Function block data, data in RAM (can be backed up or recovered at any time), and error log data		
Effect on the CPU Unit's cycle time		0.8 ms max.	20 ms max. (See note 2.)	0.2 ms
Current consumption (supplied by the Power Supply Unit)		220 mA at 5 V DC Note: The current consumption is 150 mA higher when an NT-AL001 Link Adapter is being used.		
Dimensions		34.5 x 130 x 100.5 mm (W x H x D)		
Weight		100 g max.		
Standard accessories		None		
		C200H-BAT09 Battery Set (factory installed in Unit)		

**Note:**

1. The Loop Control Unit described in this table is equipped with the Version 2.5 functions.
2. The CPU Unit's cycle time will be extended by 2.1 s max during duplex initialization.
3. The CS1D-LCB05D Duplex Loop Control Board is not available separately.  
It can only be purchased in combination with a Duplex CPU as models CS1D-CPU65P or CS1D-CPU67P.

## Functional Specifications

Item			Specifications		
Model numbers			CS1W-LCB01	CS1W-LCB05 CS1D-LCB05D	CS1W-LC001
Operation method			Function block method		
Operation cycle			Settable cycles: 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s(default: 1 s) Can be set for each function block. (See note 1.)		Settable cycles: 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) Can be set for each function block.
Number of function blocks	Analog operation	Control blocks (See note 2.)	50 blocks max.	500 blocks max.	32 blocks max.
		Operation blocks (See note 3.)			249 blocks max.
		External controller blocks	32 blocks max. (CS1D-LCB05D not included)		
	Sequence control	Sequence tables	None	200 tables max. 32 conditions and 32 actions per table max. (expandable to 64 conditions and 64 actions per table) 6,400 rules total max.	None
		Step ladder program blocks	20 blocks max. 2,000 commands total 100 commands max. per block Separable into a 100 steps max.	200 blocks max. 4,000 commands total 100 commands max. per block Seperable into a 100 steps max.	
	I/O blocks	Field terminal blocks	80 blocks max.		
		User link tables	2,400 data items max.		None
		All data	HMI functions 2,040 words max. Allocated 1 EM Area bank	HMI functions 20,040 words max. Allocated 1 EM Area bank	Send/Receive All Blocks: 1 block each max.
		CPU terminal blocks	None		16 blocks max.
		Node terminal blocks	None		1000 blocks max.
	System common blocks		1 block max.		
Method for creating and transferring function blocks			Created and transferred using CX-Process Tool (purchased separately).		
Control methods	PID control method		PID with 2 degrees of freedom (with auto-tuning)		
	Control combinations		Any of the following function blocks can be combined: Basic PID control, cascade control, feed-forward control, sample PI control, Smith dead time compen- sation control, PID control with differential gap, override control, program control, time-proportional control, etc.		
Alarms	PID block internal alarms		4 PV alarms (upper upper-limit, upper limit, lower limit, lower lower-limit) and 1 deviation alarm per PID block		
	Alarm blocks		High/low alarm blocks, deviation alarm blocks		

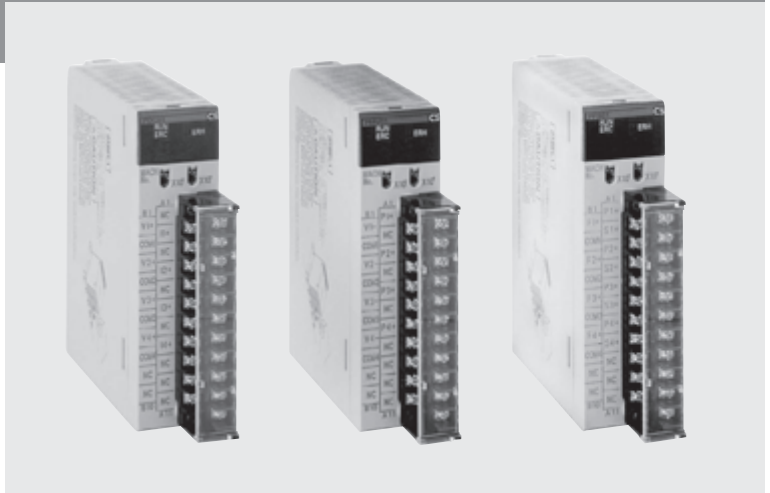
- Note:**
1. Operation cycles of 0.01, 0.02, and 0.05 s cannot be set for the CS1D-LCB05D.
  2. Control blocks such as those for PID control.
  3. Operation blocks for process control such as those for alarms, square roots, time/date calculations, and pulse-train computations.

CS1W-P□□□□

# Process I/O Units

## Wide variety of built-in signal conversion functions for direct process signal inputs.

- External converters, isolators or transducers are not required: Greatly reduces costs, space requirements, and labor.
- Receives temperature and other analog inputs.
- Built-in alarms on measured value and rate-of change reduce the amount PLC programming.
- Control outputs can be limited with the output rate-of-change limit and output high/low limit.
- Data processing includes peak/bottom hold and top/valley hold functions.
- Count the number of times that a preset threshold value is exceeded and totalize analog values.



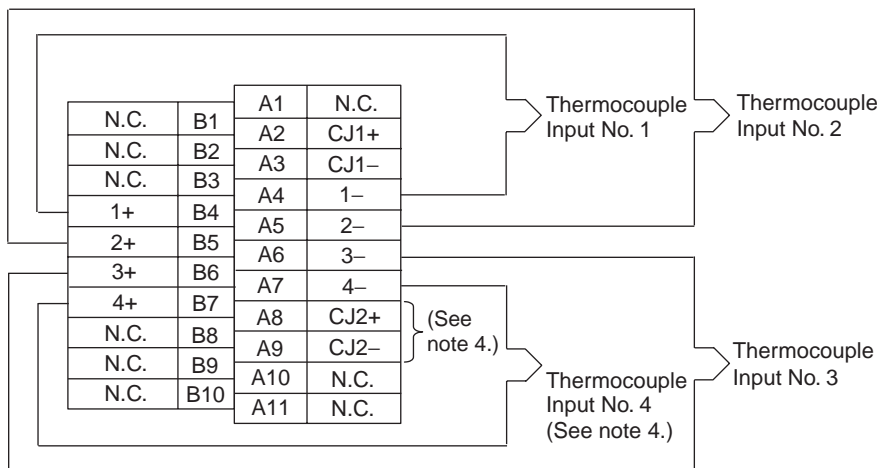
## Function

Choose from a total of 13 models, including 11 isolated-type models, to handle essentially all normal data collection and process control applications. High-speed (10 ms) and high-resolution (1/64,000) models are available for use in a wide range of applications, from data logging to high-speed temperature control.

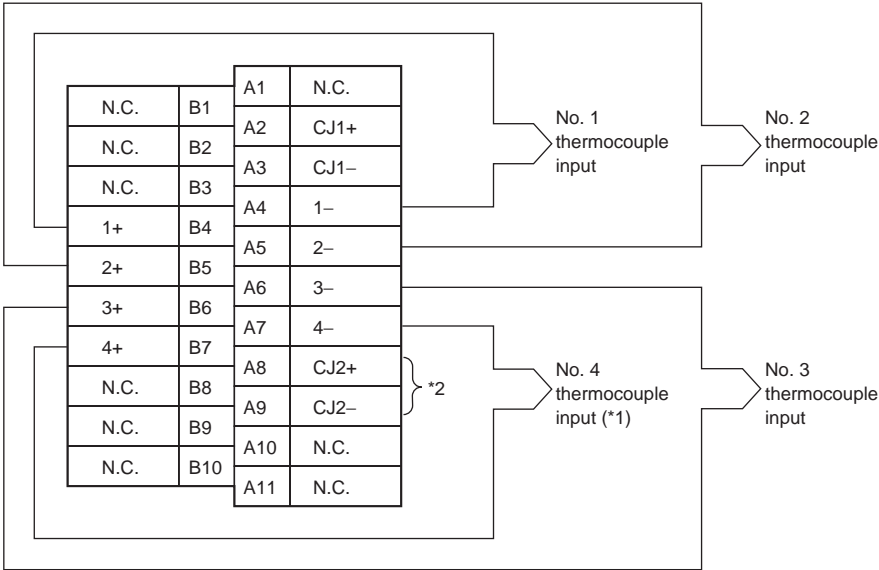
## Terminal Arrangement

### CS1W-PTS01-V1

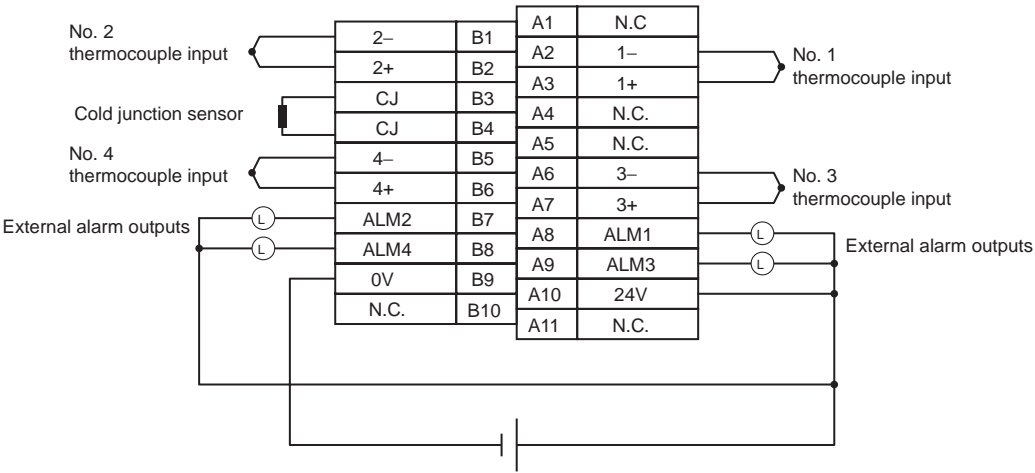
CS1W-PTS01-V1 Isolated-type Thermocouple Input Unit



CS1W-PTS11

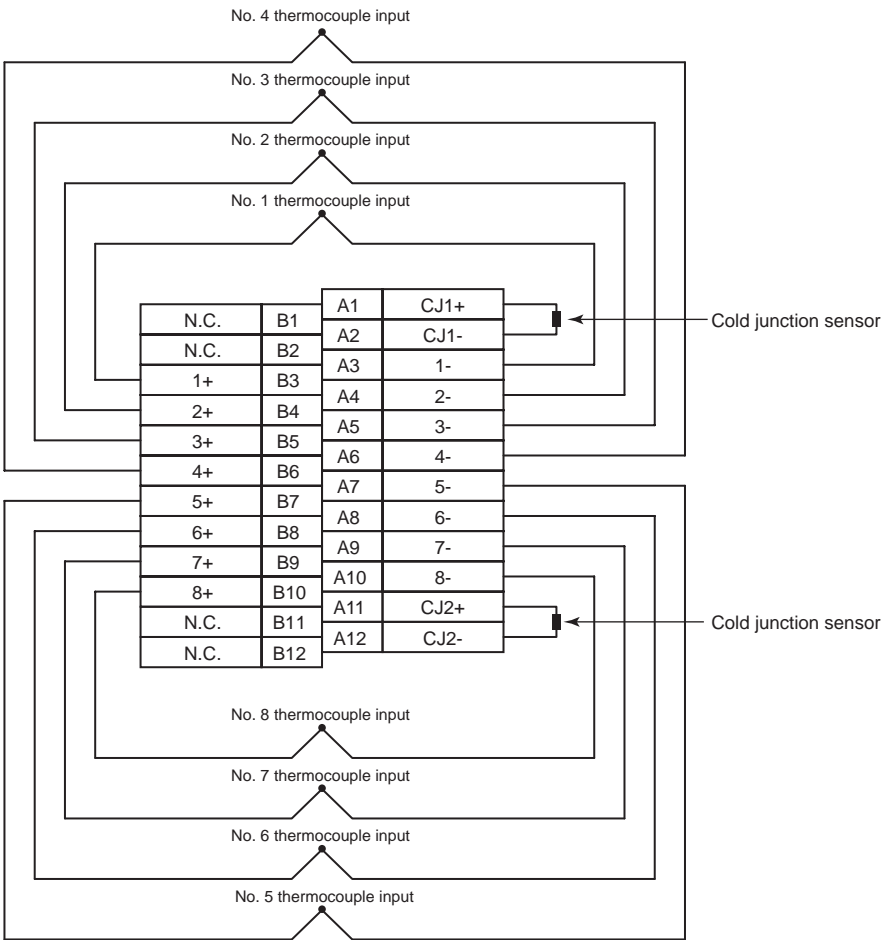


CS1W-PTS51



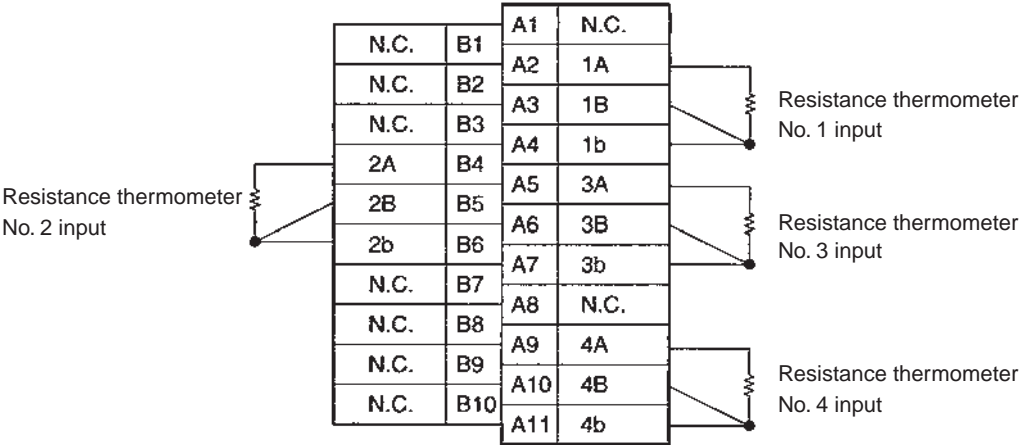


CS1W-PTS55



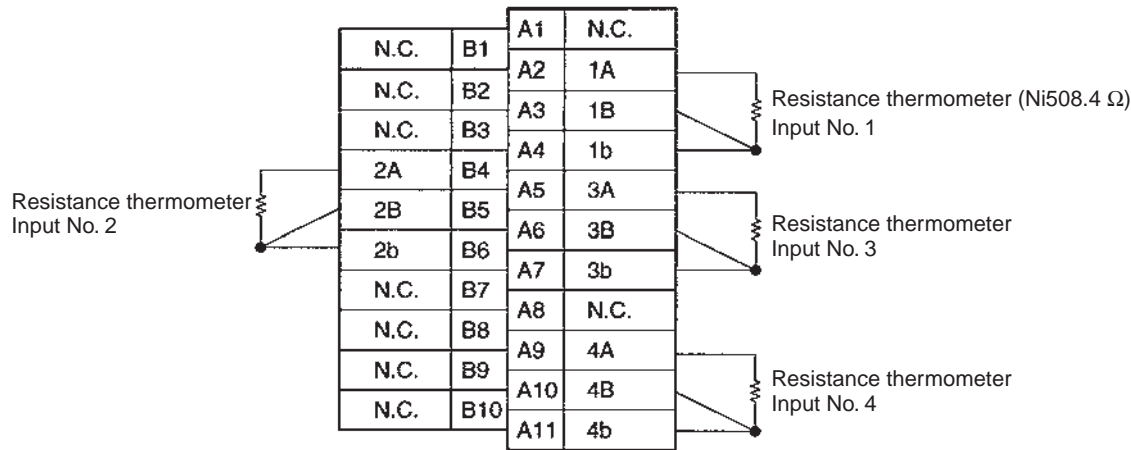
CS1W-PTS02

CS1W-PTS02 Isolated-type Resistance Thermometer Unit

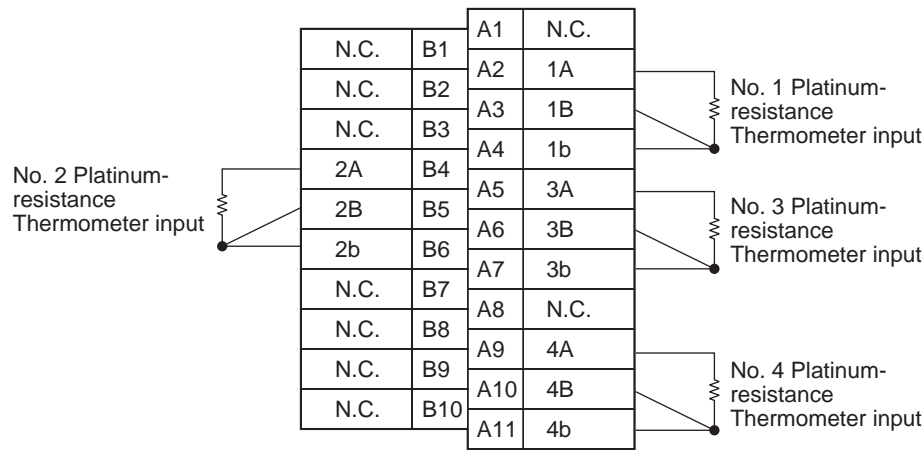


CS1W-PTS03

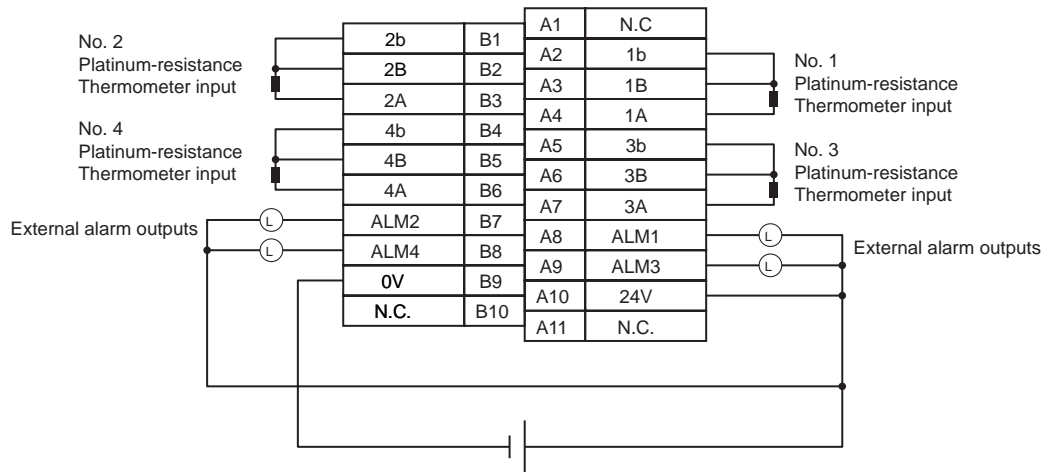
CS1W-PTS03 Isolated-type Resistance Thermometer Unit



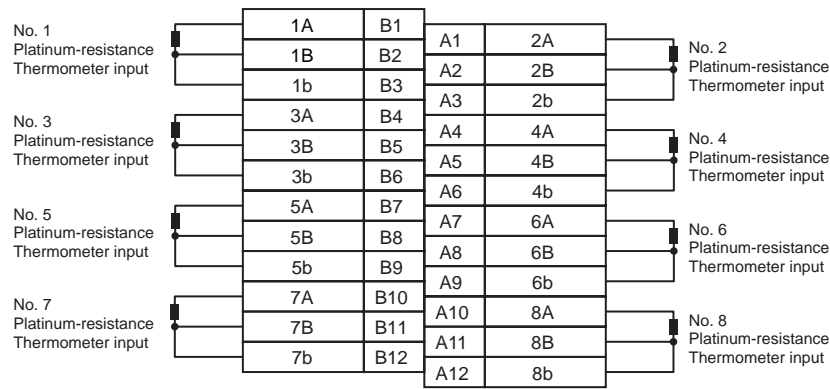
CS1W-PTS12



CS1W-PTS52

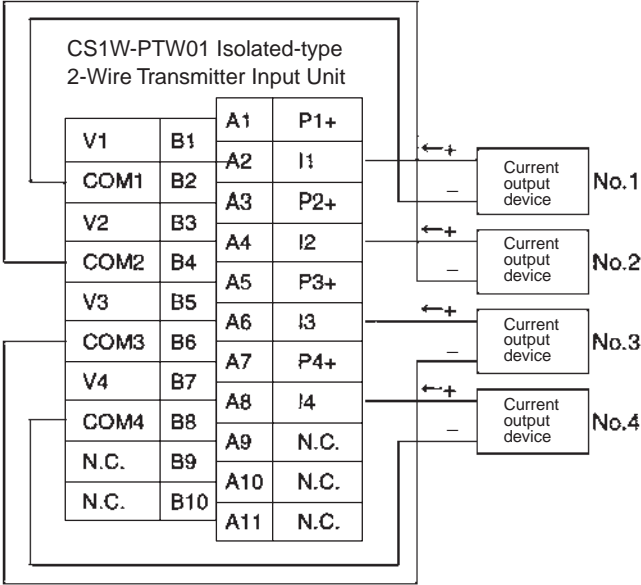
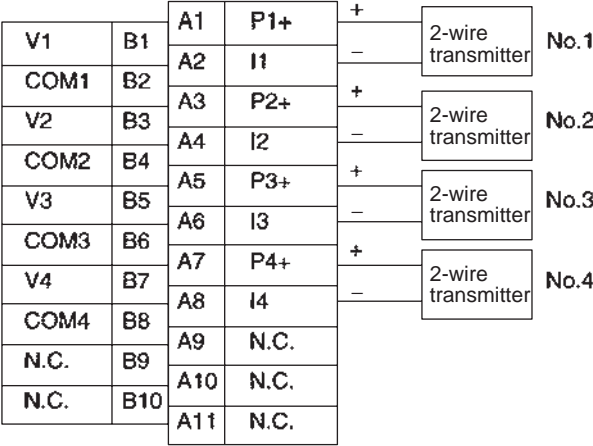


