# **Rack PLCs**

CS1 Series		
	Introduction	249
	Lineup	272
	CPU Units	274
	Power Supplies	278
	Basic System Configuration	280
	Duplex System Configuration	286
	Programming	288
	Dimensions	292
	I/O allocations	293
	Current consumption	295
	Unit Descriptions	299
	Basic I/O Units	300
	Analog/Temperature Units	315
	Position/Motion Units	338
	Communication Units	349
	Fieldbus Units	356
	Ordering Information	370

## **Rack PLC series** $\mathbf{CS1}$

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



## 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.



## **Instructions That Fit** the Application

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

High-precision Positioning

Automatic Adjustment of PID

Set and reset instructions

**PID** instructions with

Program Simplification

for DM/EM Area bits

**Double-precision** 

Constants

autotuning

floating-point instructions

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

> • Error Generation for Debugging **Failure diagnosis** instructions

- High-resolution Approximation APR instruction
- Workpiece Information Control for Conveyor Systems Table data processing instructions for stacks

## **Integrated Development Environment and Middleware** Program development

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

**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 onsite 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.



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

## **ZPLC-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.



## 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

## • Common Processing: 1.6 Times Faster

Previous CS1 models		0.5 ms
New CS1 models	0.3 ms	
The figures ab interchangeab	ove are for high-speed, general-purpose le boards.	PLCs with

## PCMIX Value: 3 Times Higher

Previous CS1 models	5	
New CS1 models	1	6

The PCMIX is the average number of instructions that can be executed in 1 µs 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)

Previous CS1 models	8 Ksteps/ms
New CS1 models	Basic instructions only: 38 Ksteps/ms Including special instructions: 22 Ksteps/ms

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

## 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.



new models have a mode where

instruction execution and peripheral

processing are processed in parallel,

Previous CS1 models		40 ns
New CS1 models	20 ns	

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

Previous CS1 models		170 ns
New CS1 models	20 ns	

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



## **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.



## 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.





Five Analog Output Five Analog Input Units of Units of 8 points each 8 points each 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 largescale 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.





Gray code converted into binary, BCD, or angles.

determined by the response speed for reading data from the absolute encoder.

**Easy Calendar Timer Function** (for CPU Unit Ver. 2.0 or Later)

Parallel

wiring

2

SYSMAC CS1 is



## **TIME-PROPORTIONAL OUTPUT (TPO) Instruction**

Compared to see whether

lower limits.

data is between upper and

(for CPU Unit Ver. 2.0 or Later)



## **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.

![](_page_7_Figure_11.jpeg)

## 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.

![](_page_7_Figure_14.jpeg)

## 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.

![](_page_7_Figure_18.jpeg)

## 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.

![](_page_7_Figure_21.jpeg)

## 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: TMHHX(552) ACCUMULATIVE TIMER: TTIMX(555) LONG TIMER: TIMLX(553) MULTI-OUTPUT TIMER: MTIMX(554) REVERSIBLE COUNTER: CNTRX(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.

![](_page_8_Figure_6.jpeg)

NEW

## CX-Programmer

OMRON FB Library

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 CSCJ-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.

The Structured Text (ST)NEWLanguage Enables TrigonometricFunctions and other Arithmetic

Processes (Unit Ver. 3.0 or later)

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.

![](_page_8_Figure_14.jpeg)

Recovery Possible by <u>NEW</u> Uploading Function Blocks from Working PLC (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.

![](_page_8_Figure_17.jpeg)

![](_page_8_Picture_19.jpeg)

![](_page_8_Figure_20.jpeg)

### 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.

![](_page_9_Figure_4.jpeg)

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

![](_page_9_Figure_6.jpeg)

## 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.

![](_page_9_Figure_12.jpeg)

## 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). Onsite PLC ladder execution can be recreated on a computer by inputting this

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

![](_page_9_Figure_16.jpeg)

### 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.

![](_page_9_Picture_19.jpeg)

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.

![](_page_9_Figure_23.jpeg)

## 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.

![](_page_9_Figure_26.jpeg)

## 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 smallscale 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.

![](_page_10_Figure_19.jpeg)

![](_page_10_Figure_20.jpeg)

## 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 userdefined 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).

![](_page_11_Figure_5.jpeg)

rogrammable Controllers

## 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)

![](_page_12_Picture_10.jpeg)

### 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.

FINS command received Serial Gateway: FINS command "capsule" opened and contents Sent as a CompoWay/F command Temperature Controller OMRON Components

## 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.

![](_page_12_Picture_23.jpeg)

![](_page_13_Picture_1.jpeg)

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**

![](_page_14_Figure_5.jpeg)

### Memory Cards for Data File Management

User programs, I/O memory, or system parameters can be converted to Windowsbased 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.

![](_page_14_Figure_8.jpeg)

### 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.

![](_page_15_Figure_3.jpeg)

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.

![](_page_15_Figure_6.jpeg)

### 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.

![](_page_15_Figure_9.jpeg)

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.

![](_page_15_Figure_13.jpeg)

## 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.

![](_page_15_Figure_18.jpeg)

### 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.

![](_page_15_Figure_21.jpeg)

## 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 SCPU Unit, a CS1D-BC082 or CS1D-BI092 Backplane, and a CS1D-PA207R or CS1D-PD024 Power Supply Unit.)

![](_page_15_Figure_25.jpeg)

Store All I/O Comments, Symbol Names, Rung Comments, <u>NEW</u> and Other Information in CPU Unit Comment Memory (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

memory when a Memory Card or EM file memory are both not available. (PLC models: CS/CJ-series with unit version 3.0 or later only.)

## 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.

![](_page_16_Figure_4.jpeg)

## **Duplex-CPU System**

![](_page_16_Picture_6.jpeg)

## 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.)

## Single-CPU System

### **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.

![](_page_16_Figure_15.jpeg)

![](_page_16_Picture_16.jpeg)

### 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.

network

The CS1D-ETN21D and

CS1D CPU Unit version 1.1 or higher are required for a duplex Ethernet

![](_page_17_Figure_5.jpeg)

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

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 guickly detect faulty nodes or lines to make maintenance easier.

![](_page_17_Figure_8.jpeg)

## 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 NEW for duplex communications with Ethernet is eliminated.

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.

![](_page_17_Figure_14.jpeg)

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

![](_page_17_Figure_16.jpeg)

### **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.

![](_page_17_Figure_20.jpeg)

## 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.

![](_page_18_Figure_24.jpeg)

## Smart Process Control

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

## 9

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

![](_page_19_Figure_5.jpeg)

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

![](_page_19_Figure_7.jpeg)

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

![](_page_20_Figure_3.jpeg)

## **PLC-based Process Control Application Examples**

![](_page_20_Figure_5.jpeg)

## Batch Control in a Chemical Plant

![](_page_20_Figure_7.jpeg)

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.

![](_page_21_Picture_4.jpeg)

## 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
- 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.

![](_page_22_Figure_33.jpeg)

## **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/CJseries PLC connected by a serial connection. It is also possible to display I/O comments created with the CX-Programmer.

NS-series

Ladder Monitor

Note: CS- and CJ-series PLCs connected via a 1:N NT Link to

serial port A or B on an NS-series Programmat

ed from System Menu.)

CF003 0000.01

SW2 ER LAMP01

Programmable Terminal

CS-/CJ-series PLC

1:N NT Link BS-2320

Serial port

A or B

CD-ROM

0

Ladder Monitor

application

0002.00

Instal

## **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 CONS						
PASSUORDI	EUN		NUL			
	685		680		(20)	
HINTS ADDRESS	101	ate.	TIN	181	1981	
				1000		
and the second s						

#### Programming Console Function

CX-Programmer

CXT file

Memory Card (Sold separately.)

I/O comment

extraction tool

I/O comment file for Ladder Monitor

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

### Switch Box Function

Terminal can be monitored

(Start

0000.00

SW1

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.

![](_page_23_Picture_16.jpeg)

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 combinal specified bits. Bit/word comments are imported from the CX-
- 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

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

![](_page_23_Figure_24.jpeg)

![](_page_23_Figure_25.jpeg)

## 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.

in various devices. Ladder programs can be monitored or transferred from the CX-Programmer NS-series PT through the NS-series PT to PLCs that are 00 connected to the PT in series or via a network. 44 000 -> Screen data or Data in Memory Card (From CX-Designer through PLC to NS-series PT) NS5-V1 5-inch Model NS10-V1 10-inch Model SPMA NS8-V1 NS12-V1 Ladder program
 (From CX-Programmer through
 NS-series PT to PLC) 8-inch Model 12-inch Mode Etherne Example: RS-232C Example: Eth Peripheral (or RS-232C) / Seria CS/CJ - • -NS-series P1 NS PT CS/CJ series PLC PLC Smart Active Parts (SAP library) NEW PLC System Compone Serial Personal computer Access devices without programs NT Link Example: DeviceNet NT Link **ر ا** Controller Link M Screen transfer Imm om the Con Link is supported from version 6. NT Lin

## **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.

## 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.

![](_page_24_Picture_11.jpeg)

For more information on this software, refer to the following site or send email to the following address. URL: http://www.omronsoft.co.jp/SP/ E-mail: rakuraku@omuronsoft.co.jp NS Series: Easily Create Multilingual Screens on Your Windows System

## 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.

![](_page_24_Figure_18.jpeg)

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

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

**NS-series PTs provide Smart** 

enabling direct access to data

Active Parts (SAP library)

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.

![](_page_24_Figure_22.jpeg)

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

![](_page_25_Figure_1.jpeg)

# A Complete Lineup of Units for Optimal Control.

Programmable Controllers

![](_page_26_Figure_1.jpeg)

Note: HMC-372/672 Memory Cards cannot be used with CS1G-CPU H, CS1H-CPU H, CJ1G-CPU H, or CJ1H-CPU H 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 addresss 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

# **CS1-series**

![](_page_27_Figure_3.jpeg)

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 EM area Bank 0 Bank n EM File Memory Bank C	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 ca- pacity	Data memory ca- pacity (See Note.)	LD instruction pro- cessing 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 µs	Peripheral port and RS-232C port.	Memory Cards Inner Board such as Serial Communications Board, Loop Control Board
CS1H-CPU66H		120 kSteps	256 kWords			(See note 1.)
CS1H-CPU65H CS1D-CPU65H CS1D-CPU65S CS1D-CPU65P		60 kSteps	128 kWords			
CS1H-CPU64H		30 kSteps	64 kWords			
CS1H-CPU63H	-	20 kSteps	1			
CS1G-CPU45H	5,120 bits (Up to 7 Expansion Racks)	60 kSteps	128 kWords	0.04 µs		
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		rox. 400 (3-digit function codes)			
Execution time		Basic instructions: 0.02 µs min., Special instructions: 0.04 µs min.			
Function Blocks (C	PU 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	I/O Area	5,120: CIO 000000 to CIO 031915 (320 words from CIO 0000 to CIO 0319) Setting of first rack words can be changed from default (CIO 0000) so that CIO 0000 to CIO 0999 can be used. I/O bits are allocated to Basic I/O Units, such as CS1 Basic I/O Units, C200H Basic I/O Units, and C200H Group-2 High- density I/O Units.			
bits if not used as shown here.)	Link Area	3,200 (200 words): CIO 10000 to CIO 119915 (words CIO 1000 to CIO 1199) Link bits are used for data links and are allocated to Units in Controller Link Systems and PC Link Systems.			
	CS1 CPU Bus Unit Area	6,400 (400 words): CIO 150000 to CIO 189915 (words CIO 1500 to CIO 1899) CS1 CPU Bus Unit bits store operating status of CS1 CPU Bus Units. (25 words per Unit, 16 Units max.)			
	Special I/O Unit Area	15,360 (960 words): CIO 200000 to CIO 295915 (words CIO 2000 to CIO 2959) Special I/O Unit bits are allocated to CS1 Special I/O Units and C200H Special I/O Units. (See Note.) (10 words per Unit, 96 Units max.) The maximum number of slots, however, is limited to 80 including expansion slots, so maximum number of Units is actually 80.) Note: Some I/O Units are classified as Special I/O Units.			
	Inner Board Area	1,600 (100 words): CIO 190000 to CIO 199915 (words CIO 1900 to CIO 1999) Inner Board bits are allocated to Inner Boards. (100 I/O words max.)			
	SYSMAC BUS Area	800 (50 words): CIO 300000 to CIO 304915 (words CIO 3000 to CIO 3049) SYSMAC BUS bits are allocated to Slave Racks connected to SYSMAC BUS Remote I/O Master Units. (10 words per Rack, 5 Racks max.)			

