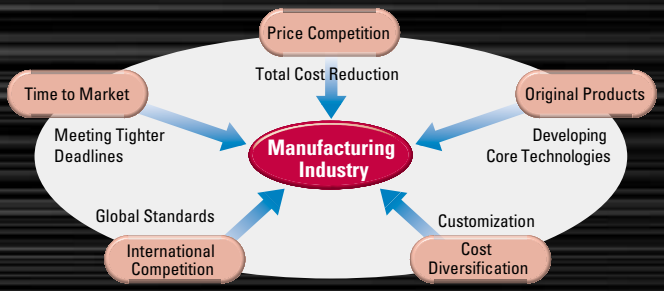
OMRON

From Machine Control to
Information Management – Multiple-application Controllers
with a Wide Range of Functions

SYSMAC CS1

Programmable Controllers

The popular SYSMAC CS1 is better than ever to allow new levels of control.



The current climate of ever-intensifying competition has created a large number of different needs for manufacturing industries around the world. To meet these needs, OMRON has made further improvements to its SYSMAC CS1 PLCs, which have been used successfully in thousands of systems, to deliver even greater performance. With an "H" for Hyper Controller, the new PLCs boast the highest standards in performance, functionality, and expandability.

High Performance

In order to create facilites that have the production capability to withstand sudden changes in demand, or to create machinery that is easily distinguished from that created by market competitors, a top-speed controller that can deliver the performance required to support these needs is required. The SYSMAC CS1 PLCs have been equipped with the highest I/O responsiveness and data control functionality to significantly reduce processing time and to control machinery movement with greater precision.

Human Efficiency

In order to allow easier development of complex programs, in addition to an integrated Windows-based development environment, the new PLCs are equipped with a variety of instructions. Structured programming functionality has been improved to allow programs to be reused with greater efficiency and thereby reduce labor requirements and cut costs.

Heritage

The know-how that our customers have accumulated through the years forms the core of their competitive strength. At OMRON, we believe in enhancing this know-how to the utmost. The key to doing this is 100% upward compatibility. CS1 PLCs allow existing Units and programs to be used without any changes.

This catalog contains information required to select products and is not intended to provide precautionary information. Refer to relevant operation manuals for all precautionary information.

Programmable Controllers are abbreviated as "PLC" in this catalog. The term "personal computers" is fully written out, and not abbreviated.

Contents

The evolution of the SYSMAC CS1 is accelera the production site.

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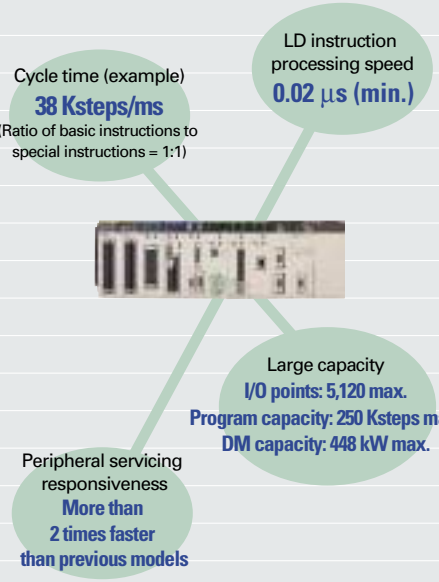
1 Ultimate Performance

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



P8-9

2 Instructions That Fit the Application

These PLCs have a variety of special instructions that allow their operation to suit the application. High-precision control can be achieved without complex programs.

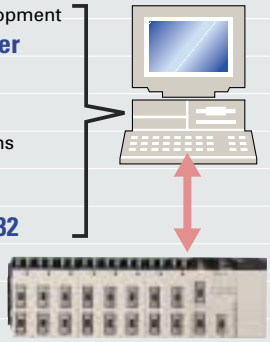
- High-precision Positioning
  Double-precision floating-point instructions
- Automatic Adjustment of PID Constants
  PID instructions with autotuning
- Program Simplification
  Set and reset instructions for DM/EM Area bits
- Error Generation for Debugging
  Failure diagnosis instructions
- High-resolution Approximation
  APR instruction
- Workpiece Information Control for Conveyor Systems
  Table data processing instructions for stacks

P10-11

3 Integrated Development Environment and Middleware

Powerful software packages are available for program development, simulation, and communications. Develop more efficient value-added systems in the time allowed.