CS1W-PTS56



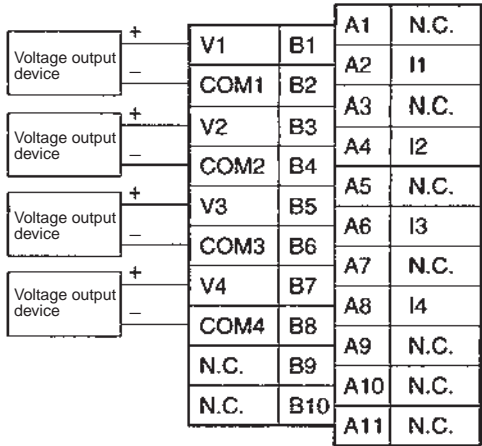
CS1W-PTW01

CS1W-PTW01 Isolated-type 2-Wire Transmitter Input Unit

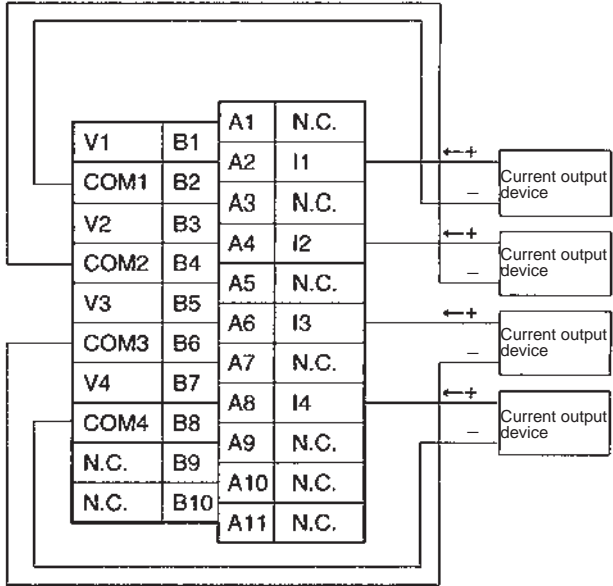


CS1W-PDC01

Voltage input

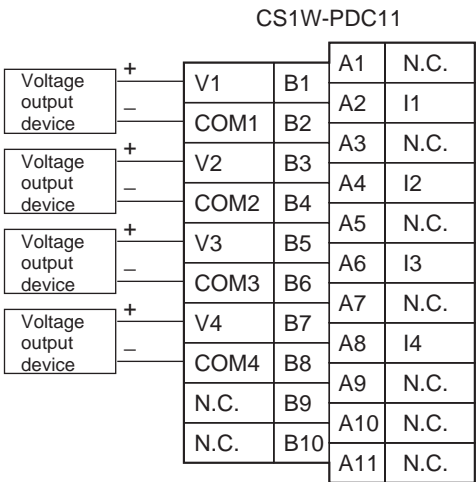


Current input

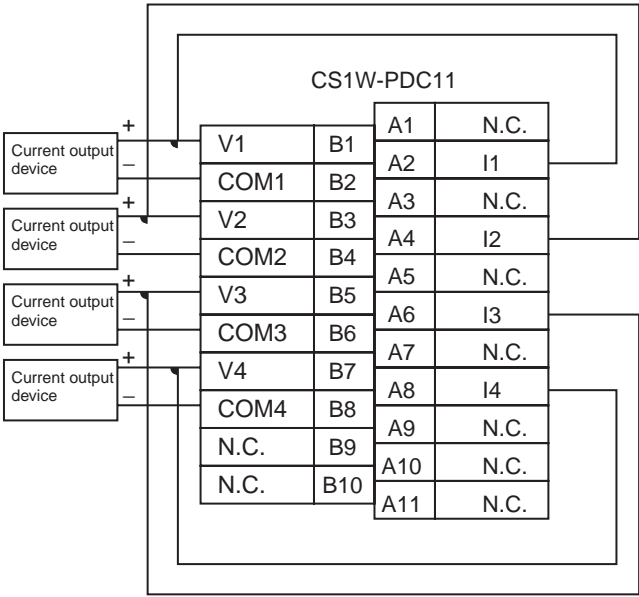


CS1W-PDC11

Voltage Inputs

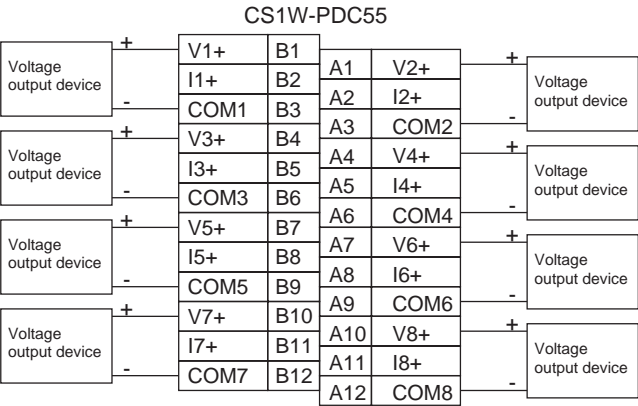


Current inputs

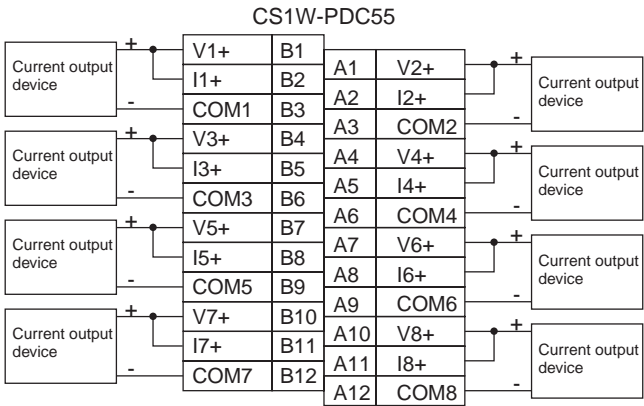


CS1W-PDC55

Voltage Inputs

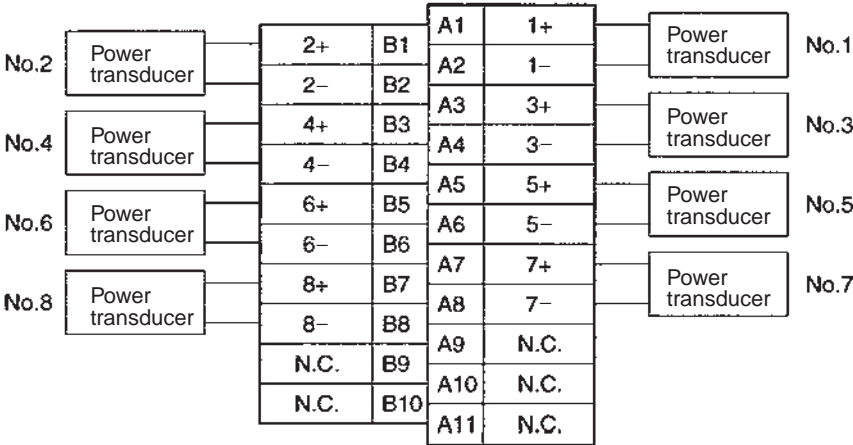


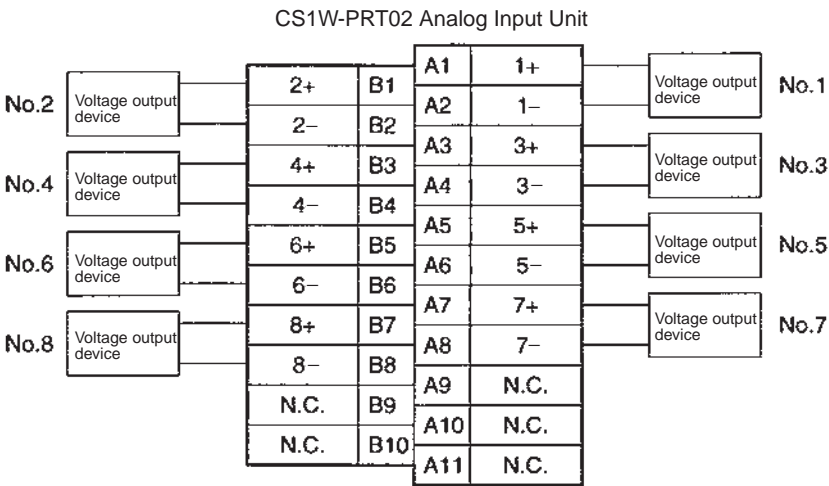
Current inputs



CS1W-PTR01

CS1W-PRT01 Power Transducer Input Unit

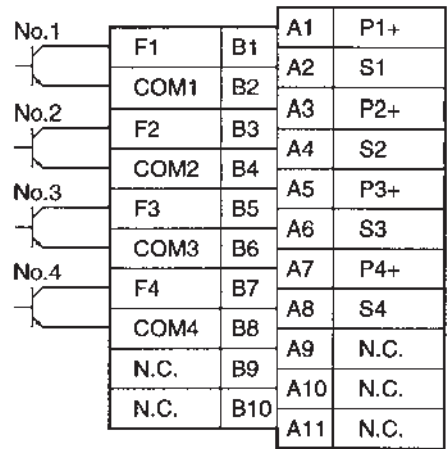




CS1W-PPS01

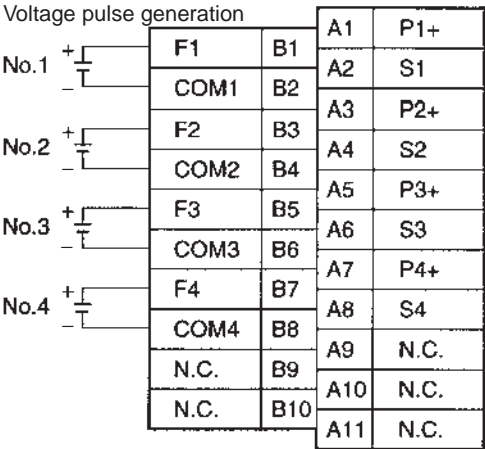
No-voltage Semiconductor Input

CS1W-PPS01 Isolated-type Pulse Input Unit



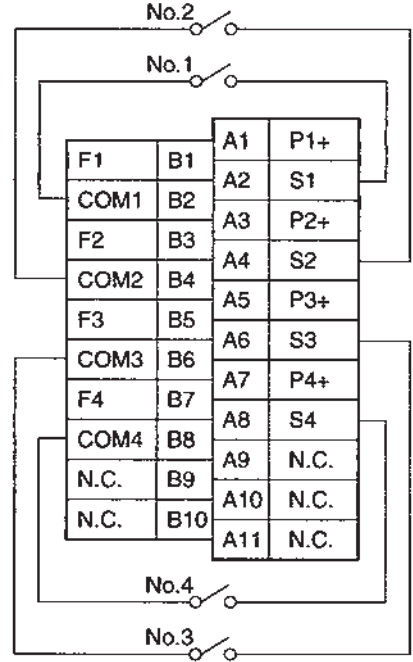
Voltage Input

CS1W-PPS01 Isolated-type Pulse Input Unit



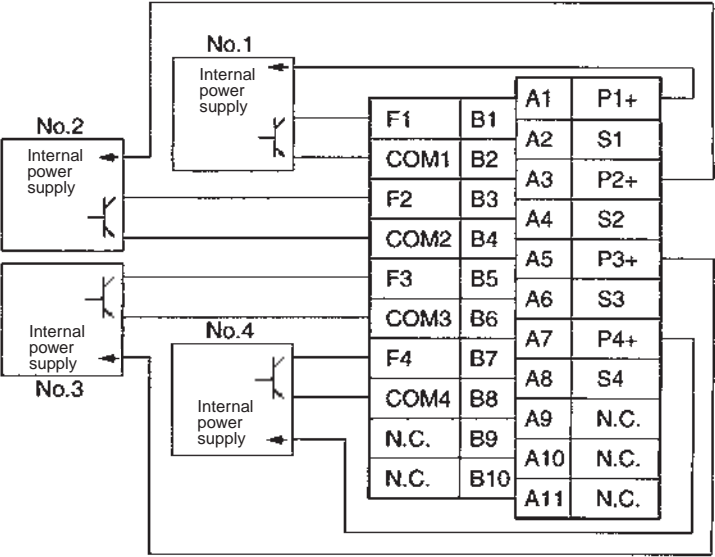
Contact Input

CS1W-PPS01 Isolated-type Pulse Input Unit

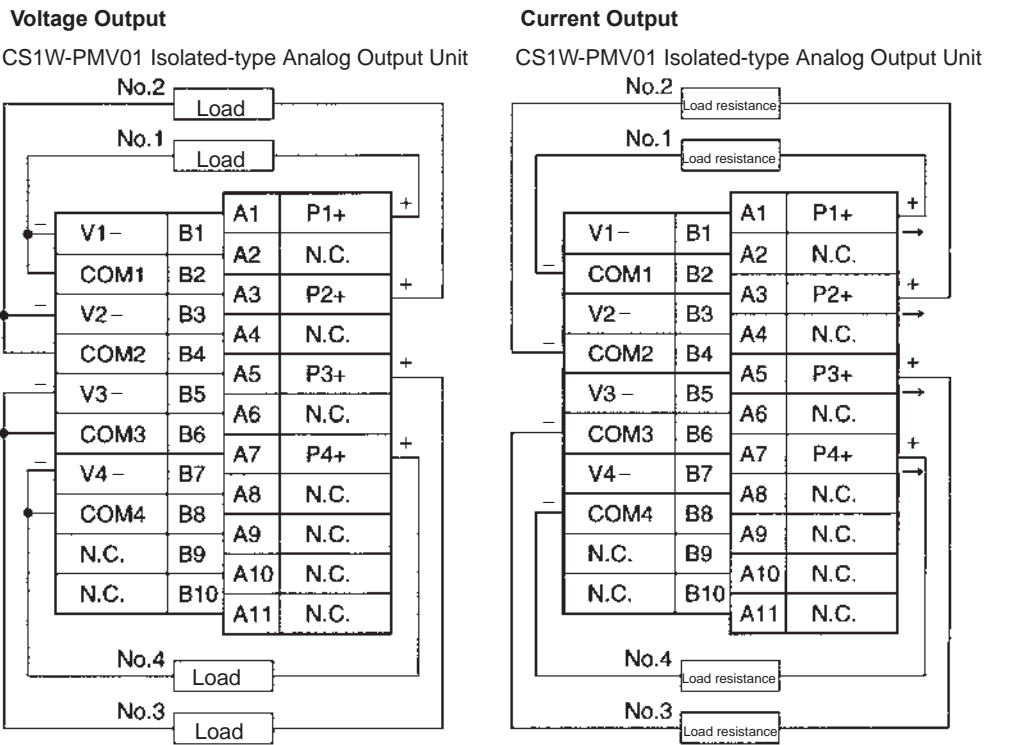


3-wire Sensor Input

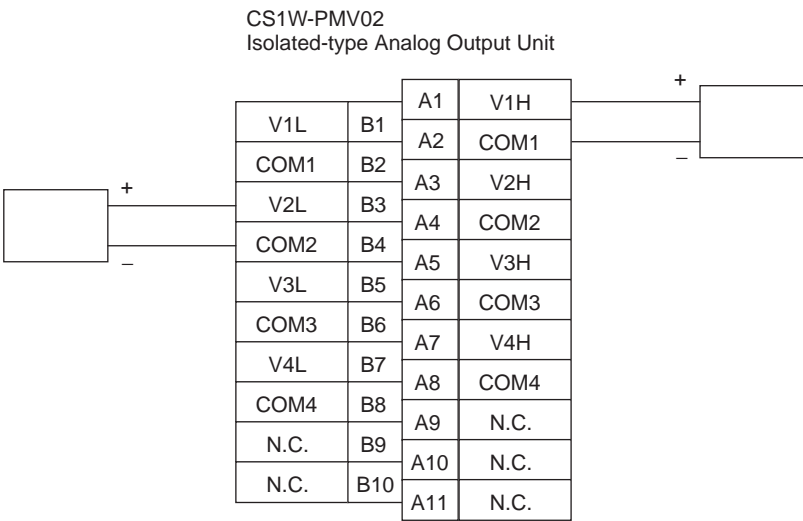
CS1W-PPS01 Isolated-type Pulse Input Unit



CS1W-PMV01



CS1W-PMV02





## Specifications

Unit name	Model	I/O capacity	Field I/O isolation	I/O range/type	Accuracy/effective resolution	Main features
Isolated-type Thermocouple Input Unit	CS1W-PTS11	4 inputs	All inputs isolated.	B, E, J, K, L, N, R, S, T, U, WRe5-26, PL II, $\pm 100$ mV	Standard accuracy: $\pm 0.05\%$ of full scale Temp coefficient: $\pm 0.01\%/^{\circ}\text{C}$ Effective resolution: 1/64,000 Conversion cycle: 20 ms/4 pts 10 ms/2 pts	Output scaling, measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range
Isolated-type Resistance Thermometer Input Unit	CS1W-PTS12	4 inputs	All inputs isolated.	Pt100 $\Omega$ (JIS, IEC), JPt100 $\Omega$ , Pt50 $\Omega$ , Ni508.4 $\Omega$	Standard accuracy: Larger of $\pm 0.05\%$ of full scale or $\pm 0.1^{\circ}\text{C}$ Temp coefficient: $\pm 0.01\%/^{\circ}\text{C}$ Effective resolution: 1/64,000 Conversion cycle: 20 ms/4 pts 10 ms/2 pts	Output scaling, measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range
Isolated-type Thermocouple Input Units (Economical type)	CS1W-PTS51	4 inputs	All inputs are isolated	B, J, K, R, S, T, L	Overall accuracy: $\pm 0.3\%$ of PV or $\pm 1^{\circ}\text{C}$ , whichever is larger, $\pm 1$ digit max. Conversion cycle: 250 ms/4 pts	Process value alarms (H, L) Process value alarm DO output Input disconnection detection
	CS1W-PTS55	8 inputs				
Isolated-type Resistance Thermometer Input Unit (Economical type)	CS1W-PTS52	4 inputs	All inputs are isolated	Pt100 (JIS, IEC), JPt100	Overall accuracy: $\pm 0.3\%$ of PV or $\pm 0.8^{\circ}\text{C}$ , whichever is larger, $\pm 1$ digit max. Conversion cycle: 250 ms/4 pts	Process value alarms (H, L) Process value alarm DO output Input disconnection detection
	CS1W-PTS56	8 inputs				
Isolated-type Two-wire Transmission Device Input Unit	CS1W-PTW01	4 inputs	All inputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: $\pm 0.2\%$ Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096 Conversion cycle: 100 ms/4 pts	Built-in power supply for 2-wire transmission device output scaling ( $\pm 32,000$ ), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms
Isolated-type Analog Input Unit	CS1W-PDC11	4 inputs	All inputs isolated.	4 to 20 mA, 0 to 20 mA, 0 to 10 V, $\pm 10$ V, 0 to 5 V, $\pm 5$ V, 1 to 5 V, 0 to 1.25 V, $\pm 1.25$ V	Standard accuracy: $\pm 0.05\%$ of full scale Temp coefficient: $\pm 0.01\%/^{\circ}\text{C}$ Effective resolution: 1/64,000 Conversion cycle: 20 ms/4 pts 10 ms/2 pts	Output scaling, measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms, top hold, bottom hold, valley hold, total value measurement
	CS1W-PDC55	8 inputs	All inputs isolated	4 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V	Standard accuracy: $\pm 0.3\%$ full scale. Resolution 1/16000. Conversion cycle 250 ms/8 pts	Measured value alarms (H, L), input detection
Isolated-type Pulse Input Unit	CS1W-PPS01	4 inputs	All inputs isolated.	Max. counting speed: 20 K pulses/s (voltage input or non-voltage semi-conductor input) or 20 pulses/s (contact input)	---	Built-in sensor power supply, contact bounce filter, unit pulse conversion, accumulative and instantaneous value output, 4 instantaneous value alarms.
Isolated-type Control Output Unit	CS1W-PMV01	4 outputs	All outputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: 4 to 20 mA: $\pm 0.1\%$ 1 to 5 V: $\pm 0.2\%$ Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096 (outputs) Conversion cycle: 100 ms/4 pts	Output disconnection alarms, control output answerback input, output rate-of-change limit, output high/low limits
Isolated-type Power Voltage Output Unit	CS1W-PMV02	4 outputs	All outputs isolated	0 to 10 V, $\pm 10$ V, 0 to 5 V, $\pm 5$ V, 0 to 1 V, $\pm 1$ V	Standard accuracy: $\pm 0.1\%$ Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution (at full scale): $\pm 10$ V or $\pm 1$ V: 1/16,000 0 to 10 V, 0 to 1 V, or $\pm 5$ V: 1/8,000 0 to 5 V: 1/4,000 Conversion cycle: 40 ms/4 pts	Output rate-of-change limit, Output high/low limit, Output scaling ( $\pm 32,000$ )
Power Transducer Input Unit	CS1W-PTR01	8 inputs	No isolation between inputs.	$\pm 1$ mA, 0 to 1 mA	Standard accuracy: $\pm 0.2\%$ Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096 Conversion cycle: 200 ms/8 pts	Motor overdrive prevention at startup, output scaling ( $\pm 32,000$ ), measured value alarms (H, L)
Analog Input Unit	CS1W-PTR02	8 inputs	No isolation between inputs.	$\pm 100$ mV, 0 to 100 mV	Standard accuracy: $\pm 0.2\%$ Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096 Conversion cycle: 200 ms/8 pts	Output scaling ( $\pm 32,000$ ), measured value alarms (H, L)

**Note:** Refer to pages 318 to 322 for descriptions of the Analog I/O Units (CS1W-AD0□□, CS1W-DA0□□, CS1W-MAD44.)

CS1W-PTS□□, C200H-TS□□□

# Temperature Sensor Units

## Direct Input from Four to Eight Temperature Sensors

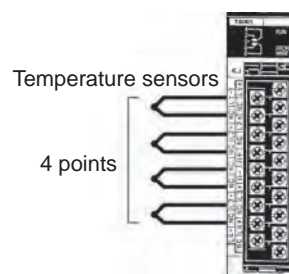
- Input directly from up to eight temperature sensors with one Unit. (The types of temperature sensor and temperature ranges can be set separately for each input for the CS1W-PTS□□.)
- Models available with isolated inputs to prevent unwanted current flow between temperature sensor inputs (CS1W-PTS□□ only).
- Provided with measured value alarms (4 points each) (CS1W-PTS□□ only).
- Sensor disconnection detection provided.