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) Ar-	I/O	Terminal Area	512 (32 words): CIO 310000 to CIO 313115 (words CIO 3100 to CIO 3131)
ea, contd.			I/O Terminal bits are allocated to I/O Terminal Units (but not to Slave Racks) connected to SYSMAC BUS Remote I/O Mas-
(The CIO Area can			ter Units. (1 word per Terminal, 32 Terminals max.)
be used as work	C20	00H Special I/O	8,196 (512 words): CIO 000000 to CIO 051115 (words CIO 0000 to CIO 0511)
bits if not used as	Uni	Area	C200H Special I/O Unit bits are allocated to C200H Special I/O Units and allow access separate from I/O refreshing.
shown here.)		DeviceNet/	1,600 (100 words):Outputs: CIO 005000 to CIO 009915 (words CIO 0050 to CIO 0099)
		PROFIBUS-DP	Inputs: CIO 035000 to CIO 039915 (words CIO 0350 to CIO 0399)
		Area	Device verbilis are anocated to shaves according to Device vertification for communications.
		PC LINK Area	b4 bits (4 words): CID 02/400 to CID 025015 (Words CID 024/16 CID 0250) When a PC Link Unit is used in a PC Link use these bits to mention PC Link errors and operating status of other CPI II hits
			in PC Link officis used in a PC Link, use these bits to monitor PC Link errors and operating status of other CPC officis
Internal I/O Area			14 800 (300 words): CIO 120000 to CIO 149915 (words CIO 1200 to CIO 1499)
Internal i/O Area			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.)
			Note: 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
Auxiliary Area			Read only: /,168 bits (448 words): A00000 to A44/15 (words A000 to A44/)
			Head/Wille: 6,192 Dits (512 Wolds): A44600 to A95915 (Wolds A446 to A959)
Tomporon/ Aroo			Autiliary Disa at allocated specific functions.
			10 bits (1700 to 1713) Temporary bits are used to store ON/OFF execution conditions at program branches.
			4,090. 10000 to 14095 (used for timers only)
Counter Area			4,096: COUD to C4095 (used tor counters only)
DM Area			32 KWords: D00000 to D32767
			beed as a general-puipose data area to reading and winning data in word units (16 bits). Words in DW Area maintain their status when PI C is turned data area to norasting mode is changed
			Internal Special (V0 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 adulesses unective.
Data Registers			DR0 to DR15. Store offset values for indirect addressing. Data registers can be used independently in each task
Data negisters			One register is 16 bits (1 word)
Index Registers			IBD to IB15 Store PLC memory addresses for indirect addressing. Index registers can be used independently in each task
index riegiotore			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).
Batterv-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)
Cvcle time monitoring	Possible (Unit stops operating if cycle is too long): 1 to 40.000 ms (Unit: 10 ms)
I/O refreshing	Cvclic refreshing, immediate refreshing, refreshing by IORF(097).
I/O memory holding when changing oper- ating 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
Eiling	User program histracians, respired a Devices (such as Frogramming console), nos Link computer.
Polyaging	Memory Card data and EM (Extended Data memory) Area can be nanued as mes.
	tracing.
Online editing	One or more program blocks in user programs can be overwritten when GPU Unit is in PHOGHAM or MONITOH 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, N I Links
Сюск	Provided on all models. Note: 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	<ul> <li>Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of counter Completion Flags and present values.</li> <li>Note: 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 turnedI ON, contents of CIO Area, Work Area, part of Auxiliary Area, timer Completion Flag and PVs, Index Registers, and Data Registers will be saved.</li> </ul>
Sending commands to a Host Link computer	FINS 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) Note: 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	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 (incl	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 (in- cluding 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	1	Contact configuration: SPST-NO Switch capacity: 250 V AC, 2 A (resis- tive load) 250 V AC, 0.5 A (induc- tion load), 24 V DC, 2 A	Contact configuration: SPST-NO Switch capacity: 240 V AC, 2 A (resis- tive load) 120 V AC, 0.5 A (in- ductive load) 24 V DC, 2 A (resis- tive load) 24 V DC, 2 A (induc- tive load)	Not provided	Contact configuration: SPST-NO Switch capacity: 250 V AC, 2 A (resis- tive load) 250 V AC, 0.5 A (in- duction 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 ternal and GR terminals (See Note 1.)			V DC) between DC ex- nals (See Note 1.)		
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.)       1         Leakage current: 10 mA max.       6         1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.)       1         Leakage current: 10 mA max.       1         Leakage current: 10 mA max.       1         Image: Current: 10 mA max.       1			1,000 V AC 50/ 60 Hz for 1 min be- tween 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 ter- minals (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 $\times$ 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 e	each in X, Y, and Z direct	ions According to JIS C0	041 / IEC 60068-2-27		
Ambient operating tempera- ture	0 to 55° C	0 to 55° C				
Ambient operating humidity	10% to 90% (with no condensation)					
Atmosphere	Must be free from corrosive gases.					
Ambient storage tempera- ture	-20 to 75°C (excluding battery)					
Grounding	Less than 100 $\Omega$					
Enclosure	IP20, intended for panel mounting.					
Weight	All models are eac	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 UI C	SA cULUS CUL NK LIO	vd'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.

## Programmable Controllers

## **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	30 A max.			
	40 A max./200 to 240 V AC				
Output capacity	7 A, 5 V DC (including CPU Unit power)	4.3 A, 5 V DC (including CPU Unit power)			
	1.3 A, 26 V DC	0.56 A, 26 V DC			
	Total: 35 W	Total: 28 W			
Output terminal	Not provided	Not provided			
RUN output	Contact configuration: SPST-NO	Not provided			
(See Note 2.)	Switch capacity:				
	240 V AC, 2 A (resistive load)				
	120 V AC, 0.5 A (inductive load)				
	24 V DC, 2 A (resistive load)				
Inculation registerios	24 V DC, 2 A (Inductive Ioad)	20 MO min (at 500, V/DC) between DC external and CB terminals			
Insulation resistance	(See Note 2.)	20 Ms2 min. (al 500 V DC) between DC external and GR terminals			
Dielectric strength	2 300 V AC 50/60 Hz for 1 min between AC external and GB ter-	1 000 V AC 50/60 Hz for 1 min between DC external and GB termi-			
Dielectric strength	minals (See Note 2.)	nals leakage current: 10 mA max (See Note 2.)			
	Leakage current: 10 mA max.				
	1 000 V AC 50/60 Hz for 1 min between AC external and GB ter-				
	minals (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 tempera-	0 to 55° C				
ture					
Ambient operating humidity	10% to 90% (with no condensation)				
Atmosphere	Must be free from corrosive gases.				
Ambient storage tempera-	-20 to 75°C (excluding battery)				
ture					
Grounding	Less than 100 Ω				
Enclosure	Mounted in a panel.	Mounted in a panel.			
Weight	All models are each 6 kg max.	All models are each 6 kg max.			

## **Basic System Configuration**

![](_page_33_Figure_2.jpeg)

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

### **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 kSt	eps	
		Data Memory: 256 kWords (DM: 32 kWords, EM: 32 kWords x 7 banks)		
ODUUS	CS1H-CPU65H	I/O bits: 5,120, Program capacity: 60 kSteps		
CPU Units		Data Memory: 128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)		
	CS1H-CPU64H	I/O bits: 5,120, Program capacity: 30 kSteps		
The second secon		Data Memory: 64 kWords (DM: 32 kWords	s, 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)		
	CSTG-CPU45H	I/U DITS: 5,120, Program capacity: 60 KSteps		
	CS1C CPU/4H	I/O bite: 1 280. Program canacity: 30 kSteps		
Lead V	0310-0-04411	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	s, EM: 32 kWords x 1 bank)	
CPU Backplanes	CS1W-BC022	2 slots (Connection to Expansion Back-	These Backplanes are for CS1 Units only.	
		plane is not possible.)	Use CS1W-BC 3 Backplanes if C200H	
	CS1W-BC032	3 slots	Units are to be installed.	
	CS1W-BC052	5 slots		
	CS1W-BC082	8 slots		
	CS1W-BC102	10 slots		

Name	Model	Specifications	
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 (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.	
Memory Cards	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	CS1W-CN114	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)	
Cables	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 sen- sors.	
Programming Device Connecting	CS1W-CN118	Connects DOS computer, D-Sub 9-pin receptacle (Length: 0.1 m)	
Cables (for peripheral port)	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	XW2Z-200S-V	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m) (For Host Link connection)	
Cable (for RS-232C port)	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 ma ufacture.	

<sup>\*1</sup> ## = 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 Con- necting Cable		
C200H Expansion I/O Rack	C200H Expansion I/O Backplane	One of each Unit is required.	
	Power Supply Unit	A CS1 Expansion Rack cannot be connected after a	
	For connection to a CPU Backplane or CS1 Expansion I/O Backplane: CS1 to C200H I/O Connecting Cable	C200H Expansion I/O Rack.	
	For connection to a C200H Expansion I/O Backplane: C200H I/O Connecting Ca- ble		

## Products Used in Expansion Racks

Name	Model	Specifications		Cable Length
CS1 Expansion I/O Back- planes	CS1W-BI032	3 slots	These Backplanes are for CS1 Units	
	CS1W-BI052	5 slots	only. Use CS1W-BI 3 Backplanes if C200H Units are to be installed.	
	CS1W-BI082	8 slots		
	CS1W-BI102	10 slots		
C200H Expansion I/O Back-	C200HW-BI031	3 slots		
planes	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	2 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	CS1W-CN313	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other	0.3 m
Cables		CS1 Expansion I/O Backplanes.	
	CS1W-CN713		0.7 m
		When using a CS1W-CN313 or CS1W-CN713 I/O Connecting Cable	
	CS1W-CN223	with a CS1 -CPU H CPU Unit, use only Cables produced on or after	2 m
	00111 01120	September 20, 2001 (production number 2091). Cables with no	
		production number, a 6-digit production number, or produced before	0
	C51W-CN323	September 20, 2001, cannot be used.	3 m
	CS1W CN522		5 m
	0010-01025	Reading the production number	511
			10
	CS1W-CN133		10 m
		Year (e.g., 1997=7)	
	CS1W-CN133-B2	Month (1 to 9, X (10), Y (11), Z (12))	12 m
		Day (01 to 31)	
Long-distance	CV500-CN312	For Long-distance Expansion Racks	0.3 m
Connecting Cables	CV500-CN612	Connects the I/O Control Unit to I/O Interface Units or connects one I/O In-	0.6 m
	CV500-CN122	terface Unit to the next I/O Interface Unit.	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	CS1W-CN311	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Ex-	0.3 m
Connecting Cables	CS1W-CN711	pansion I/O Backplanes.	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	C200H-CN311	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O	0.3 m
Cables	C200H-CN711	Backplanes.	0.7 m
	C200H-CN221		2 m
	C200H-CN521		5 m
	C200H-CN131		10 m
Programmable Controllers

#### **Expansion Rack Patterns**

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



#### CPU Rack with C200H Expansion I/O Racks





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



mounted.)

#### System Configuration (Duplex Systems)



#### **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, CS1series 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.

Programmable Controllers

#### Expansion Patterns for CS1D PLCs

#### CS1D CPU Rack + CS1D Expansion Rack

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

CS1W-CN221

CS1W-CN321

CS1W-CN521

CS1W-CN131

C200H-CN311

C200H-CN711

C200H-CN221

C200H-CN521

C200H-CN131

CS1W-CN131-B2



Connects C200H Expansion I/O Backplanes to other C200H Expansion

I/O Backplanes.

C200H I/O Connecting

Cables

2 m

3 m

5 m

10 m

12 m

0.3 m

0.7 m

2 m

5 m

10 m



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





## Programming Consoles





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

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

#### **Connecting to the Peripheral Port**



#### Peripheral Port Connecting Cables

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

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	XW2Z-200S-CV	2.0 m	D-sub, 9-pin, male
bus or Host Link	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 adapt- er 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

## CS1W-CIF31 USB-Serial Conversion Cable Serial Connecting Cable: CS1W-CN226/CN626 XW2Z-200S-CV/500S-CV XW2Z-200S-V/500S-V IBM PC/AT or compatible Peripheral or RS-232C port

with USB port

CQM1-CIF02

#### **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 consump	tion	35 mA	
Operating envi- ronment	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**

**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

Computer	Serial Communications Node	Connecting Cable model number			Length	Computer connector
IBM PC/AT or	Tool bus or SYSMAC WAY	CS1W-CIF31	CS1W-CN226		0.5 m + 2.0 m	USB (A plug connector)
compatible			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.

#### Dimensions



Unit: mm

Backplane	Α	В	W	Н	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	1				
(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	Α	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	CS1W-BI032/033 (3 slots)	246	260
Backplanes	CS1W-BI052/053 (5 slots)	316	330
	CS1W-BI082/083 (8 slots)	421	435
	CS1W-BI102/103 (10 slots)	491	505
	CS1D-Bl092 (Duplex System)		
C200H Expansion I/O	C200HW-BI031 (3 slots)	175	189
Backplanes	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.