- Program development
  CX-Programmer
- Simulation
  CX-Simulator
- Communications middleware
  Compolet, PLC Reporter 32



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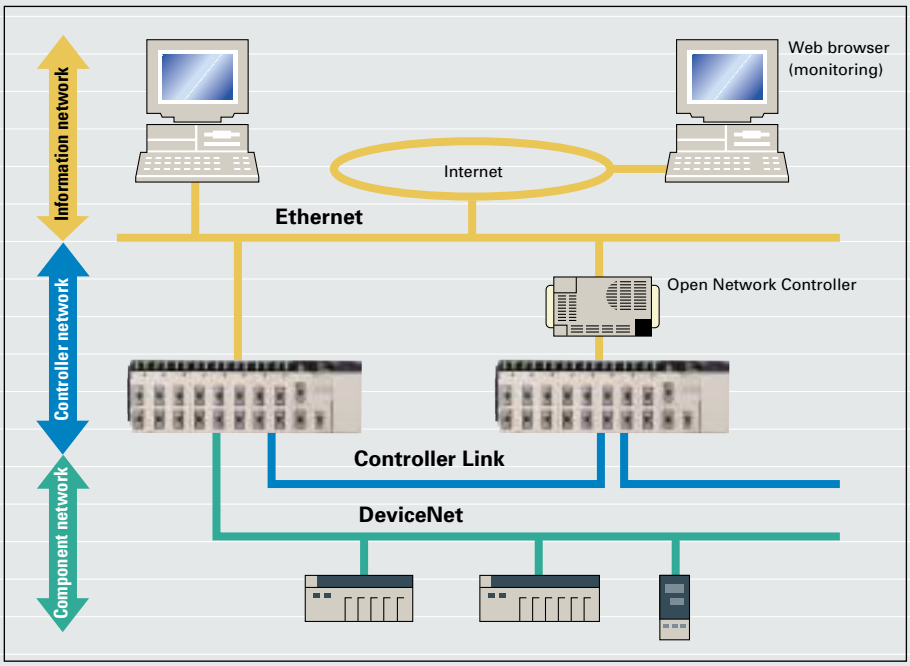
P12-13

4 Seamless Networking

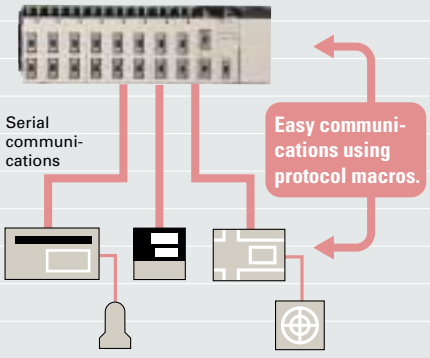
The CS1 supports message communications across three network levels, from information networks down to component networks, allowing greater on-site information management. Remote monitoring of installations is also possible using Web functions via the Internet.



P14-15

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.



P16-17

6 Inheritance and Maintenance

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

100% Upward Compatibility with Existing CS1 Systems

Battery-free Operation

Memory Cards

Remote Maintenance

Conformance to Global Standards

Etc.

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7 PLC-based System Expansion

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

PLC base

PLC-based process automation systems

High-precision positioning systems

Remote monitoring systems

Use the improved SYSMAC CS1 PLCs to scal the optimum size.

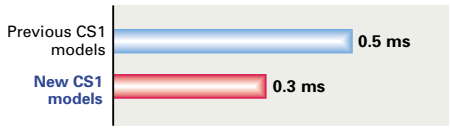
The evolution of the SYSMAC CS1 is accelerating advances in the production site.

1

Faster Instruction Execution and Faster Overall Performance

In addition to further improvements to the instruction execution engine, which is the core of overall PLC performance, the high-speed RISC chip has been upgraded to **realize the fastest instruction execution performance in the industry**. Also, the new models have a mode where instruction execution and peripheral processing are processed in parallel, enabling balanced improvements in overall speed.