## Function

Using input from thermocouples or resistance thermometers (up to 8 inputs), the Unit converts the measured temperatures into BCD or binary data and stores them in the allocated relay area every cycle. The data can be processed using the ladder program.

## Circuit Configuration



## Specifications

Model			CS1W-PTS11	CS1W-PTS51	CS1W-PTS55	CS1W-PTS12	CS1W-PTS52	CS1W-PTS56	C200H-TS001/002/101/102
Classification			CS1 Special I/O Units						C200H Special I/O Units
Unit numbers			0 to 95	0 to 95	0 to 95	0 to 95	0 to 95	0 to 95	0 to 9
Inputs			4 pts	4 pts	8 pts	4 pts	4 pts	8 pts	4 pts
Input signals	Thermo-couples	K	Yes	Yes	Yes	---	---	---	TS001, TS002
		J	Yes	Yes	Yes	---	---	---	TS001
		L	Yes	Yes	Yes	---	---	---	TS002
		R	Yes	Yes	Yes	---	---	---	---
		S	Yes	Yes	Yes	---	---	---	---
		T	Yes	Yes	Yes	---	---	---	---
		E	Yes	---	---	---	---	---	---
		B	Yes	Yes	Yes	---	---	---	---
		N	Yes	---	---	---	---	---	---
		W	Yes	---	---	---	---	---	---
		U	Yes	---	---	---	---	---	---
	PLII	Yes	---	---	---	-----	---	---	
	±100 mV	Yes	---	---	---	---	---	---	
Resistance thermometers	JPt100	---	---	---	Yes	Yes	Yes	TS101	
	PT100	---	---	---	Yes	Yes	Yes	TS102	
	Ni508.4Ω	---	---	---	Yes	Yes	Yes	---	
Input signal range settings			4 pts set individually	4 pts set individually	8 pts set individually	4 pts set individually	4 pts set individually	8 pts set individually	One setting for all 4 pts
A/D conversion output data			4-digit binary	4-digit binary or BCD	4-digit binary or BCD	4-digit binary	4-digit binary or BCD	4-digit binary or BCD	4-digit BCD
Conversion speed			20 ms/ 4 points, 10 ms/ 2 points	250 ms/Unit	250 ms/Unit	20 ms/ 4 points, 10 ms/ 2 points	250 ms/Unit	250 ms/Unit	4.8 s max. (when 4 pts are set for Unit)
Overall accuracy	Standard accuracy		±0.05% of full scale	±0.3% of PV or ±1°C, whichever is larger, ±1 digit max.		Larger of ±0.05% of full scale or ±0.1°C	±0.3% of PV or ±0.8°C, whichever is larger, ±1 digit max.		±1% + 1°C
	Temperature coefficient		±0.01%/°C						
	Cold junction compensation error		±1°C			---			
Connections			Terminal block						

**Note:** Refer to page 326 for information on CS1W-PTS□□ Process I/O Units.

C200H-TC□□□

# Temperature Control Units

## One Unit Functions as Two Temperature Controllers

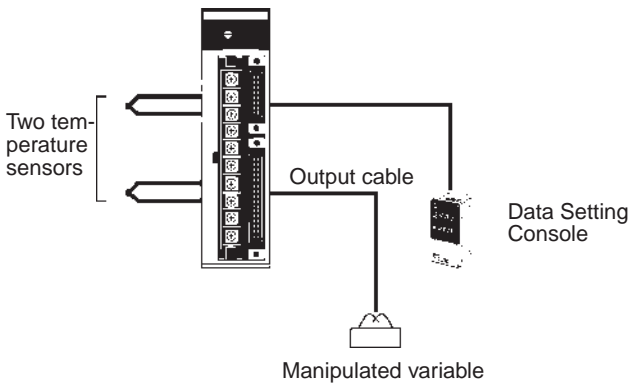
- Supports 2-loop PID control (two degrees of freedom) or ON/OFF control.
- Input directly from two temperature sensors (thermocouples: R, S, K, J, T, E, B, N, L, or U) or platinum resistance thermometers (JPt100, Pt100).
- Open-collector, voltage, or current outputs
- Sampling period: 500 ms
- Run/start control.
- Two internal alarms per loop.
- Detects heater burnout through current detectors for both loops.
- Record up to eight sets of target values, alarm values, and PID parameters.
- Connects to Data Setting Console.



## Function

Perform 2-loop PID control based on inputs from thermocouples or platinum resistance thermometers to control a transistor, voltage, or current output. Words allocated to the Unit in memory can be manipulated from the ladder diagram to start/stop operation, set the target value, read the process value, or perform other operations.

## System Configuration



## Specifications

### General

Classification	Temperature sensor inputs	Control outputs	Unit numbers	Model
C200H Special I/O Unit	Thermocouples (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	0 to 9	C200H-TC001
		Voltage (pulse)		C200H-TC002
		Current (linear)		C200H-TC003
	Platinum resistance thermometers (JPt100, Pt100)	Open-collector (pulse)		C200H-TC101
		Voltage (pulse)		C200H-TC102
		Current (linear)		C200H-TC103

### Data Setting Console

Specifications	Model
Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01

CS1W-NC□□□, C200HW-NC□□□

# Position Control Units

## High-speed, High-precision Positioning with 1, 2, or 4 Axes

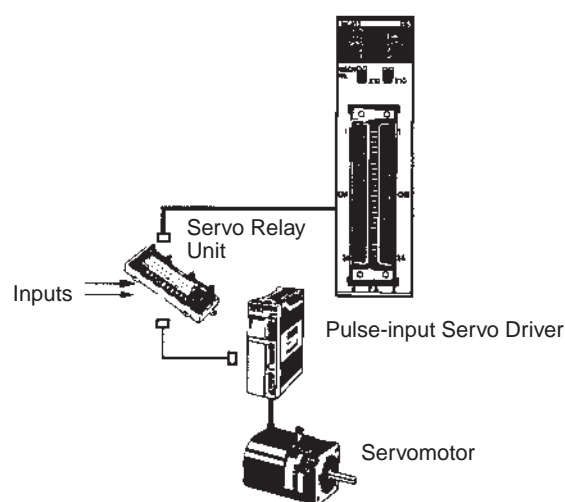
- Simple positioning systems can be created by directly specifying operation from the CPU Unit when required.
- Positioning data is saved in internal flash memory, eliminating the need to maintain a backup battery.
- Use Windows-based Support Software to easily create positioning data and store data and parameters in files. (Use WS01-NCTF1-E with C200HW-NC□ models and WS02-NCTC1-E with CS1W-NC□□ models.)
- Interrupt feeding, forced starting, and other features also supported.



## Function

These Position Control Units support open-loop control with pulse-train outputs. Position using automatic trapezoid or S-curve acceleration and deceleration. Models available with 1, 2, or 4 axes. Use in combination with servomotors or stepping motors that accept pulse-train inputs.

## System Configuration



## Specifications

Model	CS1W-NC113 CS1W-NC133	CS1W-NC213 CS1W-NC233	CS1W-NC413 CS1W-NC433	C200HW-NC113	C200HW-NC213	C200HW-NC413
Unit name	Position Control Unit					
Classification	CS1 Special I/O Units			C200H Special I/O Units		
Unit numbers	0 to 95			0 to 15 (0 to F)		
Control method	Open-loop, automatic trapezoid acceleration/deceleration					
Control output signals	CS1W-NC□13: Open-collector outputs CS1W-NC□33: Line-driver outputs			Open-collector		
Controlled axes	1	2	4	1	2	4
Operating modes	Direct operation or memory operation					
Data format	Binary (hexadecimal)			BCD		
Affect on scan time for end refresh	0.29 to 0.41 ms max./unit			2.6 to 4.5 ms max./unit		
Affect on scan time for IOWR/IORD	0.6 to 0.7 ms max./instructions			2.6 to 5.5 ms max./instructions		
Startup time	2 ms min. (Refer to operation manual for conditions.)			7.51 ms min. (Refer to operation manual for conditions.)		
Position data	−1,073,741,823 to +1,073,741,823 pulses			−9,999,999 to +9,999,999 pulses		
No. of positions	100 per axis					
Speed data	1 to 500 kpps (in 1-pps units)			1 to 500 kpps (specified as factor)		
No. of speeds	100 per axis					
Acceleration/ deceleration times	0 to 250 s (time to max. speed)					
Acceleration/ deceleration curves	Trapezoidal or S-curve					
Saving data in CPU	Flash memory					
Windows-based Support Software	CX-Position			SYSMAC-NCT (WS01-NCTF1-E)		

CS1W-MC421/-MC221

# Motion Control Units

## High-precision, Two-axis Motion Control with Multi-tasking G-language Programming

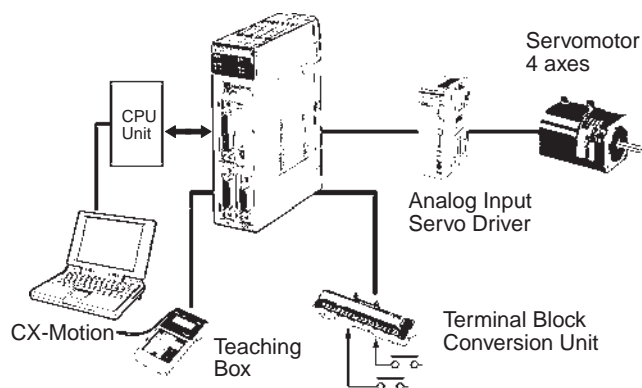
- High-speed control of up to 4 axes with one Unit and up to 76 axes with one PLC (19 Units x 4 axes) (assumes that Power Supply Unit capacity is not exceeded).
- Winding operations easily controlled at high-speed using traverse positioning control.
- High-speed response to commands from CPU Unit (8 ms for 2 axes, 13 ms for 4 axes).
- Encoder response of 2 Mpps possible with 4x frequency multiplication for applications with high-speed, high-precision servomotors.
- D interrupt code outputs to CPU Unit at end of positioning or at specified positions (D code output time: 3.3 ms max.).
- CX-Motion Windows-based Support Software  
Define user mnemonics to use in place of G codes to simplify MC program development and analysis.
- Servo trace function from CX-Motion to trace error counter changes or motor speeds.
- Automatic Loading Function  
MC programs and positioning data can be automatically downloaded from computer memory when required by the MC Unit.



## Function

The Motion Controller provides closed-loop control with analog outputs for up to 2 or 4 axes, and supports the G language for advanced, high-speed, high-precision position control, such as traverse operation. Multi-tasking allows you to run the two axes independently for a wider range of application.

## System Configuration



**Note:** The C200H-MC221 can also be used with CS1 PLCs.

## Specifications

### General

Model		CS1W-MC421	CS1W-MC221
Classification		CS1 Special I/O Unit	
Control method		Closed loop with automatic trapezoid or S-curve acceleration/deceleration	
Control output signals		Analog	
Internal programming language		G language (Program started by command sent from CPU Unit's ladder program.)	
Controlled axes		4 axes max.	2 axes max.
Maximum position value		-39,999,999 to 39,999,999 (for minimum setting unit of 1)	
Synchronous axis control		4 axes max.	2 axes max.
Positioning	Linear interpolation	4 axes max.	2 axes max.
	Arc interpolation	2 axes max. in a plane	
	Helical interpolation	2-axis arc interpolation in a plane + feed axis	---
	Traverse	2-axis traverse feeding	
	Infinite feed	Infinite feeding of one or more axes	
Interrupt feed		Interrupt feeding for specified axes (Positioning can be specified for when there is no interrupt.)	
Task programming capacity	Number of tasks	4 tasks max.	2 tasks max.
	Number of programs	25 programs when using 4 tasks	50 programs when using 2 tasks
	Program capacity	500 blocks per task when using 4 tasks	1,000 blocks per task when using 2 tasks

### CX-Motion: Windows-based Support Software

Model	WS02-MCTC1-EV□
Supported MC Units	CS1W-MC221/421, C200H-MC221, and CV500-MC221/421
Applicable computer	DOS, OS: Windows 95/98 or Windows NT Version 4.0
Functions	Functions required for MC Unit control: Creating/editing/saving/printing system parameters, positioning data, and MC programs; monitoring MC Unit operation

C200HW-MC402-E

# Motion Control Unit

## Advanced multi-axes Motion Control with Multi-task BASIC language programming

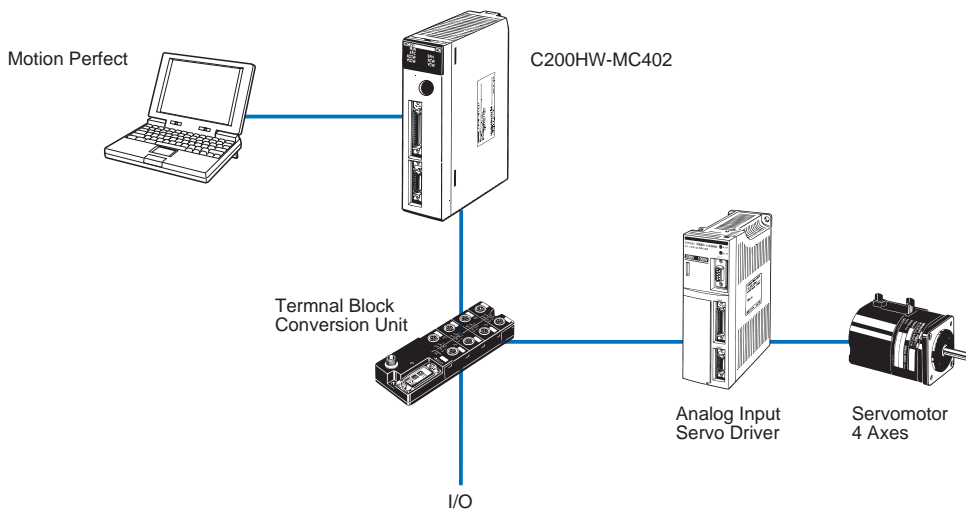
- Advanced Motion control of 4 axes per unit and up to 16 modules can be installed in one PLC
- Analogue outputs for position, Speed and Torque control
- Hardware registration input for every axis
- Electronic CAM profiles and axes synchronization
- Friendly Motion Perfect Windows-based programming and debugging software. Provides versatile test and monitoring functions including a 4-channel software oscilloscope.



## Function

The advanced Motion control unit provides closed-loop control of up to 4 axes, programmed in a multi-task BASIC type language and supported by the powerful software tool. The unit provides a complete command set, allowing applications such as flying saws, rotating knives, any synchronization and electronic CAM profile to be easily programmed.

## System Configuration



Web: <https://www.bolenscontrol.com/> - Phone: (800) 658-5241 - Email: [sales@bolenscontrol.com](mailto:sales@bolenscontrol.com)

## Specifications

### General

<b>Model</b>		<b>C200HW-MC402-E</b>
<b>Classification</b>		C200H Special I/O Unit
<b>Control Method</b>		Closed loop Position, Speed and Torque control
<b>Control Output signals</b>		Analogue
<b>Programming language</b>		BASIC type motion control language
<b>Controlled axes</b>		4 real axes and 4 virtual axes
<b>Measurement units</b>		User definable
<b>Positioning</b>	<b>Linear interpolation</b>	4 axes
	<b>Arc interpolation</b>	For any 2 axes
	<b>Helical interpolation</b>	For any 3 axes
	<b>Axes Synchronization</b>	For any 2 axes
	<b>Axes Linked CAM profile</b>	For any 2 axes
	<b>Hardware Registration Interrupt</b>	4 axes
<b>Task programming capacity</b>	<b>Number of tasks</b>	Up to 5 tasks simultaneous plus interface task
	<b>Number of programs</b>	14
	<b>Data storage capacity</b>	251 (VR) + 16000 (Table) max.

### Motion Perfect Software

<b>Model</b>	<b>Motion Perfect</b>
<b>Supported MC Units</b>	C200HW-MC402-E, R88A-MCW151-E, R88A-MCW151-DRT-E
<b>Applicable computer</b>	Windows 95/98/2000/NT4.0
<b>Functions</b>	Programming and debugging software tool. Test and monitoring functions including a 4-channel software oscilloscope.



CS1W-MCH71

# Motion Control Unit

## Multi-axes Motion Control over high-speed MECHATROLINK-II

- Up to 30 axes controlled with less wiring
- Supports Position, speed and Torque control
- Electronic CAM profiles and axes synchronization
- Hardware registration input for every axis
- Program control commands, like Multi-task programming and branching commands, and various arithmetic operations for maximum program efficiency
- Access to the complete system from one point

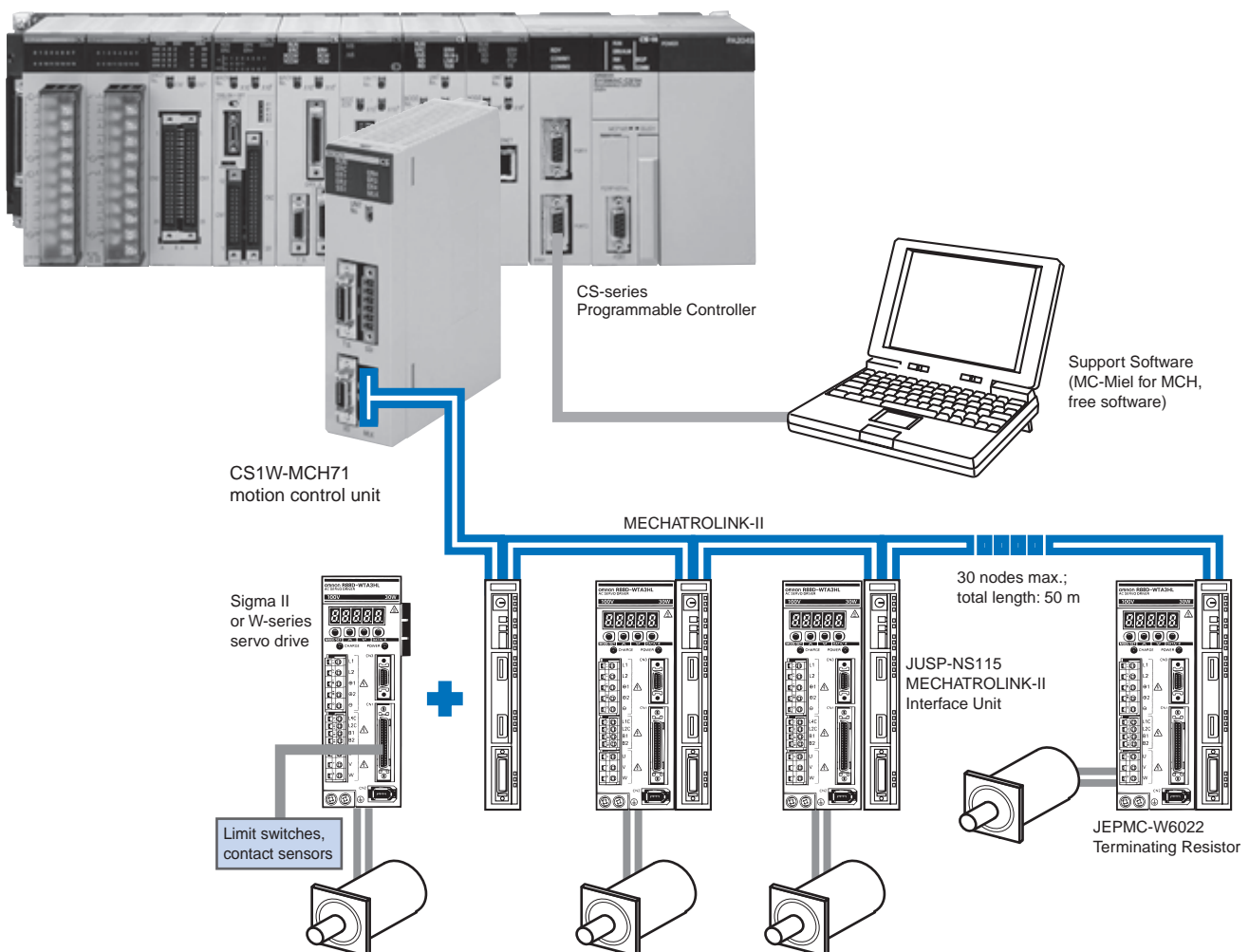


## Function

Multi-axes control is made easy by freely combining control axes. Up to 32 axes can be used, including 30 physical axes and two virtual axes, and each axis can be set individually. Position Control, synchronized control (electronic gear, electronic Cam, follow-up), speed control, and

torque control are all supported, enabling a wide range of applications. By using high-speed servo communications, motion programs, system parameters, system data, and servo drive parameters can be set and read from the software tool.