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**





C200H Basic I/O Units

#### 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.
  - 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.

CS1 Basic I/O Units



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

#### **Special I/O Units**



CS1 Special I/O Units

#### **CS1 CPU Bus 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.

#### Allocations

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

CS1 CPU Bus Units

#### 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 /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).

 $\mbox{CS1}$  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 Cons	Max. Current Consumption			
	5-V group	26-V group	24-V group	Consumption	
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**

- 1. Current required at 5 V DC by all Units (A) ⊴Max. Current shown in table
- 2. Current required at 26 V DC by all Units (B) ⊴Max. Current shown in table
- 3. Current required at 24 V DC by all Units (C) ⊴Max. Current shown in table

#### **Condition 2: Maximum Total Current Supply**

1. A  $\times$  5 V DC + B  $\times$  26 V DC + C  $\times$  24 V DC  $\trianglelefteq$ 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 Uni	t (24 V DC)	0.3 A used			0.3 A
Total current/power consumption 13.15+3.9+7.2 = 24.25 (30 W)		2.63 A (⊈.6) x 5 V = 13.15W	0.15 A ⟨	0.3 A ( ⊴0.8A) x 24 V = 7.2 W	

#### **Current Consumption Tables**

#### 5- V DC Voltage Group

Name	Model	Consumption (A)
CPULInits	CS1H-CPU67H	0.82 (See note )
(These values include current	CS1D-CPU67H	0.02 (000 11010.)
consumption by a Programming	CS1D-CPU67S	
Console.)	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-CPU6/P	1.04
Lean Cantral Baarda		0.00 (Cas note )
Loop Control Boards		0.22 (See note.)
Osvisl Osvernusiastica Desuda		0.22 (See note.)
Serial Communication Boards	CS1W-SCB21-V1	0.28 (See note.)
	CS1W-SCB41-V1	0.36 (See note.)
CPU Backplanes (for CST Units	CS1W-BC022	0.11
only)	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	CS1W-BI032	0.23
CST Onits only)	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	DC Input Units	C200H-ID211	0.01
Units		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	AC/DC Input Units	C200H-IM211	0.01
Units		C200H-IM212	0.01
	B7A Interface Units	C200H-B7AI1	0.10
		C200H-B7A12	0.10
	Interrupt Input Unit	C200HS-INT01	0.02
C200H Group-	DC Input Units	C200H-ID216	0.10
2 High-density		C200H-ID217	0.12
Input Units		C200H-ID218	0.10
		C200H-ID219	0.12
		C200H-ID111	0.12

Category	Name	Model	Consumption (A)
CS1 Input	DC Input Units	CS1W-ID211	0.10
Units		CS1W-ID231	0.15
		CS1W-ID261	0.15
		CS1W-ID201	0.10
	AC Input Lipita		0.20
	AC input Onits		0.11
	Internet Inc.		0.11
	Unit	CS1W-INT01	0.10
	High-speed Input Unit	CS1W-IDP01	0.10
	Safety Relay Unit	CS1W-SF200	0.10
C200H Output	Relay Output	C200H-OC221	0.01
Units	Units	C200H-OC222	0.01
		C200H-OC222N	0.008
		C200H-OC225	0.05
		C200H-OC226N	0.03
		C200H-OC223	0.00
			0.01
			0.01
	<b>T</b> O .		0.01
	Transistor Out-	C200H-OD411	0.14
	put Onits	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	C200H-B7A01	0.10
	Units	C200H-B7402	0.10
	Triac Output	C200H_04223	0.18
	Units		0.10
	Ormo		0.20
		0200H-0A224	0.27
CSTOutput	Relay Output	CSTW-OC201	0.10
Units	Units	CS1W-0C211	0.13
	Transistor Out-	CS1W-OD211	0.17
	put Units	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	CS1W-OA201	0.23 max.
	Units		(0.07+0.02×
			No. of points ON)
		CS1W-OA211	0.406 max. (0.07+0.021×No. of
C200H Group-	Transistor Out-	C200H-OD218	0.27
2 High-density	put Units	C200H-OD210	0.48
Output Units			0.40
0011/011-3	DC Innut/Turn		00
	sistor Output		0.27
	l Inite	CS1W-MD262	0.27
	01110	CS1W-MD291	0.35
		CS1W-MD292	0.35
	TTL I/O Unit	CS1W-MD561	0.27
C200H I/O	B7A Interface	C200H-B7A21	0.10
Units	Units	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-	DC Input Unit	C200H-ID215	0.13
density I/O	TTL Input Unit	C200H-ID501	0.13
Units (Special I/	Transistor Output Unit	C200H-OD215	0.22
O Units)	TTL Output Unit	C200H-OD501	0.22
	TTL I/O Unit	C200H-MD501	0.18
	DC Input Transistor Out-	C200H-MD215	0.18
	put Unit	C200H-MD115	0.18
C200H Special	Temperature Control	C200H-TC001	0.33
I/O Units	Units	C200H-TC002	0.33
		C200H-TC003	0.33
		C200H-TC101	0.33
		C200H-TC102	0.33
		C200H-TC102	0.33
	Heat/Cool Temperature	C200H-TV001	0.33
	Control Units	C2001-1V001	0.00
		C200H-1V002	0.33
		C200H-1V003	0.33
		C200H-1V101	0.33
		C200H-1V102	0.33
	-	C200H-1V103	0.33
	Temperature Sensor	C200H-1S001	0.45
	Units	C200H-TS002	0.45
		C200H-TS101	0.45
		C200H-TS102	0.45
C200H Special	PID Control Units	C200H-PID01	0.33
I/O Units		C200H-PID02	0.33
		C200H-PID03	0.33
	Cam Positioner Unit	C200H-CP114	0.30
	ASCII Units	C200H-ASC02	0.20
		C200H-ASC11	0.25
		C200H-ASC21	0.30
		C200H-ASC31	0.30
	Analog Input Units	C200H-AD001	0.55
		C200H-AD002	0.45
		C200H-AD003	0.10
	Analog Output Units	C200H-DA001	0.65
		C200H-DA002	0.60
		C200H-DA003	0.10
		C200H-DA004	0.10
	Analog I/O Units	C200H-MAD01	0.10
	High-speed Counter	C200H-CT001-V1	0.30
	Units	C200H-CT002	0.30
		C200H-CT021	0.45
	Motion Control Unit	C200H-MC221	0.65
			(w/Teaching
		C200HW-MC402- E	0.60
	Position Control Units	C200HW- NC113	0.30
		C200HW-NC213	0.30
		C200HW-NC413	0.50
	ID Sensor Units	C200H-IDS01-V1	0.25
		C200H-IDS21	0.25
	Fuzzy Logic Unit	C200H-FZ001	0.30
	Voice Unit	C200H-OV001	0.30
	DeviceNet Master Unit	C200HW- DRM21-V1	0.25
	DeviceNet I/O Link Unit	C200HW-DRT21	0.25
	CANopen Unit	C200HW-	0.25
	PROFIBUS-DP	CORT21-V1 C200HW-PRM21	0.60
	Master Unit		0.05
	I/O Link Unit	C200HW-PRT21	0.25
	CompoBus/S Master Unit	C200HW- SRM21-V1	0.15
	PC Link Unit	C200H-LK401	0.35

Category	Name	Model	Consumption (A)
CS1 Special	Analog Input Unit	CS1W-AD0□1-V1	0.13
I/O Unit		CS1W-AD161	0.15
	Analog Output Unit	CS1W-DA0	0.13
	Analog I/O Unit	CS1W-MAD44	0.20
	Isolated Thermocouple	CS1W-PTS01-V1	0.15
	Input Unit	CS1W-PTS11	0.12
		CS1W-PTS51	0.25
		CS1W-PTS55	0.18
	Isolated Temperature-	CS1W-PTS02	0.15
	resistance Thermome-	CS1W-PTS12	0.12
	ter Input Unit	CS1W-PTS52	0.25
		CS1W-PTS56	0.18
	Isolated Temperature- resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.15
	Isolated DC Input Unit	CS1W-PDC01	0.15
		CS1W-PDC11	0.12
		CS1W-PDC55	0.18
	Isolated Pulse Input Unit	CS1W-PPS01	0.20
	Isolated Control	CS1W-PMV01	0.15
	Output Unit	CS1W-PMV02	0.12
	Power Transducer Input Unit	CS1W-PTR01	0.15
	100-mV DC Input Unit	CS1W-PTR02	
	Motion Control Units	CS1W-MC221	0.60 (w/Teaching Box: 0.80 A)
		CS1W-MC421	0.70 (w/Teaching Box: 1.00 A)
	Position Control Units	CS1W-NC113/ 133	0.25
		CS1W-NC213/233	
		CS1W-NC413/ 433	0.36
	High-speed Counter	CS1W-CT021	
	Units	CS1W-CT041	0.45
	SSI Input Unit	CS1W-CTS21	0.32
	Customizable Counter	CS1W-HCP22-V1	0.80
	Units	CS1W-HCA12-V1 CS1W-HCA22-V1	0.75
		CS1W-HIO01-V1	0.60
	GP-IB Interface Unit	CS1W-GPI01	0.26
	RFID Sensor Unit	CS1W-V600C11	0.26
		CS1W-V600C12	0.32

#### CS1 CPU Bus Units

Category	Name	Model	Consump- tion (A)
CS1 CPU Bus	Loop Control Unit	CS1W-LC001	0.36
Jnits	Motion Control Unit	CS1W-MCH71	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
	Serial Communica-	CS1W-SCU21	0.29
	tions Unit		(See Note.)
	Ethernet Unit	CS1W-ETN□□, -ETN21D	0.40
	DeviceNet Unit	CS1W-DRM21-V1	0.29
	PROFIBUS-DP Master Unit	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 Out-	Relay Output	C200H-OC221	0.075 for 8 points ON at
put Units	Units	C200H-OC222	the same time
		C200H-OC223	
		C200H-OC224	
		C200H-OC225	
		C200H-OC222N	0.09 for 8 points ON at
		C200H-OC226N	the same time
		C200H-OC224N	-
	Transistor Output	C200H-OD216	0 075 for 8 points ON at
	Units	C200H-OD217	the same time
CS1 Output	Relay Output	CS1W-OC201	0.006 for each point ON
Units	Units	CS1W-OC211	at the same time
C200H Spe-	Analog Input Unit	C200H-AD003	0.10
cial I/O	Analog Output	C200H-DA003	0.20
Units	Units	C200H-DA004	0.25
	Analog I/O Unit	C200H-MAD01	0.20
	ID Sensor Units	C200H-IDS01-V1	0.12
		C200H-IDS21	0.12
CS1 Special	Analog Input Unit	CS1W-AD0□1-V1	0.09
I/O Units	· · · · · · · · · · · · · · · · · · ·	CS1W-AD161	0.06
	Analog Output	CS1W-DA041	0.18
	Units	CS1W-DA08V	0.18
		CS1W-DA08C	0.25
	Analog I/O Unit	CS1W-MAD44	0.20
	Isolated	CS1W-PTS01	0.15
	Thermocouple	CS1W-PTS11	0.08
	Input Unit	CS1W-PTS55	0.06
	Isolated Tempe-	CS1W-PTS02	0.15
	rature-resistance	CS1W-PTS12	0.07
	Thermometer	CS1W-PTS56	0.06
	Input Unit		0.00
	Isolated Tempera- ture- resistance Thermometer Input Unit (Ni508.4 $\Omega$ )	CS1W-PTS03	0.15
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.16
	Isolated DC Input	CS1W-PDC01	
	Unit	CS1W-PDC11	0.12
		CS1W-PDC55	0.06
	Isolated Pulse Input Unit	CS1W-PPS01	0.16
	Isolated Control	CS1W-PMV01	1
	Output Unit	CS1W-PMV02	0.12
	Power Transducer Input Unit	CS1W-PTR01	0.08
	100-mV DC Input Unit	CS1W-PTR02	
	Customizable Counter Unit	CS1W-HCA□2	0.15
	RFID Sensor Unit	CS1W-V600C1	0.12

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

Programmable Controllers

# **CS1 Unit Descriptions**

Linit		Classification	Model	Daga
I/O Unite	Input Lipits	CS1 Basic I/O Unit		300
		COT Dasie 1/0 Offic		201
		C200H Rapia I/O Linit		200
		C20011 Basic 1/O Offic		201
				301
		C000LL Creasial I/O Linit		301
	Output Lipite	C200H Special I/O Unit		300
	Output Onits	CST Basic I/O Unit		301
				301
		C000LL Dania I/O Llmit		301
		C200H Basic I/O Unit		301
				301
				301
		C200H Group-2 High Density Units		301
		C200H Special I/O Unit	C200H-OD501	301
	I/O Units	CS1 Basic I/O Unit		302
		C200H Special I/O Unit		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-IN101	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-ADLLL(-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		323
Duplex Process CPU				323
Tomporature Separa Lipit	2	CS1 Special I/O Unit		320
remperature Sensor Units				226
Temperature Control I Init	e	C200H Special I/O Unit		337
Position Control Units	5	CS1 Special I/O Unit		338
		C200H Special I/O Unit		338
Motion Control Unit		CS1 Special I/O Unit		339
		C200H Special I/O Unit	C200HW-MC402-F	341
		CS1 CPU Bus Unit	CS1W-MCH71	343
High-speed Counter Units		CS1 Special I/O Unit	CS1W-CT0	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	Serial Communications Boards	Inner Board	CS1W-SCB□1-V1	351
Boards/Unit	Serial Communications Unit	CS1 CPU Bus Unit	CS1W-SCU21-V1	351
RS-232C/RS-422 Conver	sion 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/	Controller Link Unit	CS1 CPU Bus Unit	CS1W-CLKDD-V1	359
Unit	Controller Link Boards	Personal computer ISA board	3F8F7-CLKDD-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-	DeviceNet Unit	CS1 CPU Bus Unit	CS1W-DRM21-V1	363
Bus/S Units	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 C	AN 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

Output Units CS1W-OD21 16 points



16 points

**DC Input Units** Classification

CS1 Basic I/O Unit

C200H Basic I/O Unit

C200H Group-2 I/O Units

C200H Special I/O Unit

C200H Special I/O Unit

**TTL Input Units** Classification



Input Unit CS1W-ID231 32 points Output Units CS1W-OD23 32 points

**Output Units** CS1W-OD26 64 points I/O Units CS1W-MD26 32/32 points

Input Unit CS1W-ID261

64 points



Relay Output Unit CS1W-OC201 8 independent points Relay Output Unit CS1W-OC211



Input Unit CS1W-ID291 96 points **Output Units** CS1W-OD29 96 points I/O Units CS1W-MD29□ 48/48 points



Input Unit 8 points Output Units C200H-O

5/8 points



Input Unit C200H-ID 32 points Output Units C200H-OD 32 points I/O Units C200H-MD 16/16 points

Model

CS1W-ID211

CS1W-ID231

CS1W-ID261

CS1W-ID291

C200H-ID211

C200H-ID212

C200H-ID216

C200H-ID217

C200H-ID218

C200H-ID219

C200H-ID111

C200H-ID215

Model

C200H-ID501



C200H-I 16 points **Output Units** C200H-O

16 points



AC Input Units CS1W-IA□11



Triac Output Unit CS1W-OA201 8 points

Triac Output Unit CS1W-OA211 16 points

Input voltage

24 V DC

12 V DC

24 V DC

5 V DC

Input voltage

12 to 24 V DC

12 to 24 V DC



16 points

Inputs

16 pts

32 pts

64 pts

96 pts

8 pts

16 pts

32 pts

64 pts

32 pts

64 pts

64 pts

32 pts

Inputs

32 pts



Input Unit C200H-ID 32/64 points

Output Units C200H-OD 32/64 points

Connections

block

block

block

Connector

Connector

Removable terminal

Removable terminal

Removable terminal

Connections

Connector

**Remarks** 

5 mA

Input current: 7 mA

Input current: 6 mA

Input current: approx.

Input current: 10 mA

Input current: 7 mA

Input current: 4.1 mA

Input current: 6 mA

Input current: 4.1 mA

Input current: 4.1 mA

Pulse-catch inputs

Remarks

Programmable Controllers

#### 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
				C200H-IA122V
	200 to 240 V AC	8 pts		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	6 pts 12 to 24 V DC, 0.5 A/pt, 8 A/Unit sinking Re		CS1W-OD211
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, short circuit protec-	terminal block	CS1W-OD212
		tion, alarm		
	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 protec-		CS1W-OD232
		tion, alarm		
	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 protec-	-	CS1W-OD262
		tion, alarm		
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	C200H-OD411
	8 pts	24 V DC, 2.1 A, sinking	terminal block	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	Connector	C200H-OD501
		128-pt dynamic outputs possible		

#### **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		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	Classifica- tion	Inputs/ Outputs	Input voltage	Max. switching ca- pacity	Connections	Model	Remarks
DC Input/ Transis- tor 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 Spe- cial 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/ Out- puts	Input voltage	Max. switch- ing 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



#### CS1W-ID231



#### **CS1W-ID261**



#### CS1W-ID291



#### **CS1W-IA111**



#### **CS1W-IA211**



#### CS1W-OC201



#### CS1W-OC211





#### CS1W-OD212





#### CS1W-OD232



#### **CS1W-OD261**





#### CS1W-OD291





Programmable Controllers



#### CS1W-OA211



#### **CS1W-MD261**



#### CS1W-MD262



#### CS1W-MD291



Programmable Controllers



#### CS1W-MD561



#### CS1W-IDP01



## 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 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.

# **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, tim- er pause input, and time up output	16 bits	C200H-TM001

# 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 m $\Omega$ (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.)	$20 \ M\Omega$ 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
	Consumption	24 V DC: 1.7 W max.
Inputs	Current	75 mA max.
Switching	Rated load	250 V AC, 5 A
	Rated ON current	5 A

#### **Ratings of General Inputs**

Item	Specifications
Power voltage	24 V DC
Fluctuation	$^{-15\%}$ / <sub>+10%</sub> 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

#### 317

## OMRON

## 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	CS1W-AD041-V1	4 inputs	No	1 to 5 V, 0 to 5 V,	0.25 ms/pt		318
Units	CS1W-AD081-V1	8 inputs		0 to 10 V, ±10 V, 4 to 20 mA			
	CS1W-AD161	16 inputs				2 x 34-pin MIL connectors	318
	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		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		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	1 ms/pt max.		318
Analog Output Units	CS1W-DA041	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±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, ±10 V			
	CS1W-DA08C	1		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, ±10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ±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, ±10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V	1 ms/pt max.		
Temperature	CS1W-PTS11	4 inputs	Yes	B, E, J, K, L, N, R, S, T, U,	20 ms/4 pts	Measured value alarms	
Sensor Input Units	CS1W-PTS12	-		WHe5-26, PLII, ±100 mV Pt100Ω(JIS, IEC), JPt100Ω, Pt50Ω, Ni508.4Ω	10 ms/2 pts	(HH, H, L, LL), input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range, other fea- tures.	
	CJ1W-PTS51	1		B, J, K, R, S, T, L	250 ms/4 pts	Measured value alarms (H, L),	336
	CJ1W-PTS52	1		Pt100 (IEC, JIS), JPt100	250 ms/8 pts	input disconnection alarm,	
	CJ1W-PTS55	8 inputs	1	B, J, K, R, S, T, L	250 ms/4 pts		
	CJ1W-PTS56	-		Pt100 (IEC, JIS), JPt100	250 ms/8 pts	1	
	C200H-TS001	4 inputs	No	K.J	4.8 s max.		336
	C200H-TS002	1		K, L	1		
	C200H-TS101	1		JPt100	1		
	C200H-TS102	5 inputs		Pt100	1		

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

		A1	Input 1 (+)	
Input 2 (+)	B1			
Input 2 (_)	B2	A2	Input 1 (–)	
	02	A3	AG	
AG	B3			
	B4	A4	Input 3 (+)	
Input 4 (+)	54	A5	Input 3 (–)	
Input 4 (–)	B5	A.C.		
NC	B6	Ab	N.C.	
		A7	N.C.	
N.C.	B7	A8	N.C.	
NC	B8			
N.O.		A9	N.C.	
N.C.	B9			
NC	B10	A10	N.C.	
N.C.	610	A 1 1	NC	
			N.O.	

## CS1W-AD081-V1

		A1	Input 1 (+)	
Input 2 (+)	B1			
Input 2 (_)	B2	A2	Input 1 (–)	
		A3	AG	
AG	B3			
	D/	A4	Input 3 (+)	
Input 4 (+)	D4	45	Input 3 (_)	
Input 4 (–)	B5	7.5		
	DO	A6	Input 5 (+)	
Input 6 (+)	BO	A7	Input 5 (–)	
Input 6 (–)	B7			
		A8	AG	
AG	B8	10	1 + 1 + 1 = 1	
Input 8 (+)	BO	A9	Input 7 (+)	
	D9	A10	Input 7 (_)	
Input 8 (–)	B10	0		
r - · · · / /		A11	N.C.	
#### CS1W-AD161

#### CN2 Inputs 9 to16

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

CIVI Inputs I 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			

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#### Specifications

Model			CS1W-AD041-V1	CS1W-AD081-V1	C200HW-AD003	CS1W-AD161				
Classifica	tion		CS1 Special I/O Units		C200 Special I/O Units	CS1 Special I/O Units				
Unit num	ber		0 to 95	0 to 95	0 to F	0 to 94				
Inputs			4 pts	8 pts	8 pts	16 pts				
Signal	Voltages	1 to 5 V	Yes		•	•				
range		0 to 10 V	Yes	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)					
Resolutio	n		1/8000	1/8000	1/4000	1/8000				
Conversio	on 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: ±0.4%						
Connectio	ons		Terminal block	Terminal block 2 x 34 point MIL connectors						
Features	Wire burno	ut detection	Yes	Yes						
Peak-hold function			Yes	Yes						
	Mean funct	ion	Yes	Yes						

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

#### CS1W-DA0 , C200H-DA00

## **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

		A1	N.C.
N.C.	B1		
	D0	A2	Output 1 (+)
	DZ	A3	Output 1 (–)
Output 2 (–)	B3		
Output 4 (+)	B4	A4	Output 3 (+)
		A5	Output 3 (–)
Output 4 (–)	B5	A6	$O_{i}$ the set $E(x)$
Output 6 (+)	B6		Output 5 (+)
$Output \in ( )$	B7	A7	Output 5 (–)
Output 6 (–)	ы	A8	Output 7 (+)
Output 8 (+)	B8	4.0	
	B9	A9	Output 7 (–)
		A10	N.C.
N.C.	B10		-
		A11	N.C.

#### CS1W-DA041

	A1	N.C.		
B1				
B2	A2	Output voltage 1 (+)		
<b>D</b> 0	A3	Output 1 (–)		
B3	A4	Output current 1 (+)		
B4				
B5	A5	N.C.		
	A6	N.C.		
БО	A7	Output voltage 3 (+)		
B7				
B8	A8	Output 3 (–)		
	A9	Output current 3 (+)		
B9	A10	NC		
B10		N.O.		
	A11	N.C.		
	B1   B2   B3   B4   B5   B6   B7   B8   B9   B10	A1     B1   A2     B2   A3     B3   A4     B4   A5     B5   A6     B6   A7     B7   A8     B8   A9     B9   A10     B10   A11		

#### Specifications

Model			CS1W-DA041	CS1W-DA08V	CS1W-DA08C	C200H-DA003	C200H-DA004
Classification			CS1 Special I/O Units			C200H Special I/O Un	its
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)			
Resolution			1/4000	1/4000	1/4000	1/4000	1/4000
Conversion s	peed		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				
Features	Output hold f	unction		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

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.

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

**Function** 



#### **Terminal Arrangement (CS1W-MAD44)**

B1	A1	Output 1 (+)
	A2	Output 1 (–)
B2		Output Q ( )
B3	A3	Output 3 (+)
B4	A4	Output 3 (–)
51	Δ5	NC
B5		11.0.
B6	A6	Input 1 (+)
80	Δ7	Input 1 ()
B7		input i ( )
B8	A8	AG
80	Δ9	Input 3 (+)
B9	/ 10	input o (1)
B10	A10	Input 3 (–)
ыю	A11	N.C.
	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10	A1     B2   A2     B3   A3     B4   A5     B5   A6     B6   A7     B7   A8     B9   A9     B10   A10

#### 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	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	Inputs		Voltage: ±0.2%	Voltage: ±0.2%	
accuracy			Current: ±0.4%	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 o	detection	Yes	Yes	
	Output hold		Yes	Yes	
	Ratio conversi	on	Yes	Yes	
•				•	

### CS1W-LC001, CS1W-LCB01/05, CS1D-CPU

## Loop Control Unit

Programmable Controllers

#### 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



#### **Function Block Example**



#### 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 Ad- vanced Inner Board	CS1D-LCB05D Duplex Inner Board (See note 3.)	CS1W-LC001	
Applicable PLCs		CS1G/H-CPU□□F	CS1G/H-CPU□□H	CS1D-CPU (Duplex compatible)	CS-series	
Mounting location		CPU Unit's Inner Board	slot		CPU Rack	
Max. number of B	oards/Units	1 Board max. per CPU l	Jnit		3 Units 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 Unit data area (CIO, WF	n: data can be allocated to R, HR, DM, or EM bank (	specified words in a CPU )).	CPU terminal block: A function block's ITEM data can be allo- cated to any CPU Unit data area.	
	Allocation of all data	HMI Interface function: The ITEM data of a Con Block can be allocated t bank 0.)	trol Block, Operation Blo o a specified EM bank. (	ck, or External Controller The default EM bank is	Send/Receive All Blocks: Can be allocated to any CPU Unit data area (no default setting).	
Setting switches		None		Front panel rotary switches: Unit number setting (0 to F)		
Indicators		Three LED indicators: Running, Ready, and Co	omm. port sending/recei	Five LED indicators: Running, Comm. port sending, Comm. port receiving, CPU Unit error, and Unit error		
Front panel conne	ectors	One RS-232C port (for o	connection of an ES100	·		
Data Backup		Super capacitor backs u tables and step ladder p	p all function block data orogram instructions).	Battery backs up all function block data and contents of the error log.		
Backup time of ba	ckup capacitor or battery	24 hrs at 25°C (The bac	ckup time is shorter at hig	5 years at 25° C (The battery life is shorter at higher temperatures.)		
Data stored in flas	sh memory	Function block data, dat time), and error log data	a in RAM (can be backe	Function block data and data in RAM (can be backed up or recovered at any time)		
Effect on the CPU	the CPU Unit's cycle time 0.8 ms max. (See note 2.)			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 consu Adapter is being used.	mption is 150 mA higher	360 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.			220 g max.	
Standard accesso	pries	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, Can be set for each function bloc	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 ta- ble) 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 bl	ocks	1 block max.					
Method for creating and transfering function blocks		Created and transferred using CX-Process Tool (purchased separately).						
Control methods	PID control method		PID with 2 degrees of freedom (v	with auto-tuning)				
	Control combination	าร	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 a	larms	4 PV alarms (upper upper-limit, u per PID block	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.