## System Configuration



Web: <https://www.bolenscontrol.com/> - Phone: (800) 658-5241 - Email: [sales@bolenscontrol.com](mailto:sales@bolenscontrol.com)

## Ordering Information

### Motion Controller

Name	Model
Motion Control Unit	CS1W-MCH71
Support Software	MC-Miel (free of charge)

### Mechatrolink-II related devices

Name	Model	Remarks
Mechatrolink-II Interface Unit	JUSP-NS115	For Sigma-II and W-series Servo drives
Mechatrolink-II Terminator	JEPMC-W6022	Terminating resistor
Mechatrolink-II Cables	JEPMC-W6003-A5	0.5 meter
	JEPMC-W6003-01	1 meter
	JEPMC-W6003-03	3 meters
	JEPMC-W6003-05	5 meters
	JEPMC-W6003-10	10 meters
	JEPMC-W6003-20	20 meters
	JEPMC-W6003-30	30 meters
24V DC I/O Module	JEPMC-IO2310	64 Inputs, 64 Outputs
Counter Module	JEPMC-PL2900	Reversible counters, 2 channels
Pulse Output Module	JEPMC-PL2910	Pulse train positioning, 2 channels

## Specifications

### General

Model	CS1W-MCH71	
Classification	CS-series CPU Bus unit	
Applicable PLCs	CS-series, new version (CS1[ ]-CPU[ ][H])	
Control Method	MECHATROLINK-II (Position, Speed and Torque control )	
Controlled devices	Sigma-II and W-series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface and various I/O Units.	
Programming language	BASIC type motion control language	
Controlled axes	32 max, including 30 physical or virtual axes and 2 virtual axes	
Control functions	Positioning (PTP)	Executes positioning independently for each axis at a specified speed or the speed system parameter. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/Unit)
	Linear interpolation	Executes linear interpolation for up to eight axes at a time at the specified interpolation feed speed. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/system)
	Circular interpolation	Executes circular interpolation for two axes in either clockwise or counterclockwise at the specified interpolation feed speed. Helical circular interpolation is also possible with single-axis linear interpolation added. (Simultaneous specification: Two or three axes/block, Simultaneous execution: Up to 16 blocks/system)
	Other functions	Origin searches, interrupt feeding, timed positioning, traverse positioning, independent electronic cam, synchronized electronic cam, link operation, electronic gear, follow-up synchronization, speed reference, torque reference
Motion programs	Number of tasks, number of programs	Up to 8 tasks and 256 programs/Unit (8 parallel branches per task max.)
	Program capacity	In motion program conversion, 8,000 blocks/Unit max. (2 Mbytes); number of blocks: 800
	Data capacity	Position data: 10,240 points/Unit; Cam data: 32 max.; 16,000 points/Unit
	Subroutine nesting	Five levels max.

CS1W-CT0□1, C200H-CT021

# High-speed Counter Units

## Two- and four-channel high-speed counter units with built-in fast control I/O

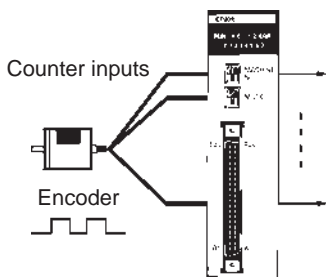
- Max. input frequency = 500 kHz. (when line driver input is used)
- Output turns ON less than 0.5 ms after set value is reached. (may deviate during execution of IORD/ IOWR instructions)
- 32-bit counting range.
- 2- and 4-axis operation available.
- Digital variable noise filter provided.
- 5-, 12-, and 24-V line driver inputs available. (5- and 12-V line driver input is only available, however, for 1 axis with the CS1W-CT021 and 2 axes with the CS1W-CT041.)
- Supports simple, ring, and linear counting modes.
- Supports offset phase input, up and down pulse input, and pulse+direction input.
- Supports 4 external control inputs, and a total of 16 functions can be set including open gate, close gate, preset, reset, capture, stop/capture/reset combinations, and reset enable.
- One Unit supports 4 external outputs and 28 internal outputs with counter value zone comparisons, target comparisons, delays, holds, programmable outputs, and hysteresis settings.
- Pulse rate measurement function and data logging.
- Counter outputs and external control inputs can be used to trigger interrupt tasks in the CPU Unit.
- Settings can be changed during Unit operation.



## Function

The High-speed Counter Units count pulse signal inputs that are too fast to be detected by normal Input Units. The Units can be programmed to produce outputs according to counter values for specified conditions, and many other functions are supported.

## System Configuration



## Terminal Arrangement

Item		Connector 2 (CN2)		Pin No.
		Row A	Row B	
Power Supply (to feed the outputs)		-PS: 0V	+PS: 12 to 24V	1
Digital Outputs [0-3] (NPN/PNP)		O2: NPN	O2: PNP	2
		O3: NPN	O3: PNP	3
Spare				4
Digital Inputs [0-3]		I2: 0V	I2: 24V	5
		I3: 0V	I3: 24V	6
Spare				7
Counter 1 & Counter 2	A	CH2: LD- / 0V	CH2: LD+	8
		CH2: 12V	CH2: 24V	9
	B	CH2: LD- / 0V	CH2: LD+	10
		CH2: 12V	CH2: 24V	11
	Z	CH2: LD- / 0V	CH2: LD+	12
		CH2: 12V	CH2: 24V	13
Spare				14
Counter 3 & Counter 4*	A	CH4: LD- / 0V	CH4: LD+	15
		CH4: 12V	CH4: 24V	16
	B	CH4: LD- / 0V	CH4: LD+	17
		CH4:12V	CH4: 24V	18
	Z	CH4: LD- / 0V	CH4: LD+	19
		CH4:12V	CH4: 24V	20

Connector 1 (CN1)		Pin No.
Row A	Row B	
-PS: 0V	+PS: 12 to 24V	1
O0: NPN	O0: PNP	2
O1: NPN	O1: PNP	3
		4
I0: 0V	I0: 24V	5
I1: 0V	I1: 24V	6
		7
CH1: LD- / 0V	CH1: LD+	8
CH1: 5V	CH1: 24V	9
CH1: LD- / 0V	CH1: LD+	10
CH1: 5V	CH1: 24V	11
CH1: LD- / 0V	CH1: LD+	12
CH1: 5V	CH1: 24V	13
		14
CH3: LD- / 0V	CH3: LD+	15
CH3: 5V	CH3: 24V	16
CH3: LD- / 0V	CH3: LD+	17
CH3: 5V	CH3: 24V	18
CH3: LD- / 0V	CH3: LD+	19
CH3: 5V	CH3: 24V	20

## Specifications

### General

Classification	Number of counters	Encoder A and B input, pulse input, Z signal	Maximum counting speed	Unit numbers	Model
C200H Special I/O Unit	2	Open-collector Input voltage: 12 V DC or 24 V DC RS-422 line driver	50 kcps 75 kcps	0 to F	C200H-CT021
CS1 Special I/O Unit	2	Open-collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (5- and 12- V DC input only possible for 1 axis.) RS-422 line driver	50 kcps 500 kcps	0 to 92 (4 unit numbers per Unit)	CS1W-CT021
		Open-collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (5- and 12- V DC input only possible up to 2 axes.) RS-422 line driver	50 kcps 500 kcps		CS1W-CT041
	4	Open-collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (5- and 12- V DC input only possible up to 2 axes.) RS-422 line driver	50 kcps 500 kcps		

CS1W-CTS21

# SSI Encoder Input Unit

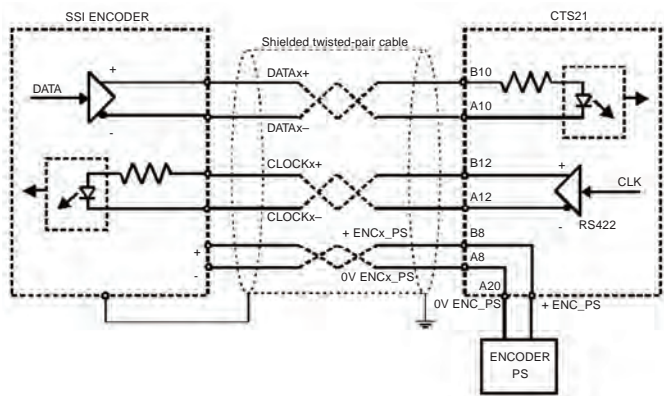
SSI (synchronous serial interface) is a standard communication protocol developed for absolute encoders. It provides easier connection and reduced wiring compared to parallel connection.



## Specifications

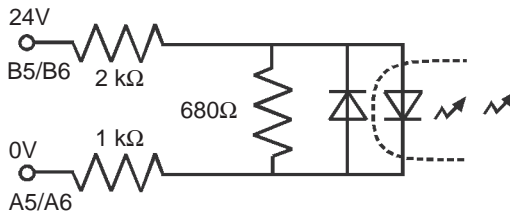
### SSI Communication

Item	Specification
CLK lines	Non-isolated differential line driver, RS422 compliant
DATA lines	Electrically isolated differential line receiver, RS422 compliant
Number of data-bits	9 to 31 (default: 24)
Value coding	Gray/Binary/Tannenbaum/Raw (default Gray)
Clock frequency	100kHz to 1.5MHz
Monoflop time	10μs to 99,990μs (default: 40 μs)
Sample rate	About 2500 Samples/sec with 2 encoders connected (with default settings)



### Input Specifications

Item	Digital Inputs
Input Voltage	24 V DC (19.6 V to 26.4 V)
Input Current (typical)	7.6 mA
ON Voltage (min.)	19.6 V
OFF Voltage (max.)	4 V
Max. repetition rate	1 kHz
Min. pulse width	10 μs
Input Voltage	24 V DC (19.6V to 26.4V)



## Output Specifications

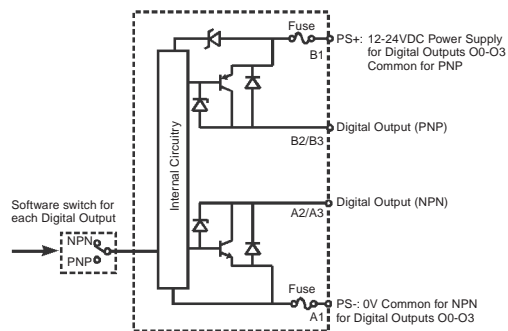
Item	Specification
Driver Type	Open Collector (NPN/PNP selectable)
Operating Voltage Range	12-24 V (10.2 to 26.4 V)
Maximum Switching Capacity	46 mA at 10.2 V to 100 mA at 20.4 V to 26.4 V (400mA max./common) (linear behaviour)
Minimum Switching Current	5 mA
Output ON-delay	0.1ms max.
Output OFF-delay	0.1ms max.
Leakage Current	0.1mA max.

The power supplied to the Unit, to feed the Digital Outputs, has to be supplied externally and should be a double insulated class II (over-voltage) type with ratings from 12 to 24VDC (10.2 to 26.4VDC). Characteristics of the Power Supply Input circuitry are summarised in the following table.

Item	Specification
Operating Voltage Range	10.2-26.4 V DC
Current Consumption	25 mA max. (excl. load current)
Internal Fault Protection	Two 1 A (not replaceable) fuses in Power Supply lines
Reverse Polarity Protection	Yes

The Digital Outputs are insulated from the I/O-bus but not from each other. They are not short circuit protected.

### Digital Output Circuitry:



## Connector (CN1 and CN2) Pin-layout

Use the following table to make connections directly to the soldering terminals of the connector jack(s) (see *Nomenclature* section for position of connectors 1 and 2 and rows A and B):

Connector 2 (CN2)				Connector 1 (CN1)			
Row A		Row B		Row A		Row B	
A1	0V_PS <sup>1</sup>	24V_PS <sup>2</sup>	B1	A1	0V_PS <sup>1</sup>	24V_PS <sup>2</sup>	B1
A2	O2 NPN	O2 PNP	B2	A2	O0 NPN	O0 PNP	B2
A3	O3 NPN	O3 PNP	B3	A3	O1 NPN	O1 PNP	B3
A4			B4	A4			B4
A5	0V I2	24V I2	B5	A5	0V I0	24V I0	B5
A6	0V I3	24V I3	B6	A6	0V I1	24V I1	B6
A7			B7	A7			B7
A8	0V ENC2_PS <sup>3</sup>	+ ENC2_PS <sup>4</sup>	B8	A8	0V ENC1_PS <sup>3</sup>	+ ENC1_PS <sup>4</sup>	B8
A9			B9	A9			B9
A10	DATA2 -	DATA2 +	B10	A10	DATA1 -	DATA1 +	B10
A11			B11	A11			B11
A12	CLOCK2 -	CLOCK2 +	B12	A12	CLOCK1 -	CLOCK1 +	B12
A13			B13	A13			B13
A14			B14	A14			B14
A15			B15	A15			B15
A16			B16	A16			B16
A17			B17	A17			B17
A18			B18	A18			B18
A19			B19	A19			B19
A20	0V ENC_PS <sup>3</sup>	+ ENC_PS <sup>4</sup>	B20	A20	0V ENC_PS <sup>3</sup>	+ ENC_PS <sup>4</sup>	B20

# Serial Communication Units

## Serial Communications Features

Unit	Model	Ports	Serial communications mode							Serial Gateway (see note)	BASIC program- ming	Message communi- cations
			Protocol macros	Host Link	NT Links	No-proto- col	Peripheral bus	Program- ming Console bus				
			General- purpose external devices	Host computers	OMRON PTs	General- purpose external devices	Program- ming Devices	Program- ming Console	Compo- Way/F devices, Inverters, Servo Drives			
CPU Units	All models	Port 1: Peripheral	No	Yes	Yes	No	Yes	Yes	No	No	No	
		Port 2: RS-232C	No	Yes	Yes	Yes	Yes	No	Yes	No	No	
ASCII Units	C200H- ASC11	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No	
		Port 2: RS-232C	No	No	No	No	No	No	Yes	Yes	No	
	C200H- ASC21	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No	
		Port 2: RS-422A/485	No	No	No	No	No	No	Yes	Yes	No	
	C200H- ASC31	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No	
		Port 2: RS-232C	No	No	No	No	No	No	Yes	Yes	No	
Serial Com- munications Boards/Units	CS1W- SCB21-V1	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No	
		Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No	
	CS1W- SCB41-V1	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No	
		Port 2: RS-422A/485	Yes	Yes	Yes	No	No	No	No	No	No	
	CS1W- SCU21-V1	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No	
		Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No	

**Note:** Requires SCU/SCB Ver 1.2 or later mounted on CS1 CPU Unit Ver 3.0.

C200H-ASC□□

# ASCII Units

## Easily Perform Serial Data Communications

- Perform ASCII communications with a wide range of external devices.
- The C200H-ASC11/ASC21/ASC31 function as special processing units with BASIC programming.
- Large-capacity user memory: 200 Kbytes
- Model available with RS422A/485 port.
- Various forms of data exchanges with CPU Unit:  
Select the best method for the read/write trigger and timing.
- High-speed data exchanges possible with shared memory (not dependant on I/O refresh).
- A wide range of interrupt processes: Interrupts from CPU to ASCII Unit, communications interrupt, key interrupts, timer interrupts, error interrupts, etc.
- Easy control of transmission control signals.
- Calculation instructions for error check codes.
- Many BASIC debugging functions (break points, 1-step execution, execution stop monitoring, etc.)
- Error log supported with up to 30 error records.



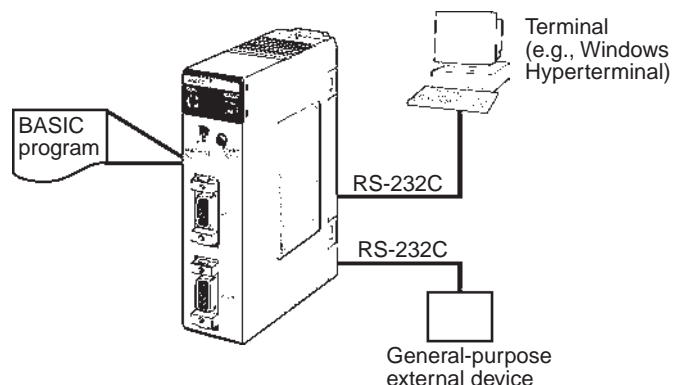
## Function

The ASCII Units support BASIC language programming and RS-232C and RS422A/485 serial communications. BASIC programming enables ASCII communications with essential any external device. It can also be used as a special processing unit to aid the CPU Unit without using external communications.

The C200H-ASC11/ASC21/ASC31 provide shared memory with the CPU Unit, and both the ASCII Unit and the CPU Unit can access the shared memory asynchronously, providing for high-speed data exchanges between the two Units without using interrupts.

A library interface toolkit is available for the creation of user-defined library routines in BASIC or C.

## System Configuration



## Specifications

### General

Classification	User memory	Shared memory	Serial communications ports	Unit numbers	Model
C200H Special I/O Unit	200 Kbytes	Provided (90 words in I/O memory)	RS-232C x 2	0 to F	C200H-ASC11
			RS-232C x 1, RS-422A/485 x 1		C200H-ASC21
			RS-232C x 2, RS-232C x 1 for terminal		C200H-ASC31

**Note:** The C200H-ASC02 can also be used with CS1 PLCs.



CS1W-SCU21-V1/-SCB□1-V1

# Serial Communications Units/Boards

## Supports Protocol Macros, Host Link Communications, and 1:N NT Links

- Serial Communications Board
- Increase the number of serial ports without using I/O slots.
- Connect general-purpose external devices 1:N using RS-422A/485.
- Generate interrupts to the CPU Unit when data is received.
- Serial Communications Unit
- Mount up to 16 Units (including all other CPU Bus Units) on CPU or Expansion Racks. Ideal for systems that require many serial ports.

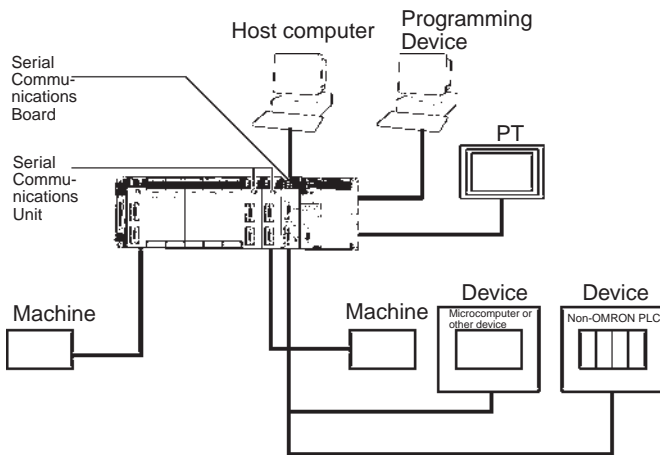


## Function

Either an Inner Board or CPU Bus Unit can be used to increase the number of serial ports (RS-232C or RS-422A/485) two at a time. You can specify Protocol Macros, Host Link Communications, or 1:N NT Links separately for each port. With the CS1 Series, you can always install the right number of serial ports for your system.

The Serial Gateway function available in SCU/SCB Units Ver.1.2 and higher enable seamless access to field devices like temperature controllers, inverters or servo drives over multiple network layers. The Gateway function handles the de/encapsulation of serial communication messages in the higher-layer FINS communication, e.g. over Controller Link or Ethernet.

## System Configuration



## Specifications

### General

Unit	Classification	Serial communications modes	Serial	Unit numbers	Model
Serial Communications Board	Inner Board	Set separately for each port: Protocol Macro, Host Link, or 1:N NT Link, Serial Gateway or non-protocol communications.	RS-232C x 2	---	CS1W-SCB21-V1
			RS-232C x 1, RS-422A/485 x 1		CS1W-SCB41-V1
Serial Communications Unit	CS1 CPU Bus Unit		RS-232C x 2	0 to F	CS1W-SCU21-V1

## Protocol Macros

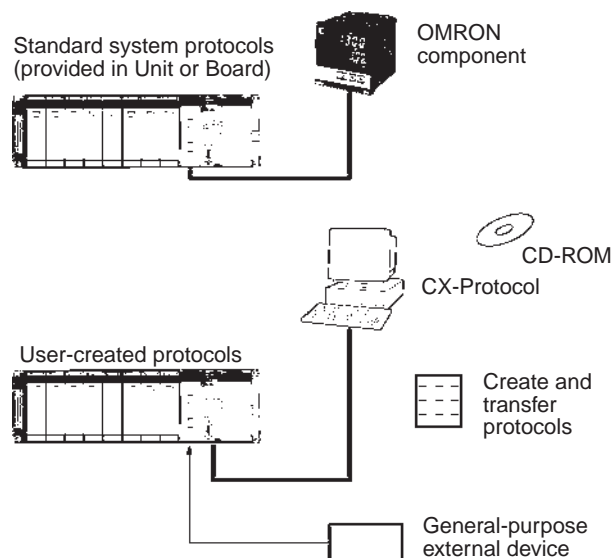
Easily Create Protocols for Data Exchange with External Devices; Execute with One Instruction

### Function

Protocols for communications with external devices can be easily created according to the communications standards required by the external device. Protocol macros enable communications with essentially any external device with an RS-232C or RS-422A/485 port without programming communications in the PLC.

Standard system protocols are provided as a standard feature for communications with OMRON components, such as Temperature Controllers, Panel Meters, Bar Code Readers, and Modems. A Windows-based tool called CX-Protocol is also available to enable creation of protocols for most any external device.