# 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

Programmable Controllers

#### CS1W-PTS11



#### CS1W-PTS51



#### CS1W-PTS55



#### CS1W-PTS02

CS1W-PTS02 Isolated-type Resistance Thermometer Unit

				Δ1	NC		
		N.C.	B1		N.O.	{	
		NO	DO	A2	1A		
		N.C.	D2	A3	1B		Resistance thermometer
		N.C.	B3				No. 1 input
		24	B4	A4	1b		
Desistance thermometer				A5	3A		
Resistance inermometer §	$\square$	2B	B5	16	20		Resistance thermometer
No. 2 input		2b	B6	AD	30	1	No 3 input
		NO	D7	A7	3b		No. 3 Input
		N.C.	B/	84	NC	1	
		N.C.	B8	/10		-	
		NC	RO	A9	4A		
		N.O.	59	A10	4B	L ś	Resistance thermometer
		N.C.	B10				No. 4 input
				A11	40		

#### CS1W-PTS03

CS1W-PTS03 Isolated-type Resistance Thermometer Unit



#### CS1W-PTS56

No. 1		1A	B1			1		
Platinum-resistance	<b>—</b>	1B	B2	A1	2A		No. 2	
Thermometer input		16	B2	A2	2B	╞───₹	Platinum-resistance	
		10	55	A3	2b	$\vdash$	memometer input	
No. 3		3A	B4	A4	4A	1	No. 4	
Platinum-resistance		Ŧ	3B	B5	Δ <u>5</u>	48		Platinum-resistance
mermometer input		3b	B6	AS	40	łľ	Thermometer input	
No. E		5A	B7	A6	40			
Platinum-resistance		5B	B8	A7	6A		No. 6	
Thermometer input	Í	55	00	A8	6B	┝──Ŧ	Platinum-resistance	
		50	Bð	A9	6b		i nermometer input	
No. 7		7A	B10	A10	84			
Platinum-resistance Thermometer input	Ī	t	7B	B11	A 4 4	07	1	No. 8 Platinum-resistance
			7b	B12	AII	88		Thermometer input
				A12	8b			

#### CS1W-PTW01

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

		Δ1	P1+	+		
V1	B1		1 17		2-wire	No.1
		A2	11	-	transmitter	
COM1	B2			+		
1/2	<b>D</b> 2	A3	P2+	-	2-wire	No 2
V2	03	A4	12	1	transmitter	NU.2
COM2	B4			-		
1/2	-	A5	P3+		2-wire	
V3	B2	16	12	- 1	transmitter	N0.3
COM3	B6	70	15			
		A7	P4+	+	Quitra	
V4	B7		14	-	2-WIFE	No.4
COM4	Do	A8	14		liansinillei	
CONI	00	A9	N.C.	1		
N.C.	B9			-		
	Dia	A10	N.C.			
N.C.	810	A11	NC	-		
L			N.O.			

	CS1W-P 2-Wire Tra	TW01 ansmi	Isolate tter Inj	ed-type out Unit	_					
	1/1	D1	A1	P1+						
		DI	A2	11			←+	-[	Current	٦
L		82	A3	P2+					output device	NO.1
	V2	B3	A4	12	1		←+	_[	Current	_ _
	COM2	B4	A5	P3+	1		_		output device	No.2
	V3	B5	46	13			←+	י ר	Current	
	сомз	B6	A7	D4.			_		output device	No.3
	V4	B7	A7	F4+	-		←-+			
	COM4	B8	A8	14			_	٦	Current output	No.4
	N.C.	B9	A9	N.C.		Γ		-	device	
	NC	B10	A10	N.C.						
	N.O.		A11	N.C.						
					-					

#### CS1W-PDC01

Voltage input

r	1+			A1	N.C.
Voltage output		V1	B1	A2	11
device	<u> </u>	COM1	B2		
	+	V2	B3	A3	N.C.
Voltage output device	_	00140	D4	A4	12
		COM2	B4	A5	N.C.
Voltage output		V3	B5	A.C.	10
device		СОМЗ	B6	AD	13
	<u>+</u>	VA	87	A7	N.C.
Voltage output device	_	V4	Б/	A8	14
	]	COM4	B8	Δ0	NC
		N.C.	B9	/	
		NC	B10	A10	N.C.
			210	A11	N.C.

#### Current input



Programmable Controllers

#### CS1W-PDC11

#### Voltage Inputs

Γ

	CS1W-PDC11										
+			A1	N.C.							
output _	V1	81	A2	11							
device +	COM1	B2	A3	N.C.							
Voltage	V2	B3	ΔΛ	12							
device	COM2	B4	A								
Voltage +	V3	B5	A5	N.C.							
output	СОМЗ	B6	A6	13							
Voltage +	V4	B7	A7	N.C.							
output _			A8	14							
device		DO	A9	N.C.							
	N.C.	В9	A10	N.C.							
	N.C.	B10	A11	N.C.							

		CS1W-PDC11									
+				A1	N.C.						
Current output		1 V1	B1	A2	1						
		COM1	B2	A2	NC						
Current output		V2	B3	A3	10.0.						
device –		COM2	B4	A4	12						
+		V3	B5	A5	N.C.						
device			00	A6	13						
+			B0	A7	N.C.						
Current output		V4	B7	A8	14						
	+	COM4	B8	10	NC						
		N.C.	B9	A9	N.C.						
		NC	B10	A10	N.C.						
			010	A11	N.C.						

#### CS1W-PDC55

#### Voltage Inputs

		CS	S1W-I	PDC5	5		
	լ+	V1+	B1			+	
Voltage		11+	B2	A1	V2+		Voltage
output device	-	COM1	B3	A2	l2+		output device
	ι+	V2	D0	A3	COM2	-	
Voltage		V3+	D4	A4	V4+	+	
output device		13+	B2	A5	14+		Voltage
	<u> </u>	COM3	B6	A6	COM4	_	output device
Vallage	<u> +</u>	V5+	B7	A7		+	
output device		15+	B8	A/	V0+		Voltage
		COM5	B9	A8	16+		output device
	μ+	V7+	B10	A9	COM6	-	
Voltage		17	D10	A10	V8+	+	Mallana
output device	-	17+	DII	A11	18+		voitage output device
	]	COM7	в12	A12	COM8	-	

#### **Current inputs**

	С	S1W-	PDC5	55		
· · · · · · · · · · · · · · · · · · ·	V1+	B1			1 L	
Current output	11+	B2	A1	V2+		Current output
-	COM1	B3	A2	l2+		device
+ •	Va	D0	A3	COM2	-	
Current output	1 V 3+	D4	A4	V4+	++	[]
device	13+	B5	Δ5	14+		Current output
-	COM3	B6	10	0014		device
++	V5+	B7	AO		. +	
Current output	15+	B8	Α/	V6+		Current output
-	COM5	B9	A8	l6+		device
	V7.	B10	A9	COM6		]
Current output		D10	A10	V8+	┝╺┿	
device	1/+	DII	A11	18+		Current output
-	COM7	B12	Δ12	COM8		device

#### CS1W-PTR01

1	······		Di	A1	1+		Power	
No.2	Power	2+	BI	A2	1–		transducer	NO.1
		2-	B2	Δ3	3±			
No.4	Power	4+	B3		0		Power	No.3
N0.4	transducer	4–	B4	A4	3-		tranoddoor	
		6+	B5	A5	5+		Power	No 5
No.6	Power transducer	6	DC	A6	5-		transducer	]
		0-	D0	A7	7+		Dowor	
No.8	Power	8+	B7	A8	7-		transducer	No.7
	transducer	8-	B8	10	N.C			
		N.C.	B9	A9	N.C.			
		N.C.	B10	A10	N.C.			
				A11	N.C.			

#### CS1W-PRT01 Power Transducer Input Unit

#### CS1W-PTR02

#### CS1W-PRT02 Analog Input Unit

			T	A1	1+		-	
No.2 Voltage	Voltago output	2+	B1	40	4		Voltage output device	No.1
	device	2-	B2	A2	I-			
		A .	00	A3	3+		Voltage output	No 0
No.4	Voltage output	4+	03	A4	3-	L	device	N0.3
	device	4-	B4	4.5				
	[	6+	B5	AS	5+		Voltage output	No.5
No.6	Voltage output device		<b>D</b> 0	A6	5-	<u> </u>	device	
	L	6-	86	A7	7+	L		
N- 0	Voltage output	8+	B7		-		Voltage output device	No.7
N0.8	device	8-	B8	A8	/-			
				A9	N.C.			
		N.C.	Bð	A10	NC			
		N.C.	B10					
		L	L	A11	N.C.			

#### CS1W-PPS01

#### No-voltage Semiconductor Input

CS1W-PPS01 Isolated-type Pulse Input Unit

#### Voltage Input

CS1W-PPS01 Isolated-type Pulse Input Unit

Voltage pulse generation									
vollage pulse g	eneration	T	A1	P1+					
	F1	B1		~ ~					
	COMI	P2	A2	S1					
-	COMIT	D2	A3	P2+					
+	F2	B3	/ 10						
No.2 +	00140	54	A4	S2					
	COM2	84	Δ <u>5</u>	D2.					
+	F3	B5	A3	FJT					
No.3 +			A6	S3					
	COM3	B6	A 7	DA					
+ <b></b>	F4	B7	A/	P4+					
No.4 <sup>+</sup> +	17	0,	A8	S4					
_ L	COM4	B8							
	NO	BO	A9	N.C.					
	N.C.	БЭ	A10	NC					
	N.C.	B10	7.10						
I	A11	N.C.							

#### **Contact Input**

CS1W-PPS01 Isolated-type Pulse Input Unit



## 3-wire Sensor Input

CS1W-PPS01 Isolated-type Pulse Input Unit



#### CS1W-PMV01

#### Voltage Output

CS1W-PMV01 Isolated-type Analog Output Unit

No.1 Load						
				P1+	7±	
╎┝╴	V1-	B1	10	NC	-	
	COM1	B2	M2	N.C.	┥╻║	
_	V2-	B3	A3	P2+	╞╧┙	
	00140	DA	A4	N.C.		
		B4	A5	P3+	]+	
	V3-	B5	46	NC	1	
<b> </b>	СОМЗ	B6			- +	
	V4 -	B7	A/	P4+		
	COMA	Do	A8	N.C.		
II		00	A9	N.C.		
	N.C.	B9	A10	N.C.	1	
	N.C.	B10	A11	NC	-	
A11 N.C.						
No.4						
Load						

#### **Current Output**

CS1W-PMV01 Isolated-type Analog Output Unit

No.2							
No.1							
Load resistance							
			1	A1	P1+	<u>+</u>	
		V1-	B1	Δ2	NC	→	
	_	COM1	B2	7.2			
		V2-	B3	A3	P2+		
	_	COM2	DA	A4	N.C.		
			D4	A5	P3+	+	
		V3 –	B5	A6	N.C.	┨→	
	-	COM3	B6	A7	D4.		
		V4-	B7	A7	F4+	_→	
	_	COM4	B8	A8	N.C.		
			<b>D</b> 0	A9	N.C.		
		N.C.	B9	A10	N.C.	1	
	N.C. B10 A11 N.C.						
No.4							
No.3							
Load resistance							

#### CS1W-PMV02

#### CS1W-PMV02 Isolated-type Analog Output Unit

					. 1
		_	A1	V1H	
	V1L	B1	Α2	COM1	
	COM1	B2	,	00111	
<u> </u> +	1/21	B3	A3	V2H	
	VZL	00	A4	COM2	
<u>}                                    </u>	COM2	B4	Δ5	V3H	
	V3L	B5	7.0		
	COM3	B6	A6	COM3	
	001013	00	A7	V4H	
	V4L	B7	<u>Δ</u> 8	COM4	
	COM4	B8		001014	
	NC	BO	A9	N.C.	
	11.0.	59	A10	N.C.	
	N.C.	B10	Δ11	NC	
			////	N.O.	

Programmable Controllers

#### 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, ±100 mV	Standard accuracy: ±0.05% of full scale Temp coefficient: ±0.01%/° 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 opera- tion and alarms, input dis- connection alarms, top hold, bottom hold, valley hold, zero span adjust- ment over user-set range
Isolated-type Resistance Thermometer Input Unit	CS1W-PTS12	4 inputs	All inputs isolated.	Pt100Ω(JIS, IEC), JPt100Ω, Pt50Ω, Ni508.4Ω	Standard accuracy: Larger of ±0.05% of full scale or ±0.1° C Temp coefficient: ±0.01%/° 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 opera- tion and alarms, input dis- connection alarms, top hold, bottom hold, valley hold, zero span adjust- ment over user-set range
Isolated-type Thermocouple Input Units (Economical type)	CS1W-PTS51 CS1W-PTS55	4 inputs 8 inputs	All inputs are isolated	B, J, K, R, S, T, L	Overall accuracy: ±0.3% of PV or ±1°C, whichever is larger, ±1digit max. Conversion cycle: 250 ms/4 pts	Process value alarms (H, L) Process value alarm DO output Input disconnection
Isolated-type	CS1W-PTS52	4 inputs	Alle inputs are	Pt100 (JIS JEC) JPt100	Overall accuracy: ±0.3% of PV	Process value alarms
Resistance Thermometer Input Unit (Economical type)	CS1W-PTS56	8 inputs	isolated	1 1100 (0.0, 120), 01 1100	or ±0.8°C, whichever is larger, ±1 digit max. Conversion cycle: 250 ms/4 pts	(H, L) Process valu alarm DO output Input disconnection detection
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: ±0.2% Temp coefficient: ±0.015%/°C Resolution: 1/4,096 Conversion cycle: 100 ms/4 pts	Built-in power supply for 2- wire transmission device output scaling (±32,000), measured value alarms (HH, H, L, LL), rate-of- change operation and alarms, input disconnec- tion 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, ±10 V, 0 to 5 V, ±5 V, 1 to 5 V, 0 to 1.25 V, ±1.25 V	Standard accuracy: ±0.05% of full scale Temp coefficient: ±0.01%/° 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 opera- tion and alarms, input dis- connection alarms, top hold, bottom hold, valley hold, total value measure- ment
	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: ±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 no- voltage semi-conductor in- put) or 20 pulses/s (contact input)		Built-in sensor power sup- ply, contact bounce filter, unit pulse conversion, ac- cumulative and instanta- neous 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: ±0.1% 1 to 5 V: ±0.2% Temp coefficient: ±0.015%/° C 4,000 (outputs) Conversion cycle: 100 ms/4 pts	Output disconnection alarms, control output an- swerback input, output rate-of-change limit, out- put high/low limits
Isolated-type Power Voltage Output Unit	CS1W-PMV02	4 outputs	All outputs isolated	0 to 10 V, ±10 V, 0 to 5 V, ±5 V, 0 to 1 V, ±1 V	Standard accuracy: ±0.1% Temp coefficient: ±0.015%/° C Resolution (at full scale): ±10 V or ±1 V: 1/16,000 0 to 10 V, 0 to 1 V, or ±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 (±32,000)
Power Transducer Input Unit	CS1W-PTR01	8 inputs	No isolation between inputs.	±1 mA, 0 to 1 mA	Standard accuracy: ±0.2% Temp coefficient: ±0.015%/°C Resolution: 1/4,096 Conversion cycle: 200 ms/8 pts	Motor overdrive preven- tion at startup, output scal- ing (±32,000), measured value alarms (H, L)
Analog Input Unit	CS1W-PTR02	8 inputs	No isolation between inputs.	±100 mV, 0 to 100 mV	Standard accuracy: ±0.2% Temp coefficient: ±0.015%/°C Resolution: 1/4,096 Conversion cycle: 200 ms/8 pts	Output scaling (±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
- Provided with measured value alarms (4 points each) (CS1W-PTS only).
- Sensor disconnection detection provided.



#### **Circuit Configuration**



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.



#### Specifications

Model								CO1W DTOFC	C200H TS001/002/101/102
Clossifies	tion		CS1W-FISII	O Unito	C31W-F1355	C31W-F1312	C31W-F1352	C31W-F1350	C200H-13001/002/101/102
Classifica					0.4- 05	0.4- 05	0.4- 05	0.4- 05	C200H Special I/O Offics
		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	Thermo-	К	Yes	Yes	Yes				TS001, TS002
Signals	couples	J	Yes	Yes	Yes				TS001
		L	Yes	Yes	Yes				TS002
		R	Yes	Yes	Yes				
		S	Yes	Yes	Yes				
		т	Yes	Yes	Yes				
		E	Yes						
		В	Yes	Yes	Yes				
		N	Yes						
		W	Yes						
		U	Yes						
		PLII	Yes						
		±100 mV	Yes						
	Resistance	JPt100				Yes	Yes	Yes	TS101
	thermome-	PT100				Yes	Yes	Yes	TS102
	lers	<b>Ni508.4</b> Ω				Yes	Yes	Yes	
Input sign	al range setti	ngs	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 conve	ersion 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
Conversio	on 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 ac	curacy	±0.05% of full scale	±0.3% of PV of whichever is la ±1 digit max.	or ±1°C, arger,	Larger of ±0.05% of full scale or ±0.1°C	±0.3% of PV of whichever is la ±1 digit max.	or ±0.8°C, arger,	±1% + 1°C
	Temperature cient	e coeffi-	±0.01%/°C						
	Cold junction compensation	n on error	±1°C						
Connectio	ons		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 (JPt00, Pt100).
- · Open-collector, voltage, or current outputs
- Sampling period: 500 ms
- Run/start control.
- Two internal alarms per loop.
- Detects heater burnout though 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,	Open-collector (pulse)	0 to 9	C200H-TC001
	B, N, L, or U)	Voltage (pulse)		C200H-TC002
		Current (linear)		C200H-TC003
	Platinum resistance thermome-	Open-collector (pulse)		C200H-TC101
	ters (JPt00, Pt100)	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

## **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 L	Jnit			1	1	
Classification	CS1 Special I/O U	Jnits		C200H Special I/C	Units		
Unit numbers	0 to 95			0 to 15 (0 to F)			
Control method	Open-loop, autor	atic trapezoid accel	eration/deceleration				
Control output signals	CS1W-NC□13: Open-collector outputs CS1W-NC□33: Line-driver outputs			Open-collector	Open-collector		
Controlled axes	1	2	4	1	2	4	
Operating modes	Direct operation of	r memory operation	•	•	•	•	
Data format	Binary (hexadecir	nal)		BCD			
Affect on scan time for end refresh	0.29 to 0.41 ms m	nax./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. (Refe	7.51 ms min. (Refer to operation manual for conditions.)		
Position data	-1,073,741,823 to	o +1,073,741,823 pu	Ilses	-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 (W	S01-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 highspeed, 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 sig	gnals	Analog				
Internal program	ming language	G language (Program started by command sent fro	om CPU Unit's ladder program.)			
Controlled axes		4 axes max.	2 axes max.			
Maximum positio	n value	-39,999,999 to 39,999,999 (for minimum setting ur	-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 car	n be specified for when there is no interrupt.)			
Task program-	Number of tasks	4 tasks max.	2 tasks max.			
ming capacity	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; moni-
	toring 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, rotaring knives, any synchronization and electronic CAM profile to be easily programmed.

#### System Configuration



### Specifications

#### General

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

#### **Motion Perfect Software**

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

# 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

#### System Configuration

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.



### **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 device	S	Sigma-II and W-series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface and various I/O Units.				
Programming lan	guage	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
		Row A	Row B	No.
Power Supply (t the outputs)	o feed	-PS: 0V	+PS: 12 to 24V	1
Digital Outputs		O2: NPN O2: PNP		2
[0-3] (NPN/PNP)		O3: NPN O3: PNP		3
Spare				4
Digital Inputs		I2: 0V	l2: 24V	5
[0-3]		13: 0V	13: 24V	6
Spare				7
Counter 1 &	Α	CH2: LD- / 0V	CH2: LD+	8
Counter 2		CH2: 12V	CH2: 24V	9
	В	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 &	Α	CH4: LD- / 0V	CH4: LD+	15
Counter 4*		CH4: 12V	CH4: 24V	16
		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	
Row A	Row B	No.
-PS: 0V	+PS:12 to 24V	1
O0: NPN	O0: PNP	2
O1: NPN	O1: PNP	3
		4
10: 0V	10: 24V	5
l1: 0V	l1: 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	50 kcps	0 to F	C200H-CT021
		RS-422 line driver	75 kcps		
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.)	50 kcps	0 to 92 (4 unit numbers per Unit)	CS1W-CT021
		RS-422 line driver	500 kcps		
	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.)	50 kcps	_	CS1W-CT041
		RS-422 line driver	500 kcps		

# 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  $\ensuremath{\text{I/O}}\xspace$  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	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_PS3	+ ENC2_PS <sup>4</sup>	B8	A8	0V ENC1_PS3	+ 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_PS3	+ ENC_PS <sup>4</sup>	B20		

## Serial Communication Units

#### **Serial Communications Features**

Unit	Model	lodel Ports	Serial communications mode							BASIC	Message
			Protocol macros	Host Link	NT Links	No-proto- col	Peripheral bus	Program- ming Console bus	Serial Gateway (see note)	program- ming	communi- cations
			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	General- purpose external device	
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-	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No
	ASC31	Port 2: RS-232C	No	No	No	No	No	No	Yes	Yes	No
Serial Com-	CS1W-	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
munications	SCB21-V1	Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
Boards/Units	CS1W-	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
	SCB41-V1	Port 2: RS-422A/485	Yes	Yes	Yes	No	No	No	No	No	No
	CS1W-	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
1	SCU21-V1	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.

# 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.



#### System Configuration



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.



#### Specifications

#### General

Classification	User memory	Shared memory	Serial communica- tions ports	Unit numbers	Model
C200H Special I/O Unit	200 Kbytes	Provided	RS-232C x 2	0 to F	C200H-ASC11
		(90 words in I/O memory)	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/-SCBD1-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	Inner Board	Set separately for each	RS-232C x 2		CS1W-SCB21-V1
Board		port: Protocol Macro, Host Link,	RS-232C x 1, RS-422A/485 x 1		CS1W-SCB41-V1
Serial Communications Unit	CS1 CPU Bus Unit	or 1:N NT Link, Serial Gateway or non-protocol communications.	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 Windowsbased 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	CompoWay/F command send/response	
		components	receive	
Digital Controllers and	Small Digital Controller with Communications (53 x 53 mm)	E5CK	Present value read, set point read, ma-	
Temperature Control-	Temperature Controllers with Digital Indications (Thermac J with com-	n- E5□J-A2H0	nipulated variable read, etc. Set point write, alarm write, PID param-	
lers	munications) (96 x 96 mm or 48 x 96 mm)			
	Digital Controllers with Communications (96 x 96 mm)	ES100	eter write, etc.	
	High-density Temperature Controller with communications (8 control	E5ZE	1	
	points)			
Intelligent Signal Processors (special specifications)		КЗТ□	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 Sys-	High speed, high precision, low cost	F200	Measurement, continuous measure-	
tems	High-precision inspection/positioning	F300	ment, etc.	
	Character inspection software/positioning software	F350	Measurement, positioning, inspection,	
			character inspection, etc.	
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

## Programmable Controllers

## 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.)



#### **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,	1 Read/Write Head	Not required	0 to 95	CS1W-V600C11
	for short distances)	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
# 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 implimented 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 ≤Number of devices in the system × 2 m Total cable length ≤20 m Length of a single cable ≤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	$35 \times 130 \times 101 \text{ mm} (W \times H \times D)$
Weight	258 g max.

## **Communications Networks**

#### Overview

Level	Network	Functions	Communications	Unit/Board
Information net-	Ethernet	Host computer to PLC	FINS messages	Ethernet Unit
works		PLC to PLC		
		Host computer to CPU Unit memory card	FTP server	_
		UNIX computer or other socket ser- vice to PLC	Socket services	_
	Controller Link	Computers connected directly to	FINS messages	Controller Link Support
netwo		network and PLC	Data links (offsets and automatic setting)	Board and Unit
Control	Controller Link	PLC to PLC	FINS messages	Controller Link Unit
networks			Data links (offsets and automatic setting)	
	DeviceNet		FINS messages on open network	DeviceNet Master Unit
	DeviceNet	PLC to components (slaves)	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 cy- cle: 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 ca- pacity		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.

# 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 repsonse 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.
  - $\bullet$  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.



#### **Ethernet Units**

#### System Configuration



#### **Specifications**

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

Programmable Controllers

## 

## 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.



#### 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 Whilte 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.
- Flexbile 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 E	CPU Bus Unit	CS Series	Wired	CS1W-CLK21-V1	Can be mounted together
			Optical ring (H-PCF cable)	CS1W-CLK12-V1 (See note.)	with previous Controller Link Units/Support Boards.
			Optical ring (GI cable)	CS1W-CLK52-V1 (See note.)	
Controller Link Support	Support Personal computer board		Wired	3G8F7-CLK21-EV1	
Boards (for PCI bus)	(for PCI bus)		Optical ring (H-PCF cable)	3G8F7-CLK12-EV1	
			Optical ring (GI cable)	3G8F7-CLK52-EV1	
Controller Link Repeater		Not mounted to PLC	Twisted-pair cable	CS1W-RPT01	Unit mounted indepen-
Units			Optical ring (H-PCF cable)	CS1W-RPT02	dently using either DIN Track or screws.
			Optical ring (GL 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.	
		Number of send words per Unit Total of Area 1 and Area 2: 1,000 words max.		
Data Link Area allocations User-set allocations		Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area		
Automatically set equal allocations		Area 1: CIO Area (including data link words), Area 2: DM Area and EM Area		
	Automatically set 1: N allocations	et 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	2 Mbps: 500 m	2 Mbps: 1.5 km
(See note 2.)	1 Mbps: 800 m	1 Mbps: 2.4 km
	500 kbps: 1 km	400 kbps: 3.0 km
Maximum number of nodes	Controller Link Unit + Repeater Unit	Controller Link Unit: 62 nodes (using a Controller Link
	Total number of nodes: 32	Unit htat supports 62 nodes)
Maximum number of Repeater levels (See note 3.)		2 levels

Note: 1. Specifications for each segment are the same as for Wired Controller Link networks.

- 2. Maximum transmission distance: Total wired cable length between the two nodes separated by the longest total wired cable length.
- 3. 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.

Programmable Controllers

#### 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 exten- sions to EN50170, as well as the standard IEC61158: 9.6 kBit/s, 19.2 kBit/s, 45.45 kBit/s, 93.75 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 ares 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	

## 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_lmp 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 to SYSMAC BUS Slave Racks Unit: cannot be used 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 (o 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			

#### 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.

 Remote I/O communications for automatic data transfers between the CPU Unit and Slaves (with no programming in the CPU Unit).

#### **System Configuration**





Programmable Controllers

- 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 explict message communication FINS commands can be send to other devices that support FINS messaging.

#### **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 sup	ply 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, ex	plicit message service		63 (See note 2.)
Max. number of I/O points	Fixed allocation	IS	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 allocation	IS	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	Fixed allocation	IS		3
mountable to PLC	User-set allocations			16
Weight	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	Up to 16 Units can be mounted	0 to F	CS1W-DRM21
	(fixed or user-set allocations)	when a Configurator is used.	(Configurator required to mount 16	
	Remote I/O communications slave		Units.)	
	(fixed or user-set allocations)			
	Message communications			
C200H Special I/O	Remote I/O communications master			C200HW-DRM21-V1
Unit	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

## Programmable Controllers

#### 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**

News	New work on 1/0 mainte	Marial
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	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 ca	n be allocated to IR, DM, HR, AR, LR, T/C, and EM areas		
First address	A readable or writable area b	y word (with some restrictions)		
Area size	Set in 1-byte increments up to	Set in 1-byte increments up to 64 bytes for both read and write areas		
Setting method	Configurator	Refer to the DeviceNet Configurator Operation Manual (W328).		
	Programming Console	1. Write the set value to I/O setting area allocated to the Special I/O Area.		
		<ol> <li>Turn ON the software switch allocated to the Special I/O Area and write the settings.</li> </ol>		
		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

 $35\times$   $130\times$  101 mm (W  $\times$  H  $\times$  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).