### System Configuration



### Types of Protocol

Protocols	External devices	Required products
Standard system protocols	OMRON components	Serial Communications Board or Unit
User-created protocols	General-purpose external device	Serial Communications Board or Unit + CX-Protocol (Windows-based protocol support software)

### Standard System Protocols

Component		Model	Send/receive sequences
CompoWay/F-compatible components		OMRON CompoWay/F slave components	CompoWay/F command send/response receive
Digital Controllers and Temperature Controllers	Small Digital Controller with Communications (53 x 53 mm)	E5CK	Present value read, set point read, manipulated variable read, etc. Set point write, alarm write, PID parameter write, etc.
	Temperature Controllers with Digital Indications (Thermac J with communications) (96 x 96 mm or 48 x 96 mm)	E5□J-A2H0	
	Digital Controllers with Communications (96 x 96 mm)	ES100□	
	High-density Temperature Controller with communications (8 control points)	E5ZE	
Intelligent Signal Processors (special specifications)		K3T□	Display value read, comparison value read, write, etc.
Bar Code Readers	Laser Scanner type	V500	Read start, data read, read stop, etc.
	CCD type	V520	
Laser Micrometer		3Z4L	Measurement condition set, continuous measurement start, etc.
Visual Inspection Systems	High speed, high precision, low cost	F200	Measurement, continuous measurement, etc.
	High-precision inspection/positioning	F300	
	Character inspection software/positioning software	F350	
RFID Controllers	Electromagnetic coupling (for short distances)	V600	Carrier data read, autoread, write, etc.
	Microwave (for long distances)	V620	
Hayes Modem AT Command		---	Modem initialize, dial, send, etc.
OMRON PLCs with Host Link (C-mode) protocol		C-Series PLCs	---
OMRON PLCs with Host Link (FINS) protocol		CS/CJ-series PLCs	Requires SCU/SCB Ver. 1.2 or higher

NT-AL001

# RS-232C/RS-422A Adapter Unit

**Allows integration of RS232C devices into RS-422A networks.**

- Long-distance transmissions are possible through an RS-422A interface. By converting from RS-232C to RS-422A and then back to RS-232C, a transmission distance of up to 500 m can be achieved.
- No power supply is required. If the 5-V terminal (150 mA max.) is connected from the RS-232C device, a separate power supply is not required to drive the Adapter Unit.
- The removable terminal block enables wiring not possible with D-sub connectors. (The RS-232C interface is 9-pin D-sub.)



## Specifications

### RS-232C Interface

Item	Specification
Baud rate	64 Kbps max.
Transmission distance	2 m max.
Connector	9-pin, D-sub connector (female)

### RS-422A Interface

Item	Specification
Baud rate	64 Kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminal block	8 terminals, M3.0; detachable

CS1W-V600□□□/C200H-IDS01-V1

# RFID Sensor Unit

## Easy integration of RFID Systems into PLC's.

- Connects V600 RFID read/write heads directly to the PLC.
- Function checking possible with standard hand-held Programming Console.
- Read data from Data Carriers simply by sending a read command.
- The C200H-IDS01-V1 can read/write up to 1,024 bytes. The CS1W-V600C11/12 can read/write up to 2,048 bytes.

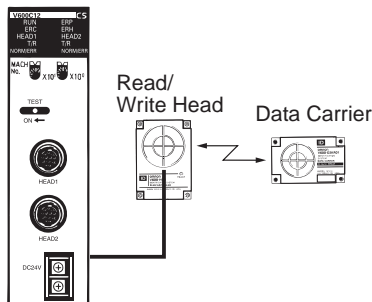


## Function

Read/write data in Data Carrier memory by sending read/write commands from the CPU Unit to the Read/Write Head.

One Read/Write Head can be connected to the CS1W-V600C11 and two Read/Write Heads can be connected to the CS1W-V600C12. The data transfer speed has been increased in both models.

## System Configuration



## Specifications

Classification	Connectable ID System	Connectable Read/Write Heads	External power supply	Unit numbers	Model
CS1 CPU Bus Unit	V600 Series (electromagnetic, for short distances)	1 Read/Write Head	Not required	0 to 95	CS1W-V600C11
		2 Read/Write Heads	24 V DC	0 to 94	CS1W-V600C12
C200H Special I/O Unit		---	Not required	0 to 9	C200H-IDS01-V1

CS1W-GPI01

# GP-IB Interface Unit

- Enables communications between SYSMAC CS-series PLCs and GP-IB instruments.
- Conforms to the standard interface IEEE-488-1978 (GP-IB).
- Usable in either Master Mode (controller) or Slave Mode (talker, listener).
- Communications with GP-IB instruments are easily implemented simply by using the INTELLIGENT I/O READ and INTELLIGENT I/O WRITE (IORD/IOWR) instruction in the ladder program in the CPU Unit to read and write buffer memory in the GP-IB Interface Unit.



## Specifications

Item	Specification
Name	SYSMAC CS-series GP-IB Interface Unit
Model number	CS1W-GPI01
Unit type	CS1 Special I/O Unit
Mounting location	CS1 CPU Rack or CS1 Expansion Rack
Max. number of GP-IB Interface Units	Up to 4 GP-IB Interface Units per CPU Unit
Unit number setting range	0 to 95
GP-IB Interface Unit settings when editing the I/O tables offline with the CX-Programmer	Number of unit numbers used: 1 Number of input words allocated: 5 Number of output words allocated: 5
Transmission method	8-bit parallel data transfer
Communications method	Half duplex
Interface	Conforms to IEEE-488-1978 (24-pin) standards
Handshaking method	Three-line handshaking
Functional specifications (GP-IB interface functions)	Master mode: SH1, AH1, T6, TE0, L4, LE0, C1 to C4, and C28 Slave mode: SH1, AH1, T6, TE0, L4, LE0, SR1, RL0, PP0, DC1, and DT0
Connection configurations	Star configuration or daisy-chain configuration
Transmission distance	Limits on the length of cables in the system (All three of these conditions must be satisfied simultaneously.) Total cable length $\leq$ Number of devices in the system $\times$ 2 m Total cable length $\leq$ 20 m Length of a single cable $\leq$ 4 m (for a 1:1 connection)
Max. number of connected devices	15 devices max. including the GP-IB Interface Unit
GP-IB device address	0 to 30
Delimiters	Select from the following: CR + LF, CR, LF, EOI, or user-set code.
Max. data transfer size	512 bytes max. in a single reception or transmission
Max. number of connectors	2 (connectors can be stacked)
Current consumption	5 VDC, 330 mA
Dimensions	35 $\times$ 130 $\times$ 101 mm (W $\times$ H $\times$ D)
Weight	258 g max.

# Communications Networks

## Overview

Level	Network	Functions	Communications	Unit/Board
Information networks	Ethernet	Host computer to PLC	FINS messages	Ethernet Unit
		PLC to PLC		
		Host computer to CPU Unit memory card	FTP server	
		UNIX computer or other socket service to PLC	Socket services	
Control networks	Controller Link	Computers connected directly to network and PLC	FINS messages	Controller Link Support Board and Unit
			Data links (offsets and automatic setting)	
	Controller Link	PLC to PLC	FINS messages	Controller Link Unit
			Data links (offsets and automatic setting)	
	DeviceNet	PLC to components (slaves)	FINS messages on open network	DeviceNet Master Unit
	DeviceNet		High-capacity remote I/O on open network (fixed or user allocations)	DeviceNet Master Unit
	PROFIBUS-DP	PLC to components (slaves)	High-capacity remote I/O on open network (user allocations)	PROFIBUS-DP Master, I/O Unit
	CAN/CANopen	Component to components	Freely configurable, object-oriented communication using CANopen or user-defined CAN protocols	CANopen Unit
	CompoBus/S	PLC to components (slaves)	High-speed remote I/O with OMRON network (fixed allocations)	CompoBus/S Master Unit

## Specifications

### Communications

Network	Ethernet	Controller Link	PROFIBUS-DP	DeviceNet	CANopen	CompoBus/S
Messages	Yes	Yes	Limited to DPV1 devices	Yes	Yes	---
Data links	---	Yes	Manually configurable	---	Yes	---
Remote I/O	---	---	Yes	Yes	Yes	Yes
Maximum speed	10/100 Mbps	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	12 Mbps Comm cycle from 1 ms	500 Kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	1 Mbps (acyclic, on-event communication)	750 Kbps (See note 1.) Comm cycle: Approx. 1 ms (128 inputs and 128 outputs)
Total distance	---	Twisted-pairs: 1 km (at 500 bps) Optical: 20 km	1200 m up to 93.75 kbps, 100 m at 12 Mbps. Extension by optical links is possible.	500 m (at 125 kbps)	5 km at 10 kbps to 40 m at 1 Mbps	Trunk line: 500 m (See note 2.) Communications cycle: 6 ms max.
Maximum nodes	---	32/62 with repeaters	126 with repeaters	63	127	32
Communications media	---	Special twisted-pair cable or optical cable	PROFIBUS cable	DeviceNet cable	ISO11898. e.g. DeviceNet cable	2-core or 4-core VCTF cable, special flat cable (See note 3.)
Network data link capacity	---	32,000/62,000 words	---	---	---	---
Remote I/O capacity	---	---	300 words (C200H) 7000 words (CJ1, CS1)	32,000 pts (with Configurator) 2,048 pts (without Configurator)	Up to 200 words configurable	256 pts
Supporting PLCs	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE	CS1, CJ1, C200HX/HG/HE/HS, CQM1/CQM1H (I/O link), CPM1A (I/O link)	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE, C200HS, CQM1/CQM1H (with I/O Link), CPM2C (with I/O Link)	CS1, C200HX/HG/HE	CS1, CJ1, C200HX/HG/HE, C200HS, CQM1/CQM1H, CPM2C-S1□0C (-DRT) SRM1; CPM1A/CPM2C (with I/O Link)

- Note:** 1. For high-speed communications mode. Trunk line length is 100 m (30 m max. for 4-core VCTF or special flat cable).  
2. For long-distance communications mode (200 m max. for 4-core VCTF or special flat cable).  
3. Different types of cables cannot be mixed.

CS1W-ETN□□

# Ethernet Units

## Enables fast data transfer within Factory Automation systems, and easily links FA systems to plant management systems

- Access socket services simply by manipulating specific bits in memory.
- Take advantage of data transfer by e-mail.
- Seamless communication with Controller Link and other networks.
- Use the Ethernet standard protocols, TCP/IP and UDP/IP.
- Use OMRON's standard FINS message communications.
- Exchange files with host computers using FTP.
- Set communications parameters with the CX-Programmer setup menus.



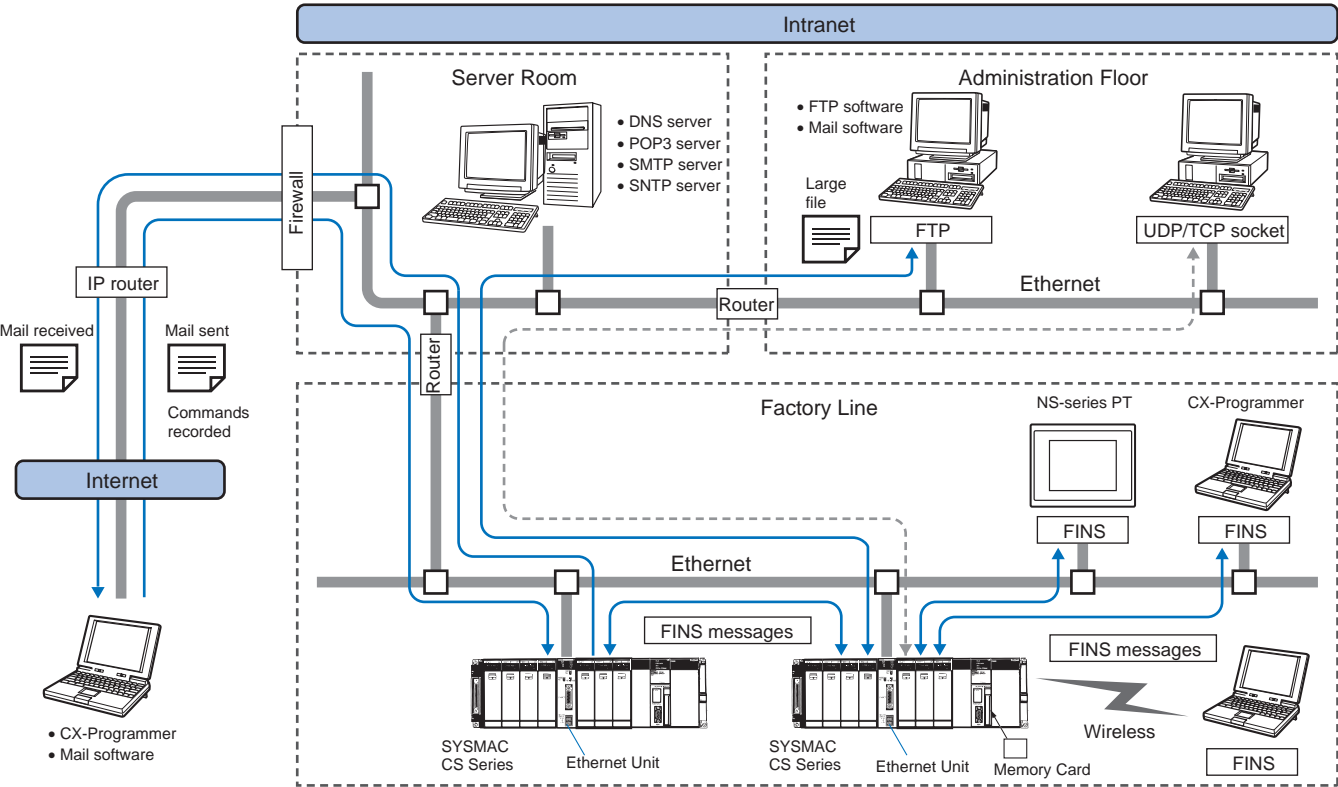
### Features of the 100Base-TX Model

- While the 100Base-TX model maintains backward compatibility with the earlier models (10Base-5 and 10Base-T), the new model has a basic system response performance about 4 times faster.
- The FINS message communications capabilities have been improved dramatically.
  - Increased number of nodes (from 124 to 254 nodes)
  - Supports TCP/IP protocol as well as the earlier UDP/IP protocol.
  - The host computer's IP address can be set dynamically (DHCP).
- A mail receiving function has been added (POP3).
- A function has been added that automatically corrects the PLC's internal clock (SNTP).
- Various kinds of servers can be specified by their host name (DNS).

### Function

Achieve a wide range of communications from PLCs connected to an Ethernet network: Transfer data with TCP/IP or UDP/IP socket services, executed OMRON's standard FINS commands, transfer files with FTP, or send mail with SMTP. Select the communications services that are required and flexibly connect PLCs on an information level Ethernet network.

System Configuration



Specifications

Unit name	Type	Communications service	Connector	Model
Ethernet Unit (100Base-TX)	CS CPU Bus Unit	FINS communications service (TCP/IP, UDP/IP), FTP server functions, socket services, mail transmission service, mail receive (remote command receive), automatically adjusted PLC built-in clock, server/host name specification)	100Base-TX (10Base-T)	CS1W-ETN21 CS1D-ETN21D

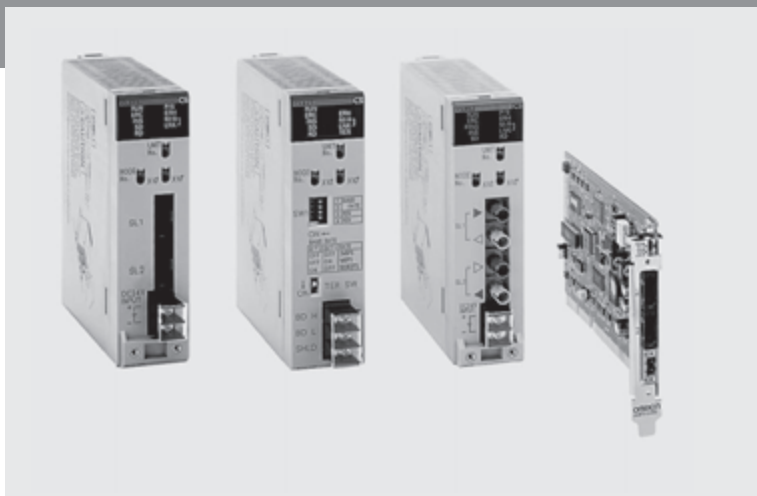


CS1W-CLK□□-V1, 3G8F7-CLK□□-V1, CS1W-RPT0□

# Controller Link Units and PCI Boards

## OMRON's efficient and easy-to-use FA Network

- Achieve high-capacity, flexible data links.
- Transfer large volumes of data through a message service.
- Connect through twisted-pair cables or optical fiber cables.
- Connect CS1, CJ1, C200HX/HG/HE and CQM1H PLCs.
- Complete error correction and troubleshooting functions.
- Quick configuration of communication links with CX-Programmer's setup menus.
- Increase network reliability with duplex connections for optical networks.
- Use either ring mode or bus mode for optical networks.



## Function

Controller Link is OMRON's proprietary 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.

## System Configuration

### Use Repeater Units for T-branch Wiring, Extension, Expansion, and Optical Sections

#### T-branching Enables More Flexible Wiring Solution for Layout, Building, and Expansion of Networks



#### Wired Types Support Long-distance Extension

The total extended length that was previously 500 m at 2 Mbps can be extended to up to 1.5 km by using two Repeater Units.

#### Connect up to 64 Nodes Using Wired Types

Networks can be constructed with up to 62 nodes when Controller Link Units/Support Boards with -V1 suffix are combined with Repeater Units.

#### Wiring with Optical Cables Increases Noise Immunity

Using two Repeater Units for optical ring enables wiring with optical cables in parts of the network subject to noise.

#### Simpler, More Flexible Data Links

#### Change Data Link Tables While Data Links Are Active

- When data link tables are changed due to additional nodes or other networking changes, data link tables can be transferred without stopping any data link communications.
- Flexible system configurations can be changed by combining node expansion using Repeater Units.

## Specifications

Unit/Board	Classification	Compatible PLC	Media	Model	Connections
Controller Link Units	CPU Bus Unit	CS Series	Wired	CS1W-CLK21-V1	Can be mounted together with previous Controller Link Units/Support Boards.
			Optical ring (H-PCF cable)	CS1W-CLK12-V1 (See note.)	
			Optical ring (GI cable)	CS1W-CLK52-V1 (See note.)	
Controller Link Support Boards	Personal computer board (for PCI bus)	---	Wired	3G8F7-CLK21-EV1	
			Optical ring (H-PCF cable)	3G8F7-CLK12-EV1	
			Optical ring (GI cable)	3G8F7-CLK52-EV1	
Controller Link Repeater Units	---	Not mounted to PLC	Twisted-pair cable	CS1W-RPT01	Unit mounted independently using either DIN Track or screws.
			Optical ring (H-PCF cable)	CS1W-RPT02	
			Optical ring (GI cable)	CS1W-RPT03	

**Note:** Lot numbers for the CS1W-CLK12-V1 and CS1W-CLK52-V1 are 030602 or later (June 2003 or later).

### Main Specifications Related to Version Upgrade for Unit Ver. 1.2

Item	Unit Ver. 1.2 or later	Pre-Ver. 1.2
Number of data link words	Number of send/receive words per Unit Total of Area 1 and Area 2: 20,000 words max.	Number of send/receive words per Unit Total of Area 1 and Area 2: 12,000 words max.
Data Link Area allocations	User-set allocations Automatically set equal allocations Automatically set 1: N allocations	Number of send words per Unit Total of Area 1 and Area 2: 1,000 words max. Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area Area 1: CIO Area (including data link words), Area 2: DM Area and EM Area Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area
Maximum number of Controller Link Units connected to a single CPU Unit	8 Units max.	4 Units max.

**Note:** CX-Programmer Ver. 5.0 or higher is requested to set a data link area with a maximum number of send and receive words of 20,000 words per Controller Unit, or to allocate the same area for Area 1 and Area 2.

### Specifications for Networks Using Repeaters

Item	Segment (See note 1.)	Total network
Transmission path configuration	Multi-drop	Tree (using Repeaters to connect each segment)
Baud rate/maximum transmission distance (See note 2.)	2 Mbps: 500 m 1 Mbps: 800 m 500 kbps: 1 km	2 Mbps: 1.5 km 1 Mbps: 2.4 km 400 kbps: 3.0 km
Maximum number of nodes	Controller Link Unit + Repeater Unit Total number of nodes: 32	Controller Link Unit: 62 nodes (using a Controller Link Unit that supports 62 nodes)
Maximum number of Repeater levels (See note 3.)	---	2 levels

- Note:**
- Specifications for each segment are the same as for Wired Controller Link networks.
  - Maximum transmission distance: Total wired cable length between the two nodes separated by the longest total wired cable length.
  - Maximum number of Repeater levels: Maximum number of Repeaters in a path linking any two nodes. For optical ring types, one set of two Units comprises one level.

CS1W-PRM21

# PROFIBUS-DP Master Unit

- PROFIBUS-DP master class one with support of DP-V1 data types.
- 7 kWord I/O
- Simple configuration through FDT/DTM based configurator
- Special CPU unit
- Handles data independent of the CPU unit, thus reducing CPU load



## Function

The CS1W-PRM21 is a master system (DPM1). It exchanges I/O data and communication/status information with the CPU of the PLC. To configure the CS1W-PRM21 a serial port of the CPU can be used. But because configuring is done through FINS

communication virtual any accesspoint on the PLC network can be used. It exchanges data and commands with PROFIBUS-DP slave stations over the PROFIBUS network.

## Specifications

Model			Remarks
CS1W-PRM21	Main function	Basic PROFIBUS-DP master Class 1 functions plus: DPV1 data types support	
	Unit No.	0-15	Special CPU unit
	Maximum number of units mountable per PLC	16	Maximum depends on PLC CPU-type
	Configurator	FTD/DTM based	Incorporates a Generic DTM to use with GSD-file based slaves
	Supported baud rate(s)	All baud rates as specified by the standard EN50170 Volume 2, the PROFIBUS extensions to EN50170, as well as the standard IEC61158: 9.6 kBit/s, 19.2 kBit/s, 45.45 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s, 12 MBit/s	The baud rate value to be used must be selected through the Configurator.
	Selectable PROFIBUS address	0-125	Set through the configurator
	Maximum number of PROFIBUS slaves	125	
	Maximum number of I/O points	7168 words	
	Maximum number of I/O points per PROFIBUS slave	244 bytes In / 244 bytes Out	
	Control and status area size	25 words	
	Supported Global_Control services	Sync Unsync Freeze Unfreeze Clear	Through Control Area
	Supported Master-Slave communication services	Data_Exchange Slave_Diag Set_PRM Chk_Cfg Global_Control	
	Power consumption	400 mA at 5 V	
	Dimensions	34.5 mm wide x 130 mm height x 111.2 mm depth	
	Weight	154 gr	
	Ambient temperature	Operating: 0 °C to 50 °C	

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C200HW-PRT21

# PROFIBUS-DP Slave Unit

## I/O Link Unit for C200H□ and CS1 PLC Ideal for distributed control.

- OMRON's C200HS, C200HE, C200HG, C200HX and CS1 PLCs can be used as an intelligent Slave on a PROFIBUS-DP network.
- Default 2 words in + 2 words out, maximum 100 words in + 100 words out.
- Simple PROFIBUS-DP node address setting by rotary switches.
- Supports SYNC/FREEZE and Fail-Safe functions.