#### 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**



Programmable Controllers

#### Specifications

	7			
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	
			16	
	Linit mounting position	CPU Back of Expansion I/O Back	10	
		Unit cannot be mounted to SYSMAC BUS Slave Racks		
	Current consumption	Internal I/O power supply: 250 mA at 5V DC	C max. (from PLC)	
		Network power supply: 45 mA max. (from	n communications connector)	
	Network power supply	24 V DC ± 10%		
	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 swite	ch (front)	
		Network baud rate (10 kbit/s ~ 1000 kbit/s) b	y 3 DIP-switches (front)	
		CANopen node address (001 ~ 127) by 7 DI	P-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 $\rightarrow$ Unit: 3 words (1 word control	data + 2 words CANopen transmit data)	
		Unit →PLC: 5 words (3 words Unit si	tatus + 2 words CANopen receive data)	
	No. of DM settings	20 words	Descender et de	
	Amount of I/O data per Unit	Default [DM settings all 0000]: 2 words in + 2	2 words out	
	<b>NA</b>	With user defined DM settings: additionally u	ip to 100 words in + 100 words out	
Network	Message communications	By IOWR/IORD instructions		
INETWORK		ISO 11898, High Speed CAN		
Internace	Bus connector	5-pin mal open style connector		
	Roud rate	10 227, remote setting not supported		
	Bauurale	10, 20, 50, 125, 250, 500, 800, 1000 KDI/S	ion of any arbitrary baud rate via the DM pattings )	
	Brofilo	(Note: Refer to appendix D for the conligurat	ion of any arbitrary badd rate via the DM settings.)	
	FIONE	Manufacturar Specific Application Brofile		
	Supported functions	Rect up type	Minimum	
			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	
			Transmit objects: 8-bit (max 100)	
			16-bit (max. 100)	
			32-bit (max. 50)	
			64-bit (max. 25)	
			Receive objects: 8-bit (max. 100)	
			32-bit (max. 100)	
			64-bit (max. 25)	
			The total size of additonally 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 servies	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 lile	UUD 12 IV Leus		

#### 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. Highspeed 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 poi	nts	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	C200HE	128 points: 10, 256 points: 5
Master Units	C200HG-CPU33/43	128 points: 10, 256 points: 5
mountable	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
	CS1	128 points: 16, 256 points: 8
Number of points	per node number	8 points
Max. number of S	laves per Master	32
Status data		Communications Error Flag and Active Slave Node (see note)
Weight		200 g max.
Approved standar	ds	UL 508 (E95399), CSA C22.2 No. 142 (LR51460)

These flags use the AR area.

## Programmable Controllers

#### **Communications Specifications**

Communications method		CompoBus/S protocol		
Coding method		Manchester coding method		
Connection method	1	Multi-drop method and T-branch method (see note 1)		
Communications baud rate		750,000 bps, 93,750 bps (see note 2)		
Communications	High-speed communications	0.5 ms with 8 Slaves for inputs and 8 Slaves for outputs		
cycle time	mode	0.8 ms with 16 Slaves for inputs and 16 Slaves for outputs		
	Long-distance	4.0 ms with 8 Slaves for inputs and 8 Slaves for outputs		
	communications mode	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:50 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:30 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 cor	nnecting nodes	32		
Error control checks	S	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	Specifica	ations		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	2 slots (D	oes not connect to	Expansion Rack.)	CS1W-BC022	U, C, N, L, CE
(for CS1 Units only)	3 slots			CS1W-BC032	
	5 slots			CS1W-BC052	
	8 slots			CS1W-BC082	
	10 slots			CS1W-BC102	
CPU Backplanes	2 slots (D	oes not connect to	Expansion Rack.)	CS1W-BC023	U, C, N, L, CE
(for CS1- and	3 slots			CS1W-BC033	
C200H I/O Units)	5 slots			CS1W-BC053	-
	8 slots			CS1W-BC083	-
	10 slots			CS1W-BC103	-
Power Supply Units	100 to 12	0 V AC or 200 to 2	240 V AC; Output capacity: 4.6 A, 5 V DC	C200HW-PA204	U, C, N, L, CE
	100 to 12 Output ca	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			
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A. 5 V DC			C200HW-PA204B	U.C
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A. 5 V DC			C200HW-PA209B	U. C. N. L. CE
	24 V DC.	Output capacity: 4	C200HW-PD024	UC1. N. L. CE	
	100 V DC	. Output capacity:	C200HW-PD106R	U.C	
I/O Control Unit	For Expandincluded.	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.)			U, C, CE
Memory Cards	Flash me	Flash memory 30 MB			L. CE
	Flash me	mory, 64 MB		HMC-EF672	_,
	Memory (	Card Adapter (for o	computer PCMIA slot)	HMC-AP001	CE
Serial Communications	2 × BS-2	32C ports protoco	I macro function	CS1W-SCB21-V1	UCNICE
Boards	1 × BS-2	$32C \text{ port} + 1 \times BS$	-422/485 port_protocol macro function	CS1W-SCB41-V1	
Programming Consoles	An Englis	h Keyboard Sheet	(CS1W-KS001-E) is required	COM1-PBO01-F	U C CF
r regianning eeneeree	(Connects	s to peripheral por	t on CPU Unit only. Cannot be connected to RS-232C port.)	C200H-PBO27-F	
Programming Console	For C200	H-PRO27 and CQ	M1H-PBO01	CS1W-KS001-E	CE
Key Sheet					-
Programming Console	Connects	the C200H-PRO2	7-E Programming Console. (Length: 2.0 m)	CS1W-CN224	-
Connecting Cables	Connects	the C200H-PRO2	7-E Programming Console. (Length: 6.0 m)	CS1W-CN624	-
CX-One	Omron's i nents, inc	integrated software	e for programming and configuration of all control system compo- drives, temperature controllers and advanced sensors.	CX-ONE-AL□□C-E <sup>*1</sup>	
Peripheral Device Connecting Cables	Connects (Conversi	Connects personal computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect BS-232C cable to peripheral port)		CS1W-CN118	CE
(for peripheral port)	Periphera	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	Periphera	al bus or Host Link.	Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-CV	
Connecting Cables	antistatic		Connects personal computers. D-sub 9-pin (Length: 5.0 m)	XW2Z-500S-CV	-
(for RS-232C port)	Host Link		Connects personal computers, D-Sub 9-pin (Length ete m)	XW2Z-200S-V	-
			Connects personal computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-V	-
USB-Serial Conversion	Converte	between USB and	I BS-232C, cable length: 0.5 m	CS1W-CIE31	
Cable	PC driver	provided on CD-F pral or RS-232C Pr	OM. Refer to Using a USB-Serial Conversion Cable to Connect to or on page 291 for specifications.		
Battery Set	For CS1 S	Series only. (Instal	a replacement battery within 2 years of the production date.)	CS1W-BAT01	L. CE

\*1  $\square$  = 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	5120	250 kSteps	448 kWords (DM: 32 kWords, EM 32 kWords x 13 banks)	CS1D-CPU67S	UC1, N, L, CE	
replacement	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, Outp	24 VDC, Output capacity: 4.3 A, 5 VDC; 0.56 A, 26 VDC, 28 W total max.				
Duplex CPU Backplane	5 slots, suppo on-line Unit re	orts dual CPUs and o	duplex unit, dual power supplies and	CS1D-BC052		
Single CPU backplane	8 slots (suppo	orts dual power supp	ly and on-line Unit replacement)	CS1D-BC082S		
Expansion Backplane	9 slots (Used Racks.)	both for CS1D Expa	nsion Racks and CS1D Long-distance Expansion	CS1D-BI092		
Controller Link Units	Optical ring ty	Optical ring type with H-PCF cable				
	Optical ring ty	Optical ring type with GI cable				
CX-One	Omron's integ components, sors.	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.				
Optical Fiber Cable	H-PCF cable for for interconnection between Duplex Controller Link Units, cable length: 50 cm		on between Duplex Controller Link Units,	CS1D-CN051		

<sup>\*1</sup>  $\square$  = Number of licences; 01, 03, 10

#### **Expansion Racks**

Name	Specifications		Model	Standards	
CS1 Expansion Backplanes	3 slots		CS1W-BI032	U, C, N, L, CE	
(for CS1 Units only)	5 slots		CS1W-BI052		
	8 slots		CS1W-BI082		
	10 slots		CS1W-BI102		
CS1 Expansion Backplanes	3 slots		CS1W-BI033	U, C, N, L, CE	
(for CS1 and C200H I/O Units)	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	C200HW-PA204			
	100 to 120 V AC or 200 to 240 V AC (with service supply: 0 pacity: 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 th cannot be used on Long-distance Expansion Racks.)	nan 12 m. (C200H Units	CS1W-II102	U, C, N, L, CE	
CS1 I/O Connecting Cables	Connects CS1 Expansion I/O Backplanes to CPU Back-	Length: 0.3 m	CS1W-CN313	N, L, CE	
	planes or other CS1 Expansion I/O Backplanes.	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		
		Length: 12 m	CS1W-CN133-B2		
Long-distance Expansion Rack	Connect I/O Control Unit to I/O Interface Unit or connects	Length: 0.3 m	CV500-CN312	N, L, CE	
Cables	two I/O Interface Units	Length: 0.6 m	CV500-CN612	N, L, CE	
		Length: 1 m	CV500-CN122		
		Length: 2 m	CV500-CN222	N, CE	
		Length: 3 m	CV500-CN322	N, CE	
		Length: 5 m	CV500-CN522	N, CE	
		Length: 10 m	CV500-CN132	N, L, CE	
		Length: 20 m	CV500-CN232	N, CE	
		Length: 30 m	CV500-CN332	N, L, CE	
		Length: 40 m	CV500-CN432	N, CE	
		Length: 50 m	CV500-CN532	N, L, CE	
CS1 to C200H I/O	Connects C200H Expansion I/O Backplanes to CPU Back-	Length: 0.3 m	CS1W-CN311	N, L, CE	
Connecting Cables	planes or CS1 Expansion I/O Backplanes.	Length: 0.7 m	CS1W-CN711		
		Length: 2 m	CS1W-CN221		
		Length: 3 m	CS1W-CN321		
		Length: 5 m	CS1W-CN521		
		Length: 10 m	CS1W-CN131		
		Length: 12 m	CS1W-CN131-B2		
C200H I/O Connecting	Connects C200H Expansion I/O Backplanes to other C200H	Length: 0.3 m	C200H-CN311	N, L, CE	
Cables	Expansion I/O Backplanes.	Length: 0.7 m	C200H-CN711		
		Length: 2 m	C200H-CN221		
		Length: 5 m	C200H-CN521	L, CE	
		Length: 10 m	C200H-CN131		

### I/O Units

#### CS1 Basic I/O Units

Classifica-	Name	Specifications		M	ountable Ra	cks		Words	Model	Standards
tion			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks	allocated (CIO 0000 to CIO 0319)		
CS1 Input	DC Input Units	24 VDC, 16 inputs, 7 mA	Yes	No	Yes	Yes	No	1	CS1W-ID211	UC1, N, L,
Units		24 VDC, 32 inputs, 6 mA	Yes	No	Yes	Yes	No	2	CS1W-ID231	CE
		24 VDC, 64 inputs, 6 mA	Yes	No	Yes	Yes	No	4	CS1W-ID261	1
		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	
Safety Relay Unit		24 VDC, 2 channels with 4 in- puts each, 4 pts/common	Yes	No	Yes	Yes	No	1	CS1W-SF200	U, C, CE
CS1 Out- Relay Output put Units Units		250 VAC or 120 VDC, inde- pendent contacts, 8 outputs, 2 A	Yes	No	Yes	Yes	No	1	CS1W-OC201	UC1, N, L, CE
		250 VAC or 120 VDC, 16 outputs, 2 A	Yes	No	Yes	Yes	No	1	CS1W-OC211	
	Transistor Output Units	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, 0.1 A, 96 sinking outputs	Yes	No	Yes	Yes	No	6	CS1W-OD291	U, C, N, L, CE
		12 to 24 VDC, 0.1 A, 96 sourcing outputs	Yes	No	Yes	Yes	No	6	CS1W-OD292	
	Triac Output	250 VAC, 1.2 A, 8 outputs	Yes	No	Yes	Yes	No	1	CS1W-OA201	UC, N, L, CE
	Units	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. 5A, 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	
	Sourcing inputs/outputs TTL I/O Unit 5 VDC, 32 inputs, 32 outputs		Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD561	UC, N, L, CE

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

#### C200H Basic I/O Units

Classifica-	Name	Specifications	Mountable Racks			Words	Model	Standards		
tion			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks	allocated (CIO 0000 to CIO 0319)		
C200H Input	DC Input Units	12 to 24 VDC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-ID211	U, C, N, L,
Units (See		24 VDC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-ID212	CE
note 1.)	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 240 VAC, 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	12 to 24 VDC, 8 inputs	Yes	Yes (See	Yes (See	No (See	No	1	C200HS-INT01	+
C200H Out-	Relay Bit Out-	250 VAC/24VDC, 2 A 8 outputs max	Yes	Yes	Yes	No	Yes	1	C200H-OC221	U, C, N
(See note 1.)		250 VAC/24VDC, 2 A 12 outputs max	Yes	Yes	Yes	No	Yes	1	C200H-OC222	-
		250 VAC/24VDC, 2A,	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/24 VDC, 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 Out- put Units	Transistor Out- put Units	12 to 48 VDC, 1A, 8 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD411	U, C, N, L, CE
(See note 1.)		24 VDC, 2.1 A, 8 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD213	1
		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	1
		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	1
		24 VDC, 0.3 A, 16 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD212	1
		24 VDC, 1 A, 16 sourcing outputs, load short-circuit pro- tection.	Yes	Yes	Yes	No	Yes	1	C200H-OD21A	CE
	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.