## Specifications

### Communication Specifications

Applicable standard	EN 50170 vol. 2
Station type	Modular station, max. 32 modules Configurable with In-, Out- and I/O-modules of 1, 2, 4, 8 and 16 words Total of 0 to 100 words in + 0 to 100 words out, with consistency over the full length
Bus connector	9-pin female sub-D connector (RS-485 PROFIBUS connector)
Bus termination	External
Baud rate (auto-detect)	9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbit/s, 1.5 / 3 / 6 / 12 Mbit/s
PROFIBUS address range	0 to 125, Remote setting not supported
Communication cable	Type A (EN 50170 vol. 2)
Minimum slave interval time	0.5 ms
Supported DP functions	Data_Exchange Slave_Diag Set_Prm Chk_Cfg Global_Control (SYNC, FREEZE, CLEAR) Get_Cfg RD_Imp RD_Outp
PROFIBUS-DP GSD file	OC_04AC.GSD

### Unit Specifications

Host PLC system	C200HS, C200HE, C200HG, C200HX, CS1	
Maximum number of Units per PLC system	C200HS C200HE-CPU11/32/42 C200HG-CPU33/43 C200HX-CPU34/44	10
	All others	16
Slave unit mounting position	CPU Rack or Expansion I/O Rack Unit: cannot be mounted on SYSMAC BUS Slave Racks Unit: cannot be mounted on a C200H PLC system	
Current consumption	250 mA at 5 V DC (from PLC power supply)	
Weight	180 g	
Switch settings	Special I/O Unit number (0-F) by notary switch PROFIBUS-DP mode address (0 to 125) by 3 rotary switches	
LED indicators	Unit status: RUN (green LED), ERR (red LED) Network status: COMM (green LED), BF (red LED)	
No. of IR words	PLC to Slave Unit: 3 words (1 word of control data + 2 words slave input data) Slave unit to PLC: 5 words (3 words of unit status + 2 words slave output data)	
No. of DM settings	8 words of Unit setup information	
Amount of I/O data per Unit	Default (DM settings all 0000)	all PLC's: 2 words in + 2 words out
	With user defined DM settings	C200HS: up to 80 words in + out all others: up to 100 words in + 100 words out
Storage temperature	- 20 °C to + 75 °C	
Operating temperature	0 °C to + 55 °C	
Operating humidity	10% to 90% (non-condensing)	
Conformance to EMC- and environmental standards	EN50081-2	
	EN61131-2	

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CS1W-DRM21-V1

# DeviceNet Unit

## Multivendor Field Network

- Control of up to 32,000 points (2,000 words) per master.
- Remote I/O communications can be allocated in any area using DM settings.
- 16 DeviceNet Units can be mounted for each CPU Unit (3 max. for fixed allocations).
- When using the Configurator (see note), remote I/O can be allocated in an order independent of node address.

**Note:** The Configurator is allocating a node-address if connected to DeviceNet using a DeviceNet communication card. It is not doing this if connected through the serial communications interface of the CPU.

- DeviceNet Units can be used as a master and a slave, and this functionality can be used simultaneously.

**Note:** DeviceNet Units allow DeviceNet networks to be treated exactly like Controller Link, Ethernet, or other networks for message communications or remote programming and monitoring by a CX-Programmer.

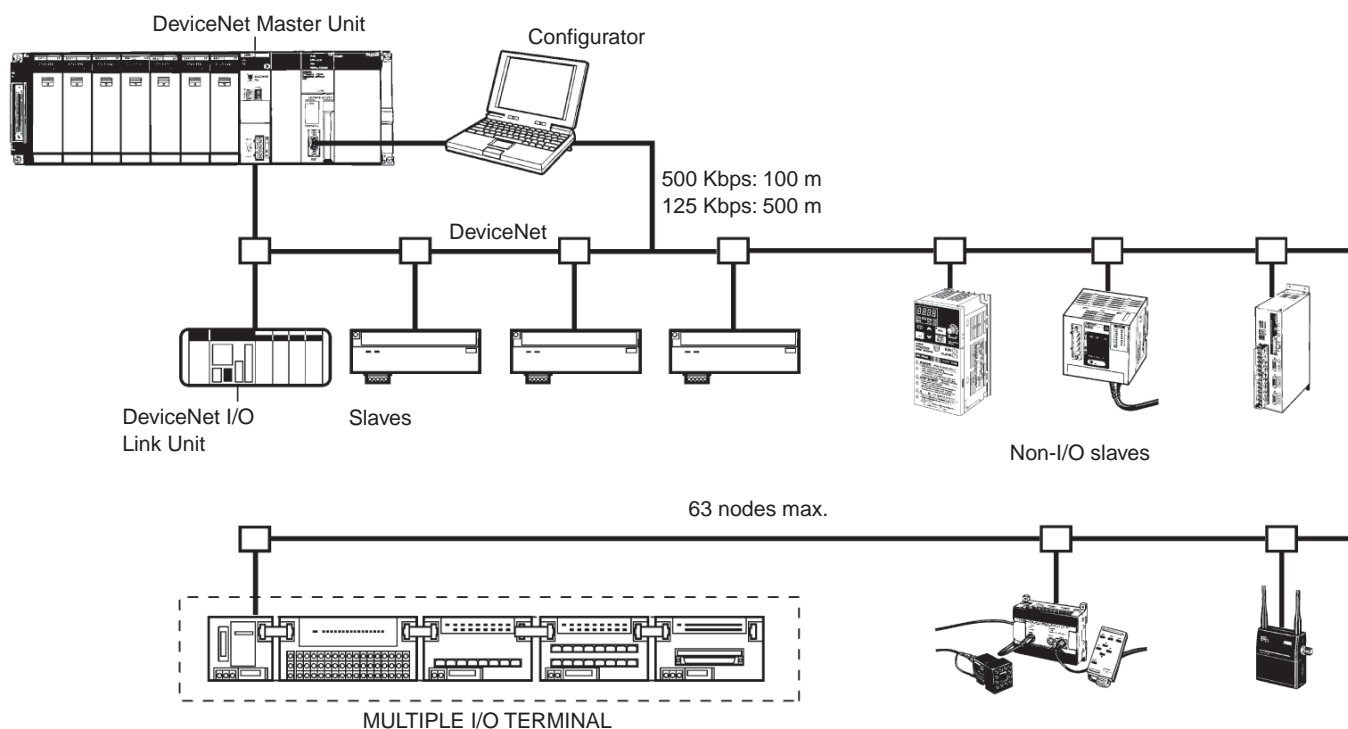


## Function

OMRON supports the DeviceNet open field network, a multivendor network for machine/line control and information. The following types of communications are possible.

1. Remote I/O communications for automatic data transfers between the CPU Unit and Slaves (with no programming in the CPU Unit).
2. Explicit message communications. This can be programmed from the CPU unit (IOWR and CMND instructions) and read from/write to other DeviceNet units.
3. With explicit message communication FINS commands can be sent to other devices that support FINS messaging.

## System Configuration



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## Ordering Information

Compatible PLCs		Maximum number of I/O points			Model
		Fixed allocations	User-set allocations		
			Using allocated DM Area words	Using Configurator	
CS1 Series	When used as a master	Input: 1,024 points Output: 1,024 points Total: 2,048 points (128 words)	Input: 8,000 points Output: 8,000 points Total: 16,000 points (1,000 words)	Input: 8,000 points x 2 blocks Output: 8,000 points x 2 blocks Total: 32,000 points (2,000 words)	CS1W-DRM21
	When used as a slave	Input: 16 points Output: 16 points Total: 32 points (2 words)	Input: 1,600 points Output: 1,600 points Total: 3,200 points (200 words)	Input: 1,600 points x 1 block Output: 1,600 points x 2 blocks Total: 4,800 points (300 words)	

## Specifications

### Master/Slave Specifications

Communications power supply voltage				11 to 25 V DC (supplied from the communications connector) (See note 1.)
Current consumption				Communications:30 mA max. Internal circuit:290 mA max.
Max. number of connectable slaves	Remote I/O, explicit message service			63 (See note 2.)
Max. number of I/O points	Fixed allocations		When used as a master	2,048 points
			When used as a slave	32 points
	User-set allocations	Using allocated DM Area words	When used as a master	16,000 points
			When used as a slave	3,200 points
		Using Configurator	When used as a master	32,000 points
			When used as a slave	4,800 points
Number of allocated words	Fixed allocations		When used as a master	64 input and 64 output words Software switch/status area: 25 words
			When used as a slave	1 input word, 1 output word (See note 3.)
	User-set allocations	Using allocated DM Area words	When used as a master	500 input and 500 output words Software switch/status area: 25 words
			When used as a slave	100 input and 100 output words (See note 3.) Software switch/status area: 25 words
		Using Configurator	When used as a master	500 input words x 2 blocks, 500 output words x 2 blocks Software switch/Status area: 25 words
			When used as a slave	100 input words x 1 blocks, 100 output words x 2 blocks Software switch/Status area: 25 words
Max. message length				542 bytes (See note 4.)
Max. number of Units mountable to PLC	Fixed allocations			3
	User-set allocations			16
Weight				172 g max.

- Note:** 1. Refer to the *DeviceNet (CompoBus/D) Operation Manual (W267)* for the communications power supply specifications.  
2. The DeviceNet unit uses a node of the 64 supported by DeviceNet, leaves connection is possible to 63 slaves.  
3. When the DeviceNet is used a slave, "input" and "output" respectively refer to input from the master to the slave and output from the slave to the master.  
4. The maximum message length includes the command code when using the CMND instruction.  
5. The CS1W-DRM21 cannot perform message communications with the E5ZE-8□D1□B. Use the E5ZE-8□D1□B-V2, which is a later version. For details on the E5ZE-8□D1□B-V2, refer to the catalog for the product itself (SGTD-017).

### DeviceNet Unit

Classification	Types of communications	Specifications	Unit numbers	Model
CS1 CPU Bus Unit	Remote I/O communications master (fixed or user-set allocations) Remote I/O communications slave (fixed or user-set allocations) Message communications	Up to 16 Units can be mounted when a Configurator is used.	0 to F (Configurator required to mount 16 Units.)	CS1W-DRM21
C200H Special I/O Unit	Remote I/O communications master			C200HW-DRM21-V1
	Remote I/O communications slave			C200HW-DRT21

### DeviceNet Configurator

Model number	Specifications
WS02-CFDC1-E	Software only (Windows 95, 98, NT 4.0, 2000, or XP)
3G8E2-DRM21-E-V1	PC card with software (Windows 95 or 98)

C200HW-DRT21

# DeviceNet I/O Link Unit

**I/O Link Unit is ideal for distributed control. PLC can be used as an Intelligent Slave on the DeviceNet.**

- Intelligent DeviceNet Slave
- Supports I/O and message communications.
- Maximum I/O area size:  
512 input points (32 words)  
512 output points (32 words)
- Programming Console or Configurator freely allocates I/O areas.



## Ordering Information

Name	Max. number I/O points	Model
I/O Link Unit (for SYSMAC CS1, C200HX/HG/HE)	512 inputs, 512 outputs (1,024 points in total)	C200HW-DRT21

## Specifications

### Ratings/Characteristics

#### General Specifications

Item	Specification
Communications power supply voltage	11 to 25 V DC
Current consumption	Communications power supply: 45 mA max. Internal circuit power supply: 250 mA max. at 5 V DC
Max. number of I/O points	512 input points (32 words) 512 output points (32 words)
Default area	Write area (linking with Master's write area): 1 word out of 350 IR words Read area (linking with Master's read area): 1 word out of 50 IR words
No. of connectable Units	10 max. (CS1/C200HX/HG/HE CPU Unit handles up to 880 I/O points) 16 max. (CS1/C200HX/HG/HE CPU Unit handles more than 880 I/O points)
Weight	250 g max.

### Function Specifications

#### Settings (Slave)

Item	Specification
Function	A write area block and a read area block can be freely allocated to any areas or addresses respectively
Allowable setting area	Both read and write areas can be allocated to IR, DM, HR, AR, LR, T/C, and EM areas
First address	A readable or writable area by word (with some restrictions)
Area size	Set in 1-byte increments up to 64 bytes for both read and write areas
Setting method	Configurator Programming Console
	Refer to the <i>DeviceNet Configurator Operation Manual (W328)</i> . 1. Write the set value to I/O setting area allocated to the Special I/O Area. 2. Turn ON the software switch allocated to the Special I/O Area and write the settings. 3. Turn the Programming Console OFF and ON or reset the AR area.

### Message Communications

Item	Specification
Function	Supports messages that can be written to or read from the CS1/C200HX/HG/HE's user I/O areas (i.e., IR, DM, HR, AR, LR, T/C, and EM areas)
Master	OMRON's Master Unit or compatible unit from Rockwell
Max. message size	Slave (C200HW-DRT21) 200 bytes per READ or WRITE command

## Dimensions

35 × 130 × 101 mm (W × H × D)

## Precautions

Refer to the relevant catalog for details on CS1-series and C200HX/HG/HE PLCs (CS1 Series: Cat. No. P047; C200HX/HG/HE: Cat. No. P036).

Web: <https://www.bolenscontrol.com/> - Phone: (800) 658-5241 - Email: [sales@bolenscontrol.com](mailto:sales@bolenscontrol.com)



C200HW-CORT21-V1

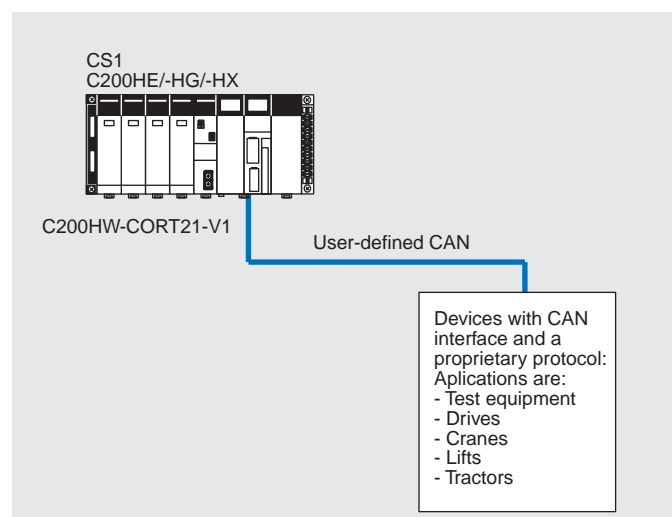
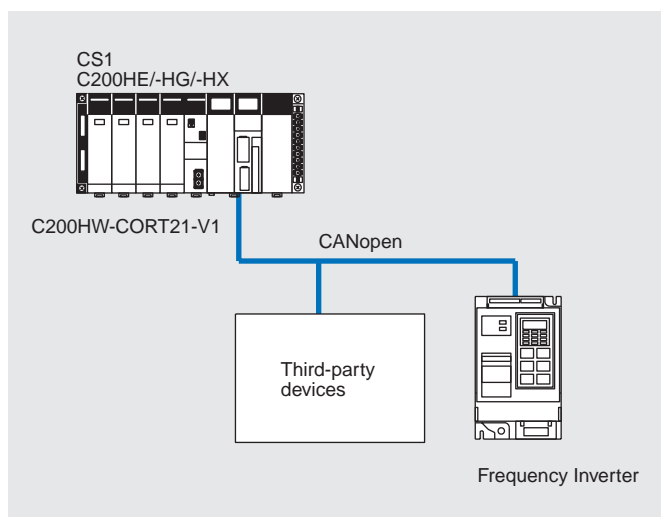
# CAN & CANopen communication unit

## CAN & CANopen communication unit Supports CANopen, but can also be used to communicate with a user-defined CAN protocol

- PDO's configurable with CANopen Configurator or IOWR PLC instructions
- Able to transceive any user defined CAN message up to 2000 msgs/s using IOWR PLC instructions
- Able to set any arbitrary baud rate supported by the CAN controller
- Mountable on C200H Alpha and CS1 backplanes



## System Configuration





## Specifications

Installation	Host PLC system	C200HE, C200HG, C200HX, CS1-series	
	Maximum number of Units per PLC system	C200HE C200HG-CPU3□-E/CPU4□-E C200HX-CPU3□-E/CPU4□-E	10
		All others	16
	Unit mounting position	CPU Rack of Expansion I/O Rack Unit cannot be mounted to SYSMAC BUS Slave Racks	
	Current consumption	Internal I/O power supply: 250 mA at 5V DC max. (from PLC) Network power supply: 45 mA max. (from communications connector)	
	Weight	250 g	
Environment	Storage temperature	- 20 °C to + 75 °C	
	Operating temperature	0 °C to + 55 °C	
	Operating humidity	10 to 90% (non-condensing)	
	Conformance to EMC- and environmental standards	EN50081-2 EN61131-2	
User Interface	Switch settings	Special I/O Unit number (0~F) by rotary switch (front) Network baud rate (10 kbit/s ~ 1000 kbit/s) by 3 DIP-switches (front) CANopen node address (001 ~ 127) by 7 DIP-switches (rear)	
	Indicators	Unit status: RUN (green LED), ERR (red LED) Network status: 2 x 7-segment display	
PLC Interface	No. of IR words	PLC →Unit: 3 words (1 word control data + 2 words CANopen transmit data) Unit →PLC: 5 words (3 words Unit status + 2 words CANopen receive data)	
	No. of DM settings	20 words	
	Amount of I/O data per Unit	Default [DM settings all 0000]: 2 words in + 2 words out With user defined DM settings: additionally up to 100 words in + 100 words out	
	Message communications	By IOWR/IORD instructions	
Network interface	CAN interface	ISO 11898, High Speed CAN	
	Bus connector	5-pin mal open style connector	
	Node address	1 to 127, remote setting not supported	
	Baud rate	10, 20, 50, 125, 250, 500, 800, 1000 kbit/s (Note: Refer to appendix D for the configuration of any arbitrary baud rate via the DM settings.)	
	Profile	Communication Profile DS301 version 4.0 Manufacturer Specific Application Profile	
	Supported functions	Boot-up type	Minimum
		NMT	Slave
		Number of PDOs	Max. 64 transmit PDOs and 64 receive PDOs
		PDO transmission modes	Default: Asynchronous Configurable: Synchronous cyclic Synchronous acyclic
		PDO linking	Supported
		PDO mapping	Variable
		Application objects	Default configuration: Transmit objects: 4 x 8-bit Receive objects: 4 x 8-bit  Additionally configurable: Transmit objects: 8-bit (max. 100) 16-bit (max. 100) 32-bit (max. 50) 64-bit (max. 25) Receive objects: 8-bit (max. 100) 16-bit (max. 100) 32-bit (max. 50) 64-bit (max. 25)  The total size of additionally configured transmit- and receive objects is limited to 100 words each.
		Number of SDOs	1 server
		Emergency Message	EMCY Producer
		Synchronisation	SYNC Consumer
		Error control services	Heartbeat (1 producer and 1 consumer) and Node guarding
		Storing of Parameters	Yes, can be stored in non-volatile memory
		User defined CAN messages	Transmission using IOWR PLC instruction Reception through configurable identifier filter
	EDS file	CORT21V1.eds	

C200HW-SRM21-V1

# CompoBus/S Master Unit

## CompoBus/S is a high-speed I/O bus

- Up to 256 I/O points per Master.
- Up to 32 Slaves per Master.
- Communications cycle time: 0.5 ms (at 750 kbps).
- Communications distance: Up to 500 m (at 93.75 kbps).

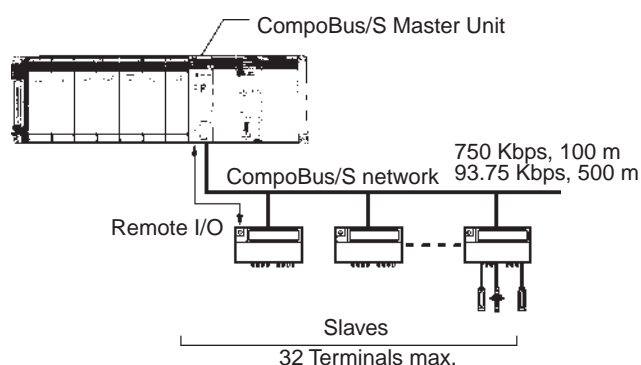
Free wiring with any branching method for up to 200 m (in long-distance communications mode).



## Function

A high-speed ON/OFF bus that automatically transfers remote I/O status to the CPU Unit without any programming in the CPU Unit. High-speed remote I/O is supported by a communications cycle time of 1 ms maximum for 256 I/O points.

## System Configuration



## Specifications

### General

Classification	Communications	Specifications	Unit number	Model
C200H Special I/O Unit	Remote I/O	No. of mountable Units: 16	0 to F	C200HW-SRM21-V1

### Unit Specifications

Current consumption		150 mA max. at 5 V DC
Number of I/O points		256 points (128 inputs/128 outputs), 128 points (64 inputs/64 outputs) (switchable)
Number of occupied words		256 points: 20 words (8 input words/8 output words, 4 status data) 128 points: 10 words (4 input words/4 output words, 2 status data)
PLC		CS1, C200HX (-ZE), C200HG (-ZE), C200HE (-ZE), C200HS
Number of Master Units mountable	C200HE	128 points: 10, 256 points: 5
	C200HG-CPU33/43	128 points: 10, 256 points: 5
	C200HG-CPU53/63	128 points: 16, 256 points: 8
	C200HX-CPU34/44	128 points: 10, 256 points: 5
	C200HX-CPU54/64	128 points: 16, 256 points: 8
	C200HS	128 points: 10, 256 points: 5
Number of points per node number		8 points
Max. number of Slaves per Master		32
Status data		Communications Error Flag and Active Slave Node (see note)
Weight		200 g max.
Approved standards		UL 508 (E95399), CSA C22.2 No. 142 (LR51460)

These flags use the AR area.