Programmable Controllers

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

Classifica-	Name	Specifications		Мо	ountable Rad	ks		Words	Model	Standards
tion			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks	allocated (CIO 0000 to CIO 0319)		
C200H	DC Input Units	24 VDC, 32 inputs	Yes	Yes	Yes	No	No	2	C200H-ID216	U, C, N, L, CE
Group-2		24 VDC, 64 inputs	Yes	Yes	Yes	No	No	4	C200H-ID217	
Input Units		24 VDC, 32 inputs, 6 mA	Yes	Yes	Yes	No	No	2	C200H-ID218	U, C, CE
(See note.)		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	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
Output Units (See note.)		0.5 A/ 24 VDC, 32 sourcing outputs, load short-circuit protection	Yes	Yes	Yes	No	No	2	C200H-OD21B	U, C, CE
		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/	XW2Z-□□B (See note 1.)	
		Terminal Block Unit	MD262 and C200H-ID216/ID217/	XW2B-40G4	
			ID218/ID219/ID111/OD218/OD21B/	XW2B-40G5	
			00219	XW2D-40G6	
	1:2 connections	Special Cable		XW2Z-DD (See notes 1 and 2.)	
		Terminal Block Unit		XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	-
				XW2C-20G5-IN16	1

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

2. The XW2Z-DD, CS1W-ODD, and C200H-ODD cannot be connected. Only the inputs of the CS1W-MD can be connected.

#### 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/	XW2Z-DDH-1 (see note.)		
		Terminal Block Unit	MD291/MD292	XW2B-60G4		
				XW2B-60G5		
	1:2	Special Cable		XW2Z-DDH-2 (see note.)		
		Terminal Block Unit		XW2B-20G4		
				XW2B-20G5		
				XW2D-20G6		
				XW2B-40G4		
				XW2B-40G5		
				XW2D-40G6		
	1:3	Special Cable		XW2Z-DDH-3 (see note.)		
		Terminal Block Unit		XW2B-20G4		
				XW2B-20G5	1	
				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	Model	Standards
		CPU Rack	C200H Ex- pansion I/O Racks	CS1 Expan- sion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks	No.		
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	1	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	
	12 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD115	U, C, N

#### 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	Special Cable	For C200H-ID215/ID501/OD215/	XW2Z-DDA (See note.)	
connection parts	Terminal Block Connector	MD115/MD215	XW2B-20G4	
		For C200H-ID215/ID501/MD115/	XW2B-20G5	
		$\square\square \square$ – cable length	XW2D-20G6	
			XW2B-20G5-D	
			XW2B-40G5-T	
	Special Cable		XW2Z-DDA (see note)	
	Terminal Block Connector		XW2C-20G6-IN16	7

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	Mounta	ble Racks		Unit No.	Model	Standards		
		CPU Rack	C200H Ex- pansion I/O Racks	CS1 Expan- sion 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 out- put	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 out- put	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 val- ues, set points, alarm values, PID parameters, bank numbers, etc.							C200H-DSC01	
	Connecting Cable, 2 m					C200H-CN225			
	Connecting Cable, 4 m						1	C200H-CN425	

Name	Specifications	Mountab	le Racks				Unit No	Model	Standards
nume	opcontations	CPU Rack	C200H Ex- pansion I/O Racks	CS1 Expan- sion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks		model	otandarus
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 out- put	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 out- put	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-proportion- ing PID, or ON/OFF tran- sistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-PID01	U, C, CE
	Voltage output/current input, time-proportion- ing PID, or ON/OFF volt- age 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 val- ues, set points, alarm values, PID parameters, bank numbers, etc.							C200H-DSC01	
	Connecting Cable, 2 m							C200H-CN225	
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 (select- able); 8 inputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes	0 to F	C200H-AD003	U, C, N, L, CE
Ánalog 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	1	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 compat- ible	Yes	Yes	Yes	No	Yes	0 to F	C200H-CT021	U, C, CE

Name	Specifications	Mountable Backs						Model	Standards
		CPU Rack	C200H Ex- pansion I/O Racks	CS1 Expan- sion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks			
Motion Control Units	G-language program- mable, two-axis analog outputs	Yes	Yes	Yes	No	Yes	0 to F	C200H-MC221	U, C, CE
	MC Support Software IBM PC/AT or compati- ble							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 Conver- sion Unit Simplifies wiring.					]	XW2B-20J6-6		
	Connecting Cable for Terminal Block Conver- sion 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 Connect- ing Cables for computer							CS1W-CN226 (2 m) CS1W-CN626 (6 m)	CE
	RS-232C Port Connect- ing Cables for computer							XW2Z-200S-CV (2 m)	
								XW2Z-500S-CV (5 m)	-
								NCT V1.11 or earlier XW2Z-200S (2 m)	-
								(See note 1.) XW2Z-500S (5 m)	-
	1-axis Relay Unit for	-						(See note 1.) XW2B-20J6-1B	-
	2-axis Relay Unit for C200HW-NC213/ NC413	-						XW2B-40J6-2B	-
	1-axis U, H, M Connect- ing Cables for C200HW- NC113							XW2Z-050J-A6 (0.5 m)	
	2-axis U, H, M Connect- ing Cables for C200HW-	-						XW2Z-0003-A8 (111) XW2Z-050J-A7 (0.5 m)	
	1-axis UEP Connecting Cables for C200HW-	-						XW2Z-100J-A7 (1 m) XW2Z-050J-A8 (0.5 m)	-
	NC113 2-axis UEP Connecting							XW2Z-100J-A8 (1 m) XW2Z-050J-A9	 
	Cables for C200HW- NC213/NC413							(0.5 m) XW2Z-100J-A9 (1 m)	-

#### CS1 Special I/O Units

Ν	ame	Specifications	Mountable	e Racks	-	-	Unit No.	Model	Standards	
			CPU Rack	C200H Ex- pansion I/O Racks	CS1 Expan- sion Racks	CS1 Long- distance Racks	SYSMAC BUS Slave Racks			
A	nalog 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)						0 to 94	CS1W-AD161	UC1, N, CE
A U	nalog Output nits	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						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	
A	nalog I/O Unit	4 inputs (4 to 20 mA, 1 to 5 V, etc.)							CS1W-MAD44	
		10 V, etc.)								
Ρ	rocess I/O Units Isolated Ther-	4 inputs. B. E. J. K. N. R.	Yes	No	Yes	Yes	No	0 to 95	CS1W-PTS11	UC1. CE. N
	mocouple Input Unit	S, T, U, WRe5-26, PLII, ±100 mV								
		4 Inputs, B, J, K, R, S, T, L							CS1W-P1551	CE, UCI
		8 inputs, B, J, K, R, S, T, L							CS1W-PTS55	UC1, CE
	Isolated Temperature- resistance	4 inputs, Pt100Ω (JIS, IEC), JPt100Ω, Pt150Ω,							CS1W-PTS12	UC1, CE, N
	Thermometer	Ni508.4Ω 4 inputs, Pt100Ω							CS1W-PTS52	UC1, CE
	Input Unit	(JIS, IEC), JP5100Ω 8 inputs, Pt100Ω (JIS_IEC)_JPt100Ω							CS1W-PTS56	
	Isolated Two- wire Transmis- sion Device In- put Unit	4 inputs, 4 to 20 mA, 1 to 5 V							CS1W-PTW01	UC1, CE
	Isolated DC Input Unit	4 inputs, 4 to 20 mA, 1 to 5 V, 0 to 5 V, ±5 V, 0 to 10 V, +10 V							CS1W-PDC01	
		4 inputs, 4 to 20 mA, 0 to 20 mA, 0 to 10 V, ±10V, 0 to 5 V, ±5V, 1 to 5 V, 0 to 1.25 V, ±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	4 inputs							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, ±10 V, 0 to 5 V, ±5 V, 0 to 1 V, ±1 V							CS1W-PMV02	
	Power Trans-	8 inputs, 0 to 1 mA, ±1							CS1W-PTR01	
	100-mV DC	8 inputs, 0 to 100 mA,							CS1W-PTR02	
L	pop Control Units	Control loops: 32 Porcesses: 250	Yes	No	No	No	No	0 to F	CS1W-LC001	UC1, N, CE
L( B	oop Control oards	50 blocks maximum in- cluding both adjustment	CPU Unit I	Inner Board for	CS1-H PLCs	<u>I</u>	<u>I</u>	1	CS1W-LCB01	UC1, N, CE
		500 blocks maximum in- cluding both adjustment and operation blocks							CS1W-LCO05	

		Mauntable Daala						Madal	
Name	Specifications	Mountab CPU Rack	le Racks C200H Ex- pansion I/O Racks	CS1 Expan- sion Racks	CS1 Long- distance Backs	SYSMAC BUS Slave Backs	Unit No.	Model	Standards
High-Speed Counter Units	Pulse input: 2 pts Count- ing speed: 500 kcps	Yes	No	Yes	Yes	No	0 to 92	CS1W-CT021	U, C, CE
	Pulse input: 4 pts Count- ing speed: 500 kcps							CS1W-CT041	-
	Solder terminal; 40p and a Connector Cover							C500-CE401	
	Solderless terminal; 40p and a Connector Cover							C500-CE402	
	Pressure welded termi- nal: 40p							C500-CE403	
	Solder terminal; 40p and a Connector Cover (Hor- izontal-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 Four axis pulse train	-					0 to 94	CS1W-NC233 CS1W-NC433	-
SSI Unit	line-driver output SSI encoder inputs:	Yes	No	Yes	Yes	No	0 to 94	CS1W-CTS21	CE
Motion Control	2 channels 4 axes, analog outputs,	Yes	No	Yes	Yes	No	0 to 93	CS1W-MC421	U, C, CE
Units	G language 2 axes, analog outputs, G language							CS1W-MC221	
	MCH high-speed serial link						0 to F	CS1W-MCH71	
Computer Con- necting Cables	Peripheral port on CPU Unit		•	-!	-!	-		CS1W-CN226 (2 m) CS1W-CN626 (6 m)	CE
	RS-232C port on CPU Unit					XW2Z-200S-CV (2 m)			
T L' D								XW2Z-500S-CV (5 m)	
Teaching Box Teaching Box Cor	necting Cable (2 m)							CVM1-PRO01 CV500-CN224	U, C, CE CE
Memory Pack MC Terminal Block	k Conversion Unit for 2							CVM1-MP702 XW2B-20J6-6	U, C, CE 
Axes (simplifies wi MC Terminal Block Axes (simplifies wi	k Conversion Unit for 4 iring I/O connectors)							XW2B-40J6-7	_
MC Terminal Block	k Conversion Unit Cable	Vee	IN	Vee	Ma a	- Nia	0 to 5	XW2Z-100J-F1	
nications Unit	Two RS-232C Ports	res	INO	res	res	INO		0510-50021-01	U, C, L, N, CE
RS-232C–RS- 422A Conver- sion 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 Optical (H-PCF cable)	Yes	No	Yes	Yes	No	0 to F	CS1W-CLK21-V1	U, C, L, N, CE
	Optical (GI fiber 62.5/125 µm)						0101	CS1W-CLK52-V1	0, 0, 0
Controller Link	Wired							3G8F7-CLK21-V1	CE
Support Boards	Optical (H-PCF cable) Optical (GI fiber 62 5/125 um)	1						3G8F7-CLK12-V1 3G8F7-CLK52-V1	_
Controller Link Belay Terminals	Wired (a set of 5)							CJ1W-TB101	
Controller Link	Twisted-pair							CS1W-RPT01	UC1, CE
Repeater Units	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 Ex- pansion I/O Racks	CS1 Expan- sion 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 mas- ter.	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 communica- tion, 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

#### **Optional Products**

Name	Specifications	Model	Standards	
I/O Unit Cover	Cover for 10-pin terminal block	C200H-COV11		
Terminal Block Covers	C200H-COV02			
	Short protection for 19-pin terminal block (package of 10	-pin terminal block (package of 10 covers); 12 pts		
C200H Unit Connector Cover	200H Unit Connector over			
CS1 Special I/O Unit Connector Cover	Protective cover for unused I/O Connecting Cable connecting	ectors	CV500-COV01	
C200H Expansion I/O	Electrically insulate C200H Expansion I/O Backplanes	For 3-slot Backplane	C200HW-ATT32	N, L, CE
Backplane Insulation	from the control panel to increase noise resistance.	For 5-slot Backplane	C200HW-ATT52	
Plates		For 8-slot Backplane	C200HW-ATT82	]
e e e e		For 10-slot Backplane	C200HW-ATTA2	
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 Programmir	ng Console to a panel.	C200H-ATT01	
Space Unit	Used for empty I/O slot on the CS1W-BC 3/BI 3 or	C200H-SP001		
	Used for empty I/O slot on CS1W-BC 2/BI 2 and C	CS1W-SP001		
	Used for empty Power Supply Unit slot on CS1D-BC	CS1W-SP002		
	Used for empty Power Supply Unit slot on CS1D-BC	CS1W-SP002		
Battery Set	For CS-series CPU Units. (Use batteries within wo years	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	