## Communications Specifications

Communications method		CompoBus/S protocol
Coding method		Manchester coding method
Connection method		Multi-drop method and T-branch method (see note 1)
Communications baud rate		750,000 bps, 93,750 bps (see note 2)
Communications cycle time	High-speed communications mode	0.5 ms with 8 Slaves for inputs and 8 Slaves for outputs
		0.8 ms with 16 Slaves for inputs and 16 Slaves for outputs
	Long-distance communications mode	4.0 ms with 8 Slaves for inputs and 8 Slaves for outputs
		6.0 ms with 16 Slaves for inputs and 16 Slaves for outputs
Communications cable		2-conductor VCTF cable (0.75 x 2), 4-conductor VCTF cable (0.75 x 4) Special Flat Cable
Communications distance	High-speed communications mode	2-conductor VCTF cable: Main line length:100 m max. Branch line length:3 m max. Total branch line length:50 m max. Special Flat Cable, 4-conductor VCTF cable: Main line length:30 m max. Branch line length:3 m max. Total branch line length:30 m max. (When Special Flat Cable is used to connect fewer than 16 Slaves, the main line can be up to 100 m long and the total branch line length can be up to 50 m.)
	Long-distance communications mode	2-conductor VCTF cable: Main line length:500 m max. Branch line length:6 m max. Total branch line length:120 m max. Special Flat Cable, 4-conductor VCTF cable: Variable branch wiring (total cable length 200 m max.) (There are no limits on the branching format or main, branch, or total line lengths. The terminator must be connected to the point in the system farthest from the master.)
Max. number of connecting nodes		32
Error control checks		Manchester code check, frame length check, and parity check

**Note:** 1. A terminator must be connected to the point in the system most remote from the Master.

2. The communications baud rate is set by the DIP switch.

# Ordering Information

## International Standards

The indicated standards are those current for UL, CSA, cULus, NK and Lloyds standards and EC directives as of September 2004.

Abbreviations used:

U = UL, U1 = UL Class I Div.2 for hazardous locations, C = CSA, UC = cULus, UC1 = cULus Class I Div.2 for hazardous locations  
CU = cUL, N = NK (Nippon Kaiji Kyokai), L = Lloyd's Register, CE = EC Directives. Please contact OMRON representative for application conditions.

## CPU Rack

Name	Specifications			Model	Standards
CPU Units (See note.)	I/O bits	Program capacity	Data memory capacity	---	---
	5,120	250 kSteps	448 kWords (DM: 32 kWords, EM: 32 kWords × 13 banks)	CS1H-CPU67H	UC1, N, L, CE
	5,120	120 kSteps	256 kWords (DM: 32 kWords, EM: 32 kWords × 7 banks)	CS1H-CPU66H	
	5,120	60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords × 3 banks)	CS1H-CPU65H	
	5,120	30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 bank)	CS1H-CPU64H	
	5,120	20 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 bank)	CS1H-CPU63H	
	5,120	60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords × 3 banks)	CS1G-CPU45H	
	1,280	30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 bank)	CS1G-CPU44H	
	960	20 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 bank)	CS1G-CPU43H	
960	10 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 bank)	CS1G-CPU42H		
CPU Backplanes (for CS1 Units only)	2 slots (Does not connect to Expansion Rack.)			CS1W-BC022	U, C, N, L, CE
	3 slots			CS1W-BC032	
	5 slots			CS1W-BC052	
	8 slots			CS1W-BC082	
	10 slots			CS1W-BC102	
CPU Backplanes (for CS1- and C200H I/O Units)	2 slots (Does not connect to Expansion Rack.)			CS1W-BC023	U, C, N, L, CE
	3 slots			CS1W-BC033	
	5 slots			CS1W-BC053	
	8 slots			CS1W-BC083	
	10 slots			CS1W-BC103	
Power Supply Units	100 to 120 V AC or 200 to 240 V AC; Output capacity: 4.6 A, 5 V DC			C200HW-PA204	U, C, N, L, CE
	100 to 120 V AC or 200 to 240 V AC (with 0.8 A, 24 V DC service power supply) Output capacity: 4.6 A, 5 V DC			C200HW-PA204S	
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC			C200HW-PA204R	U, C
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC			C200HW-PA209R	U, C, N, L, CE
	24 V DC, Output capacity: 4.6 A, 5 V DC			C200HW-PD024	UC1, N, L, CE
	100 V DC, Output capacity: 6 A, 5 V DC			C200HW-PD106R	U, C
I/O Control Unit	For Expansion Racks connected over a distance of more than 12 m (2 terminating resistors included. C200H Units cannot be used on Long-distance Expansion Racks.)			CS1W-IC102	U, C, CE
Memory Cards	Flash memory, 30 MB			HMC-EF372	L, CE
	Flash memory, 64 MB			HMC-EF672	
	Memory Card Adapter (for computer PCMCIA slot)			HMC-AP001	CE
Serial Communications Boards	2 × RS-232C ports, protocol macro function			CS1W-SCB21-V1	U, C, N, L, CE
	1 × RS-232C port + 1 × RS-422/485 port, protocol macro function			CS1W-SCB41-V1	
Programming Consoles	An English Keyboard Sheet (CS1W-KS001-E) is required. (Connects to peripheral port on CPU Unit only. Cannot be connected to RS-232C port.)			CQM1-PRO01-E	U, C, CE
				C200H-PRO27-E	U, C, N, CE
Programming Console Key Sheet	For C200H-PRO27 and CQM1H-PRO01			CS1W-KS001-E	CE
Programming Console Connecting Cables	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)			CS1W-CN224	
	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)			CS1W-CN624	
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.			CX-ONE-AL□□C-E <sup>*1</sup>	---
Peripheral Device Connecting Cables (for peripheral port)	Connects personal computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect RS-232C cable to peripheral port)			CS1W-CN118	CE
	Peripheral bus or Host Link	Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	CS1W-CN226		
		Connects personal computers, D-Sub 9-pin (Length: 6.0 m)	CS1W-CN626		
Peripheral Device Connecting Cables (for RS-232C port)	Peripheral bus or Host Link, antistatic	Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-CV	---	
		Connects personal computers, D-sub 9-pin (Length: 5.0 m)	XW2Z-500S-CV		
	Host Link	Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-V		
		Connects personal computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-V		
USB-Serial Conversion Cable	Converts between USB and RS-232C, cable length: 0.5 m PC driver provided on CD-ROM. Refer to <i>Using a USB-Serial Conversion Cable to Connect to a Peripheral or RS-232C Port</i> on page 291 for specifications.			CS1W-CIF31	---
Battery Set	For CS1 Series only. (Install a replacement battery within 2 years of the production date.)			CS1W-BAT01	L, CE

\*1 □□ = Number of licences; 01, 03, 10

**Note:** When using a CS1W-CN313 or CS1W-CN713 I/O Connecting Cable with a CS1□-CPU□□H CPU Unit, use only Cables produced on or after September 20, 2001 (production number 2091). Cables with no production number, a 6-digit production number, or produced before September 20, 2001, cannot be used.

## SYSMAC CS1D Duplex System

Name	Specifications			Model	Standards
Duplex CPU Units	I/O capacity	Program capacity	Data memory capacity	---	UC1, N, L, CE
	5,120 points	60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords x 3 banks)	CS1D-CPU65H	
		250 Ksteps	448 Kwords (DM: 32 Kwords, EM: 32 Kwords x 13 banks)	CS1D-CPU67H	
Duplex process control CPUs (include LCB05 option board for duplex system)	5,120 points	60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords x 3 banks)	CS1D-CPU65P CS1D-CPU67P	UC1, CE
Single CPU Units supporting online I/O unit replacement	5120	250 kSteps	448 kWords (DM: 32 kWords, EM 32 kWords x 13 banks)	CS1D-CPU67S	UC1, N, L, CE
	5120	60 kSteps	128 kWords (DM: 32 kWords, EM 32 kWords x 3 banks)	CS1D-CPU65S	
	1280	30 kSteps	64 kWords (DM: 32 kWords, EM 32 kWords x 1 bank)	CS1D-CPU44S	
	960	10 kSteps	64 kWords (DM: 32 kWords, EM 32 kWords x 1 bank)	CS1D-CPU42S	
Duplex Unit	---			CS1D-DPL01	UC1, N, L, CE
CS1D Power Supply Units	100 to 120 VAC or 200 to 240 VAC, 50/60 Hz (with RUN output) Output capacity: 7 A, 5 VDC; 1.3 A, 26 VDC, 35 W total max.			CS1D-PA207R	
	24 VDC, Output capacity: 4.3 A, 5 VDC; 0.56 A, 26 VDC, 28 W total max.			CS1D-PD024	
Duplex CPU Backplane	5 slots, supports dual CPUs and duplex unit, dual power supplies and on-line Unit replacement			CS1D-BC052	
Single CPU backplane	8 slots (supports dual power supply and on-line Unit replacement)			CS1D-BC082S	
Expansion Backplane	9 slots (Used both for CS1D Expansion Racks and CS1D Long-distance Expansion Racks.)			CS1D-BI092	---
Controller Link Units	Optical ring type with H-PCF cable			CS1D-CLK12-V1	
	Optical ring type with GI cable			CS1D-CLK52-V1	---
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.			CX-ONE-AL□□C-E <sup>*1</sup>	
Optical Fiber Cable	H-PCF cable for for interconnection between Duplex Controller Link Units, cable length: 50 cm			CS1D-CN051	---

\*1 □□ = Number of licences; 01, 03, 10

## Expansion Racks

Name	Specifications	Model	Standards
CS1 Expansion Backplanes (for CS1 Units only)	3 slots	CS1W-BI032	U, C, N, L, CE
	5 slots	CS1W-BI052	
	8 slots	CS1W-BI082	
	10 slots	CS1W-BI102	
CS1 Expansion Backplanes (for CS1 and C200H I/O Units)	3 slots	CS1W-BI033	U, C, N, L, CE
	5 slots	CS1W-BI053	
	8 slots	CS1W-BI083	
	10 slots	CS1W-BI103	
C200H Expansion I/O Backplanes	3 slots	C200HW-BI031	U, C, N, L, CE
	5 slots	C200HW-BI051	
	8 slots	C200HW-BI081-V1	
	10 slots	C200HW-BI101-V1	
Power Supply Units	100 to 120 V AC or 200 to 240 V AC, Output capacity: 4.6 A, 5 V DC	C200HW-PA204	U, C
	100 to 120 V AC or 200 to 240 V AC (with service supply: 0.8 A, 24 V DC), Output capacity: 4.6 A, 5 V DC	C200HW-PA204S	
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC	C200HW-PA204R	U, C
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC	C200HW-PA209R	U, C, N, L, CE
	24 V DC, Output capacity: 4.6 A, 5 V DC	C200HW-PD024	UC1, N, L, CE
	100 V DC, Output capacity: 6 A, 5 V DC	C200HW-PD106R	U, C
I/O Interface Unit	For Expansion Racks connected over a distance of more than 12 m. (C200H Units cannot be used on Long-distance Expansion Racks.)	CS1W-II102	U, C, N, L, CE
CS1 I/O Connecting Cables	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes.	Length: 0.3 m CS1W-CN313	N, L, CE
		Length: 0.7 m CS1W-CN713	
		Length: 2 m CS1W-CN223	
		Length: 3 m CS1W-CN323	
		Length: 5 m CS1W-CN523	
		Length: 10 m CS1W-CN133	
Long-distance Expansion Rack Cables	Connect I/O Control Unit to I/O Interface Unit or connects two I/O Interface Units	Length: 12 m CS1W-CN133-B2	N, L, CE
		Length: 0.3 m CV500-CN312	
		Length: 0.6 m CV500-CN612	
		Length: 1 m CV500-CN122	
		Length: 2 m CV500-CN222	
		Length: 3 m CV500-CN322	
		Length: 5 m CV500-CN522	
		Length: 10 m CV500-CN132	
		Length: 20 m CV500-CN232	
		Length: 30 m CV500-CN332	
CS1 to C200H I/O Connecting Cables	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	Length: 40 m CV500-CN432	N, L, CE
		Length: 50 m CV500-CN532	
		Length: 0.3 m CS1W-CN311	
		Length: 0.7 m CS1W-CN711	
		Length: 2 m CS1W-CN221	
		Length: 3 m CS1W-CN321	
C200H I/O Connecting Cables	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	Length: 5 m CS1W-CN521	N, L, CE
		Length: 10 m CS1W-CN131	
		Length: 12 m CS1W-CN131-B2	
		Length: 0.3 m C200H-CN311	
		Length: 0.7 m C200H-CN711	
		Length: 2 m C200H-CN221	L, CE
		Length: 5 m C200H-CN521	
		Length: 10 m C200H-CN131	

## I/O Units

### CS1 Basic I/O Units

Classification	Name	Specifications	Mountable Racks					Words allocated (CIO 0000 to CIO 0319)	Model	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
CS1 Input Units	DC Input Units	24 VDC, 16 inputs, 7 mA	Yes	No	Yes	Yes	No	1	CS1W-ID211	UC1, N, L, CE
		24 VDC, 32 inputs, 6 mA	Yes	No	Yes	Yes	No	2	CS1W-ID231	
		24 VDC, 64 inputs, 6 mA	Yes	No	Yes	Yes	No	4	CS1W-ID261	
		24 VDC, 96 inputs, approx. 5 mA	Yes	No	Yes	Yes	No	6	CS1W-ID291	U, C, N, L, CE
	AC Input Units	100 to 120 VAC, 100 to 120 VDC, 16 inputs	Yes	No	Yes	Yes	No	1	CS1W-IA111	UC1, N, L, CE
		200 to 240 VAC, 16 inputs	Yes	No	Yes	Yes	No	1	CS1W-IA211	UC, N, L, CE
	Interrupt Input Unit	24 VDC, 16 inputs, 7 mA	Yes	No	Yes (See note.)	Yes (See note.)	No	1	CS1W-INT01	UC1, N, L, CE
	High-speed Input Unit	24 VDC, 16 inputs, 7 mA	Yes	No	Yes	Yes	No	1	CS1W-IDP01	
CS1 Out-put Units	Relay Output Units	24 VDC, 2 channels with 4 in-puts each, 4 pts/common	Yes	No	Yes	Yes	No	1	CS1W-SF200	U, C, CE
		250 VAC or 120 VDC, independent contacts, 8 outputs, 2 A	Yes	No	Yes	Yes	No	1	CS1W-OC201	UC1, N, L, CE
	Transistor Output Units	250 VAC or 120 VDC, 16 outputs, 2 A	Yes	No	Yes	Yes	No	1	CS1W-OC211	
		12 to 24 VDC, 0.5A, 16 sinking outputs	Yes	No	Yes	Yes	No	1	CS1W-OD211	
		24 VDC, 0.5A, 16 sourcing outputs	Yes	No	Yes	Yes	No	1	CS1W-OD212	U, C, N, L, CE
		12 to 24 VDC, 0.5A, 32 sinking outputs	Yes	No	Yes	Yes	No	2	CS1W-OD231	UC1, N, L, CE
		24 VDC, 0.5A, 32 sourcing outputs	Yes	No	Yes	Yes	No	2	CS1W-OD232	U, C, N, L, CE
		12 to 24 VDC, 0.3A, 64 sinking outputs	Yes	No	Yes	Yes	No	4	CS1W-OD261	UC1, N, L, CE
		24 VDC, 0.3A, 64 sourcing outputs	Yes	No	Yes	Yes	No	4	CS1W-OD262	
		12 to 24 VDC, 0.1A, 96 sinking outputs	Yes	No	Yes	Yes	No	6	CS1W-OD291	U, C, N, L, CE
		12 to 24 VDC, 0.1A, 96 sourcing outputs	Yes	No	Yes	Yes	No	6	CS1W-OD292	
	Triac Output Units	250 VAC, 1.2 A, 8 outputs	Yes	No	Yes	Yes	No	1	CS1W-OA201	UC, N, L, CE
		250 VAC, 0.5 A, 16 outputs	Yes	No	Yes	Yes	No	1	CS1W-OA211	
CS1 I/O Units	DC Input/Transistor Output Units	24 VDC, 6 mA, 32 inputs, 12 to 24 VDC, 0.3 A, 32 sinking outputs	Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD261	UC1, N, L, CE
		24 VDC, 6 mA, 32 inputs, 24 VDC, 0.3 A, 32 sourcing outputs	Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD262	U, C, N, L, CE
		24 VDC, approx. 5 A, 48 inputs, 12 to 24 VDC, 0.1 A, 48 outputs, sinking inputs/outputs	Yes	No	Yes	Yes	No	Inputs: 3 Outputs: 3	CS1W-MD291	
		24 VDC, approx. 5 A, 48 inputs, 12 to 24 VDC, 0.1 A, 48 outputs, sourcing inputs/outputs	Yes	No	Yes	Yes	No	Inputs: 3 Outputs: 3	CS1W-MD292	UC, N, L, CE
	TTL I/O Unit	5 VDC, 32 inputs, 32 outputs	Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD561	

**Note:** Interrupt inputs are not supported on these Racks (i.e., used as normal I/O Unit).

C200H Basic I/O Units

Classification	Name	Specifications	Mountable Racks					Words allocated (CIO 0000 to CIO 0319)	Model	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
C200H Input Units (See note 1.)	DC Input Units	12 to 24 VDC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-ID211	U, C, N, L, CE
		24 VDC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-ID212	
	AC Input Units	100 to 120VAC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA121	U, C, N, L
		100 to 120VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA122	
		100 to 120VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA122V	CE
		200 to 240VAC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA221	U, C, N, L
		200 to 240VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA222	
		200 to 240VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA222V	CE
	AC/DC Input Units	12 to 24 VAC/VDC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IM211	U, C, N, L, CE
		24 VAC/VDC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IM212	
	Interrupt Input Unit	12 to 24 VDC, 8 inputs	Yes	Yes (See note 2.)	Yes (See note 2.)	No (See note 2.)	No	1	C200HS-INT01	
C200H Output Units (See note 1.)	Relay Bit Output Units	250 VAC/24VDC, 2 A, 8 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC221	U, C, N
		250 VAC/24VDC, 2 A, 12 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC222	
		250 VAC/24VDC, 2 A, 12 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC222N	CE
		250 VAC/24VDC, 2 A, 16 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC225	U, C, N, L
		250 VAC/24VDC, 2 A, 16 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC226N	CE
		250 VAC/24VDC, 2 A, independent contacts, 5 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC223	U, C, N, L
		250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC224	
		250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC224N	CE
C200H Output Units (See note 1.)	Transistor Output Units	12 to 48 VDC, 1 A, 8 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD411	U, C, N, L, CE
		24 VDC, 2.1 A, 8 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD213	
		24 VDC, 0.8 A, 8 sourcing outputs, load short-circuit protection.	Yes	Yes	Yes	No	Yes	1	C200H-OD214	U, C, N, L
		5 to 24 VDC, 0.3 A, 8 sourcing outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD216	
		24 VDC, 0.3 A, 12 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD211	U, C, N, L, CE
		5 to 24 VDC, 0.3 A, 12 sourcing outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD217	
		24 VDC, 0.3 A, 16 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD212	CE
		24 VDC, 1 A, 16 sourcing outputs, load short-circuit protection.	Yes	Yes	Yes	No	Yes	1	C200H-OD21A	
	Triac Output Units	250 VAC, 1.2 A, 8 outputs	Yes	Yes	Yes	No	Yes	1	C200H-OA223	CE
		250 VAC, 0.3 A, 12 outputs	Yes	Yes	Yes	No	Yes	1	C200H-OA222V	
		250 VAC, 0.5 A, 12 outputs	Yes	Yes	Yes	No	Yes	1	C200H-OA224	U, C, N, L

**Note:** 1. C200H Units cannot be used with CS1D CPU Units.

2. Interrupt inputs are not supported on these Racks (i.e., used as normal I/O Unit).

3. The C200H-ID001 (no-voltage contacts, 8 inputs, NPN) and C200H-ID002 (no-voltage contacts, 8 inputs, PNP) cannot be used.



## C200H Group-2 High-density I/O Units

Classification	Name	Specifications	Mountable Racks					Words allocated (CIO 0000 to CIO 0319)	Model	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks			
C200H Group-2 High-density Input Units (See note.)	DC Input Units	24 VDC, 32 inputs	Yes	Yes	Yes	No	No	2	C200H-ID216	U, C, N, L, CE
		24 VDC, 64 inputs	Yes	Yes	Yes	No	No	4	C200H-ID217	
		24 VDC, 32 inputs, 6 mA	Yes	Yes	Yes	No	No	2	C200H-ID218	U, C, CE
		24 VDC, 64 inputs, 6 mA	Yes	Yes	Yes	No	No	4	C200H-ID219	
		12 VDC, 64 inputs	Yes	Yes	Yes	No	No	4	C200H-ID111	U, C
C200H Group-2 High-density Output Units (See note.)	Transistor Out- put Units	16 mA/4.5 V to 100 mA/26.4 V, 32 sinking outputs	Yes	Yes	Yes	No	No	2	C200H-OD218	U, C, N, L, CE
		0.5 A/ 24 VDC, 32 sourcing outputs, load short-circuit protection	Yes	Yes	Yes	No	No	2	C200H-OD21B	
		16 mA/4.5 V to 100mA/ 26.4 V, 64 sinking outputs	Yes	Yes	Yes	No	No	4	C200H-OD219	U, C, N, L, CE

**Note:** C200H Units cannot be used with CS1D CPU Units.

### Connectors for CS1 32- and 64-point I/O units, and C200H Group-2 High-density I/O Units

Part	Connection		Remarks	Model	Standards
Applicable connector	Soldered (included with Unit)		From Fujitsu Socket: FCN-361J040-AU Connector bar: FCN-360C040-J2	C500-CE404	---
	Crimped		From Fujitsu Socket: FCN-363J040 Connector bar: FCN-360C040-J2 Contacts: FCN-363J-AU	C500-CE405	
	Pressure welded		From Fujitsu: FCN-367J040-AU	C500-CE403	
Terminal block connection parts	1:1 connections	Special Cable	For CS1W-ID231/ID261/OD231/ OD232/OD261/OD262/MD261/ MD262 and C200H-ID216/ID217/ ID218/ID219/ID111/OD218/OD21B/ OD219	XW2Z-□□□B (See note 1.)	
		Terminal Block Unit		XW2B-40G4	
	1:2 connections	Special Cable		XW2B-40G5	
				XW2D-40G6	
				XW2Z-□□□D (See notes 1 and 2.)	
				XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	
				XW2C-20G5-IN16	

**Note:** 1. Refer to page 384 (Wiring Devices) for details. (Square boxes indicate the cable length.)

2. The XW2Z-□□□D, CS1W-OD□□□, and C200H-OD□□□ cannot be connected. Only the inputs of the CS1W-MD□□□ can be connect-  
ed.

### Connectors for CS1 96-point I/O Units

Part	Connection		Remarks	Model	Standards
Applicable connectors	Soldered (included with Unit)		From Fujitsu Socket: FCN-361J056-AU Connector bar: FCN-360C056-J3	CS1W-CE561	---
	Crimped		From Fujitsu Socket: FCN-363J056 Connector bar: FCN-360C056-J3 Contacts: FCN-363J-AU	CS1W-CE562	
	Pressure welded		From Fujitsu: FCN-367J056-AU	CS1W-CE563	
Terminal block	1:1	Special Cable	For CS1W-ID291/OD291/OD292/ MD291/MD292	XW2Z-□□□H-1 (see note.)	
		Terminal Block Unit		XW2B-60G4	
	1:2	Special Cable Terminal Block Unit		XW2B-60G5	
				XW2Z-□□□H-2 (see note.)	
				XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	
				XW2B-40G4	
				XW2B-40G5	
				XW2D-40G6	
	1:3	Special Cable Terminal Block Unit		XW2Z-□□□H-3 (see note.)	
				XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	

**Note:** Refer to page 384 (Wiring Devices) for details. (Square boxes indicate the cable length.)

## C200H High-density I/O Units Classified as Special I/O Units

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
DC Input Units	24 V DC, 32 inputs	Yes	Yes	Yes	No	Yes	0 to 9	C200H-ID215	U, C, N, L, CE
TTL Input Units	5 V DC, 32 inputs	Yes	Yes	Yes	No	Yes		C200H-ID501	
Transistor Output Units	24 V DC, 32 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-OD215	
TTL Output Units	5 V DC, 32 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-OD501	
TTL I/O Units	5 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD501	
DC Input/Transistor Output Units	24 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD215	U, C, N
	12 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD115	

## Connectors for C200H High-density I/O Units

Part	Connection	Remarks	Model	Standards
Applicable connectors	Soldered (included with Unit)	From Fujitsu Socket: FCN-361J024-AU Connector bar: FCN-360C024-J2	C500-CE241	---
	Crimped	From Fujitsu Socket: FCN-363J024 Connector bar: FCN-360C024-J2 Contacts: FCN-363J-AU	C500-CE242	
	Pressure welded	From Fujitsu: FCN-367J024-AU/F	C500-CE243	
Terminal block connection parts	Special Cable	For C200H-ID215/ID501/OD215/MD115/MD215	XW2Z-□□□A (See note.)	
	Terminal Block Connector	For C200H-ID215/ID501/MD115/MD215/MD501 □□□ = cable length	XW2B-20G4	
			XW2B-20G5	
			XW2D-20G6	
			XW2B-20G5-D	
			XW2B-40G5-T	
	Special Cable		XW2Z-□□□A (see note)	
	Terminal Block Connector		XW2C-20G6-IN16	

**Note:** Refer to page 384 (Wiring Devices) for details. (Square boxes indicate the cable length.)

## C200H Special I/O Units (Cannot be used with CS1D)

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Temperature Control Units	Thermocouple input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-TC001	U, C, CE
	Thermocouple input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TC002	
	Thermocouple input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TC003	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes		C200H-TC101	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TC102	
	Temperature-resistance thermometer input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TC103	
Data Setting Console	Used with Temperature Control Units. Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	---					---	C200H-DSC01	---
	Connecting Cable, 2 m	---						C200H-CN225	
	Connecting Cable, 4 m	---						C200H-CN425	

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Heat/Cool Temperature Control Units	Thermocouple input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-TV001	U, C, CE
	Thermocouple input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TV002	
	Thermocouple input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TV003	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes		C200H-TV101	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TV102	
	Temperature-resistance thermometer input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TV103	
Temperature Sensor Units	Thermocouple input, K/J selectable	Yes	Yes	Yes	No	Yes	0 to 9	C200H-TS001	U, C
	Thermocouple input, K/L selectable	Yes	Yes	Yes	No	Yes		C200H-TS002	
	Temperature-resistance thermometer, JPt 100	Yes	Yes	Yes	No	Yes		C200H-TS101	
	Temperature-resistance thermometer, Pt 100	Yes	Yes	Yes	No	Yes		C200H-TS102	
PID Control Units	Voltage output/current input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-PID01	U, C, CE
	Voltage output/current input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-PID02	
	Voltage output/current input, PID current output	Yes	Yes	Yes	No	Yes		C200H-PID03	
Data Setting Console	Used with PID Control Units. Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	---					---	C200H-DSC01	---
	Connecting Cable, 2 m	---						C200H-CN225	
	Connecting Cable, 4 m	---						C200H-CN425	
ASCII Units	200-Kbyte RAM, 2 RS-232C ports	Yes	Yes	Yes	No	Yes	0 to F	C200H-ASC11	U, C, CE
	200-Kbyte RAM, RS-232C port, RS-422/485 port	Yes	Yes	Yes	No	Yes		C200H-ASC21	
	200-Kbyte RAM, 3 RS-232C ports ( 1 terminal only)	Yes	Yes	Yes	No	Yes		C200H-ASC31	
Analog Input Units	4 to 20 mA, 1 to 5/0 to 10 V/−10 to +10 V (selectable); 8 inputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes	0 to F	C200H-AD003	U, C, N, L, CE
Analog Output Units	1 to 5 V, −10 to +10 V (selectable), 8 outputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes	0 to F	C200H-DA003	U, C, N, L, CE
	4 to 20 mA, 8 outputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes		C200H-DA004	
Analog I/O Units	2 inputs (4 to 20 mA, 1 to 5 V, etc.) 2 outputs (4 to 20 mA, 1 to 5 V, etc.)	Yes	Yes	Yes	No	Yes		C200H-MAD01	
High-Speed Counter Units	Two-axis pulse input, counting rate: 75 kcps max., line driver compatible	Yes	Yes	Yes	No	Yes	0 to F	C200H-CT021	U, C, CE

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Motion Control Units	G-language programmable, two-axis analog outputs	Yes	Yes	Yes	No	Yes	0 to F	C200H-MC221	U, C, CE
	MC Support Software IBM PC/AT or compatible	---	---	---	---	---	---	CV500-ZN3AT1-E	---
	Connecting Cable: 3.3 m	---	---	---	---	---	---	CV500-CIF01	---
	Teaching Box	---	---	---	---	---	---	CVM1-PRO01	U, C, CE
	Connection cable for Teaching Box: 2 m long	---	---	---	---	---	---	CV500-CN224	CE
	Memory Pack	---	---	---	---	---	---	CVM1-MP702	U, C, CE
	Terminal Block Conversion Unit Simplifies wiring.	---	---	---	---	---	---	XW2B-20J6-6	---
	Connecting Cable for Terminal Block Conversion Unit	---	---	---	---	---	---	XW2Z-100J-F1	---
	4 axes, analog+digital I/O, Motion Perfect BASIC language	Yes	Yes	Yes	No	No	0 to F	C200HW-MC402-E	CE
Position Control Units	One-axis pulse-train open-collector output	Yes	Yes	Yes	No	Yes	0 to F	C200HW-NC113	U, C, CE
	Two-axis pulse-train open-collector output	Yes	Yes	Yes	No	Yes	---	C200HW-NC213	---
	Four-axis pulse-train open-collector output	Yes	Yes	Yes	No	Yes	---	C200HW-NC413	---
	Peripheral Port Connecting Cables for computer	---	---	---	---	---	---	CS1W-CN226 (2 m)	CE
	RS-232C Port Connecting Cables for computer	---	---	---	---	---	---	CS1W-CN626 (6 m)	---
		---	---	---	---	---	---	XW2Z-200S-CV (2 m)	---
		---	---	---	---	---	---	NCT V1.11 or earlier	---
		---	---	---	---	---	---	XW2Z-500S-CV (5 m)	---
		---	---	---	---	---	---	NCT V1.11 or earlier	---
		---	---	---	---	---	---	XW2Z-200S (2 m) (See note 1.)	---
		---	---	---	---	---	---	XW2Z-500S (5 m) (See note 1.)	---
		---	---	---	---	---	---	XW2B-20J6-1B	---
		---	---	---	---	---	---	XW2B-40J6-2B	---
	1-axis Relay Unit for C200HW-NC113	---	---	---	---	---	---	XW2Z-050J-A6 (0.5 m)	---
	2-axis Relay Unit for C200HW-NC213/NC413	---	---	---	---	---	---	XW2Z-100J-A6 (1 m)	---
	1-axis U, H, M Connecting Cables for C200HW-NC113	---	---	---	---	---	---	XW2Z-050J-A7 (0.5 m)	---
	2-axis U, H, M Connecting Cables for C200HW-NC213/NC413	---	---	---	---	---	---	XW2Z-100J-A7 (1 m)	---
	1-axis UEP Connecting Cables for C200HW-NC113	---	---	---	---	---	---	XW2Z-050J-A8 (0.5 m)	---
	2-axis UEP Connecting Cables for C200HW-NC213/NC413	---	---	---	---	---	---	XW2Z-100J-A8 (1 m)	---
		---	---	---	---	---	---	XW2Z-050J-A9 (0.5 m)	---
		---	---	---	---	---	---	XW2Z-100J-A9 (1 m)	---

## CS1 Special I/O Units

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Analog Input Units	4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000	Yes	No	Yes	Yes	No	0 to 95	CS1W-AD041-V1	UC1, N, L, CE
	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000							CS1W-AD081-V1	
	16 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000						0 to 94	CS1W-AD161	UC1, N, CE
Analog Output Units	4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000	Yes	No	Yes	Yes	No	0 to 95	CS1W-DA041	UC1, N, L, CE
	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000							CS1W-DA08V	
	8 outputs (4 to 20 mA) Resolution: 1/4,000							CS1W-DA08C	
Analog I/O Unit	4 inputs (4 to 20 mA, 1 to 5 V, etc.) 4 outputs (1 to 5 V, 0 to 10 V, etc.)	Yes	No	Yes	Yes	No		CS1W-MAD44	
Process I/O Units									
Isolated Thermocouple Input Unit	4 inputs, B, E, J, K, N, R, S, T, U, WRe5-26, PLII, $\pm 100$ mV	Yes	No	Yes	Yes	No	0 to 95	CS1W-PTS11	UC1, CE, N
	4 inputs, B, J, K, R, S, T, L							CS1W-PTS51	CE, UC1
	8 inputs, B, J, K, R, S, T, L							CS1W-PTS55	UC1, CE
Isolated Temperature-resistance	4 inputs, Pt100 $\Omega$ (JIS, IEC), JPt100 $\Omega$ , Pt150 $\Omega$ , Ni508.4 $\Omega$	Yes	No	Yes	Yes	No	0 to 95	CS1W-PTS12	UC1, CE, N
Thermometer Input Unit	4 inputs, Pt100 $\Omega$ (JIS, IEC), JP5100 $\Omega$							CS1W-PTS52	UC1, CE
	8 inputs, Pt100 $\Omega$ (JIS, IEC), JPt100 $\Omega$							CS1W-PTS56	
Isolated Two-wire Transmission Device Input Unit	4 inputs, 4 to 20 mA, 1 to 5 V	Yes	No	Yes	Yes	No	0 to 95	CS1W-PTW01	UC1, CE
Isolated DC Input Unit	4 inputs, 4 to 20 mA, 1 to 5 V, 0 to 5 V, $\pm 5$ V, 0 to 10 V, $\pm 10$ V							CS1W-PDC01	
	4 inputs, 4 to 20 mA, 0 to 20 mA, 0 to 10 V, $\pm 10$ V, 0 to 5 V, $\pm 5$ V, 1 to 5 V, 0 to 1.25 V, $\pm 1.25$ V							CS1W-PDC11	UC1, CE, N
	8 inputs, 4 to 20 mA, 0 to 10 V, 1 to 5 V, 0 to 5 V							CS1W-PDC55	
Isolated Pulse Input Unit	4 inputs	Yes	No	Yes	Yes	No	0 to 95	CS1W-PPS01	UC1, CE
Isolated Control Output Unit	4 outputs, 4 to 20 mA, 1 to 5 V							CS1W-PMV01	
	4 outputs, 0 to 10 V, $\pm 10$ V, 0 to 5 V, $\pm 5$ V, 0 to 1 V, $\pm 1$ V							CS1W-PMV02	
Power Transducer Input Unit	8 inputs, 0 to 1 mA, $\pm 1$ mA	Yes	No	Yes	Yes	No	0 to 95	CS1W-PTR01	UC1, CE
100-mV DC Input Unit	8 inputs, 0 to 100 mA, $\pm 100$ mV							CS1W-PTR02	
Loop Control Units	Control loops: 32 Processes: 250	Yes	No	No	No	No	0 to F	CS1W-LC001	UC1, N, CE
Loop Control Boards	50 blocks maximum including both adjustment and operation blocks	CPU Unit Inner Board for CS1-H PLCs						CS1W-LCB01	UC1, N, CE
	500 blocks maximum including both adjustment and operation blocks							CS1W-LCO05	






Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
High-Speed Counter Units	Pulse input: 2 pts Counting speed: 500 kcps max.	Yes	No	Yes	Yes	No	0 to 92	CS1W-CT021	U, C, CE
	Pulse input: 4 pts Counting speed: 500 kcps max.							CS1W-CT041	
	Solder terminal; 40p and a Connector Cover	---					---	C500-CE401	---
	Solderless terminal; 40p and a Connector Cover (Crimped)	---						C500-CE402	
	Pressure welded terminal; 40p	---						C500-CE403	
	Solder terminal; 40p and a Connector Cover (Horizontal-type)	---						C500-CE404	
	Crimp-style terminal; 40p and a Connector Cover (Horizontal-type)	---						C500-CE405	
Position Control Units	One-axis pulse train open-collector output	Yes	No	Yes	Yes	No	0 to 95	CS1W-NC113	U, C, N, L, CE
	Two-axis pulse train open-collector output							CS1W-NC213	
	Four-axis pulse train open-collector output						0 to 94	CS1W-NC413	
	One-axis pulse train line-driver output						0 to 95	CS1W-NC133	
	Two axis pulse train line-driver output							CS1W-NC233	
	Four axis pulse train line-driver output						0 to 94	CS1W-NC433	
SSI Unit	SSI encoder inputs: 2 channels	Yes	No	Yes	Yes	No	0 to 94	CS1W-CTS21	CE
Motion Control Units	4 axes, analog outputs, G language	Yes	No	Yes	Yes	No	0 to 93	CS1W-MC421	U, C, CE
	2 axes, analog outputs, G language							CS1W-MC221	
	MCH high-speed serial link						0 to F	CS1W-MCH71	
Computer Connecting Cables	Peripheral port on CPU Unit	---						CS1W-CN226 (2 m)	CE
	RS-232C port on CPU Unit							CS1W-CN626 (6 m)	
								XW2Z-200S-CV (2 m)	---
								XW2Z-500S-CV (5 m)	
Teaching Box		---					---	CVM1-PRO01	U, C, CE
Teaching Box Connecting Cable (2 m)								CV500-CN224	CE
Memory Pack								CVM1-MP702	U, C, CE
MC Terminal Block Conversion Unit for 2 Axes (simplifies wiring I/O connectors)								XW2B-20J6-6	---
MC Terminal Block Conversion Unit for 4 Axes (simplifies wiring I/O connectors)								XW2B-40J6-7	
MC Terminal Block Conversion Unit Cable								XW2Z-100J-F1	
Serial Communications Unit	Two RS-232C Ports	Yes	No	Yes	Yes	No	0 to F	CS1W-SCU21-V1	U, C, L, N, CE
RS-232C–RS-422A Conversion Unit	1 RS-232C port and 1 RS-422A terminal block	---					---	NT-AL001	---
Ethernet Unit	100Base-Tx	Yes	No	Yes	Yes	No	0 to F	CS1W-ETN21 CS1D-ETN21D	UC1, L, N,
Controller Link Units	Wired	Yes	No	Yes	Yes	No	0 to F	CS1W-CLK21-V1	U, C, L, N, CE
	Optical (H-PCF cable)						0 to F	CS1W-CLK12-V1	U, C, CE
	Optical (GI fiber 62.5/125 μm)							CS1W-CLK52-V1	
Controller Link Support Boards	Wired	---					---	3G8F7-CLK21-V1	CE
	Optical (H-PCF cable)							3G8F7-CLK12-V1	
	Optical (GI fiber 62.5/125 μm)							3G8F7-CLK52-V1	
Controller Link Relay Terminals	Wired (a set of 5)	---					---	CJ1W-TB101	---
Controller Link Repeater Units	Twisted-pair	---					---	CS1W-RPT01	UC1, CE
	Optical ring (H-PCF cable)	---					---	CS1W-RPT02	
	Optical ring (GI cable)	---					---	CS1W-RPT03	
GPIB Unit	Supports Master and Slave Modes	Yes	No	Yes	Yes	No	0 to 95	CS1W-GPI01	UC, CE

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
DeviceNet Unit	Functions as master and/or slave; allows control of 2,048 points max. per master.	Yes	No	Yes	Yes	No	---	CS1W-DRM21-V1	0 to F
PROFIBUS-DP Unit	Master Unit for up to 7000 remote I/O words	Yes	No	Yes	Yes	No	0 to F	CS1W-PRM21	CE
	Master Unit for up to 300 remote I/O words	Yes	Yes	Yes	No	No		C200HW-PRM21	
	I/O Link for up to 200 I/O words							C200HW-PRT21	U, L, C, CE
CAN/CANopen Unit	Freely configurable CAN communication, or CANopen protocol	Yes	Yes	Yes	No	No	0 to F	C200HW-CORT21-V1	U, C, CE

**Note: 1.** A 25-pin to 9-pin adapter is required to connected to a 9-pin, D-sub RS-232C connector on an IBM PC/AT or compatible.

**Note:** Setting tool software for the Processing I/O Units also supports CS1W-AD□□□, CS1WS-DA□□□, and CS1W-MAD44.

## Optional Products

Name	Specifications	Model	Standards
I/O Unit Cover	Cover for 10-pin terminal block	C200H-COV11	---
Terminal Block Covers 	Short protection for 10-pin terminal block (package of 10 covers); 8 pts	C200H-COV02	
	Short protection for 19-pin terminal block (package of 10 covers); 12 pts	C200H-COV03	
C200H Unit Connector Cover 	Protective cover for unused I/O Connecting Cable connectors	C500-COV01	
CS1 Special I/O Unit Connector Cover	Protective cover for unused I/O Connecting Cable connectors	CV500-COV01	N, L, CE
C200H Expansion I/O Backplane Insulation Plates 	Electrically insulate C200H Expansion I/O Backplanes from the control panel to increase noise resistance.	For 3-slot Backplane	
		For 5-slot Backplane	
		For 8-slot Backplane	
		For 10-slot Backplane	
Relay 	24 V DC, for C200H-OC221/OC222/OC223/OC224/OC225	G6B-1174P-FD-US	---
Programming Console Mounting Bracket 	Used to attach C200H-PRO27-E Hand-held Programming Console to a panel.	C200H-ATT01	
Space Unit	Used for empty I/O slot on the CS1W-BC□□□3/BI□□□3 or C200HW-BI□□□.	C200H-SP001	---
	Used for empty I/O slot on CS1W-BC□□□2/BI□□□2 and CS1D-BC□□□(S)/BI□□□	CS1W-SP001	
	Used for empty Power Supply Unit slot on CS1D-BC□□□(S)/BI□□□; same shape as the CS1W-PA207R.	CS1W-SP002	
	Used for empty Power Supply Unit slot on CS1D-BC□□□(S)/BI□□□; same shape as the CS1W-PA207R.	CS1W-SP002	
Battery Set	For CS-series CPU Units. (Use batteries within two years of manufacture).	CS1W-BAT01	L, CE
Terminating Resistor (See note.)	Mounts to end of CS1 Long-distance Expansion Rack	CV500-TER01	U, C

**Note:** Two Terminating Resistors are included with the CS1W-IC102 I/O Control Unit.

## Mounting Rails and Accessories

Name	Specifications	Model number	Standards
DIN rail Mounting Bracket	1 set (2 included)	C200H-DIN01	---
DIN rails	Length: 50 cm; height: 7.3 cm	PFP-50N	
	Length: 1 m; height: 7.3 cm	PFP-100N	
	Length: 50 cm; height: 16 mm	PFP-100N2	
End Plate	---	PFP-M	
Spacer		PFP-S	

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.  
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P08E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

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