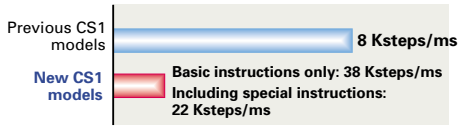
● Common Processing: 1.6 Times Faster



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

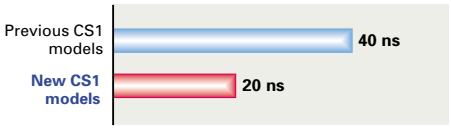
● Cycle Time: 2.5 to 4.8 Times Shorter

(Cycle time for 128 inputs and 128 outputs)



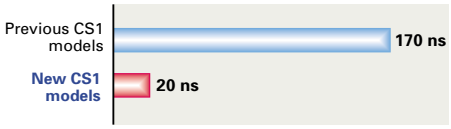
With normal I/O refresh, 1-ms pulses are not lost even for large-capacity (e.g., 30-Kstep) programs. This allows use in applications requiring a high working accuracy, such as molding equipment.

● LD Instruction Processing Speed: 2 Times Faster



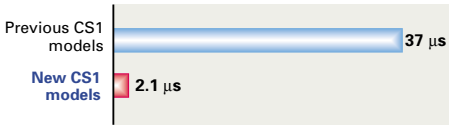
The development of a special LSI to execute instructions and use of a high-speed RISC chip enable high-speed processing at the CPU.

● OUT Instruction Processing Speed: 8 Times Faster



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

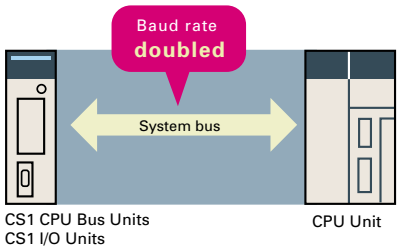
● Subroutine Processing Speed: 17.6 Times Faster



Cycle time overhead due to program structuring is minimized.

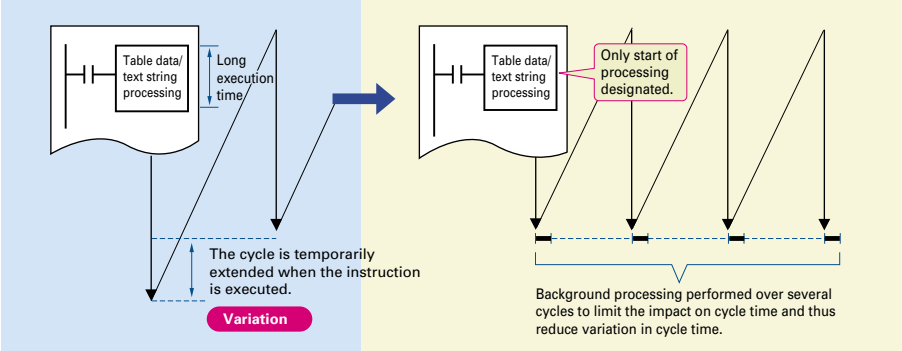
System Bus Baud Rate Doubled

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



Reduced Variation in Cycle Time During Data Processing

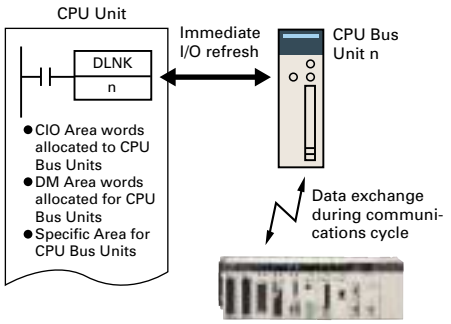
Instructions that require long execution time, such as table data processing instructions and text string processing instructions, are processed over multiple cycles to minimize variations in cycle time and maintain stable I/O response.



e advanced systems to

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. 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.



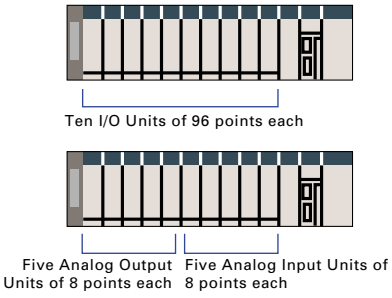
Unit name	Refresh function
Controller Link Unit	Data links
DeviceNet Unit	Remote I/O
Serial Communications Unit	Protocol macros
Ethernet Unit	Socket service based on manipulation of specific bits.

Large Capacity CPU Units for Greater Component Control Power

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

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

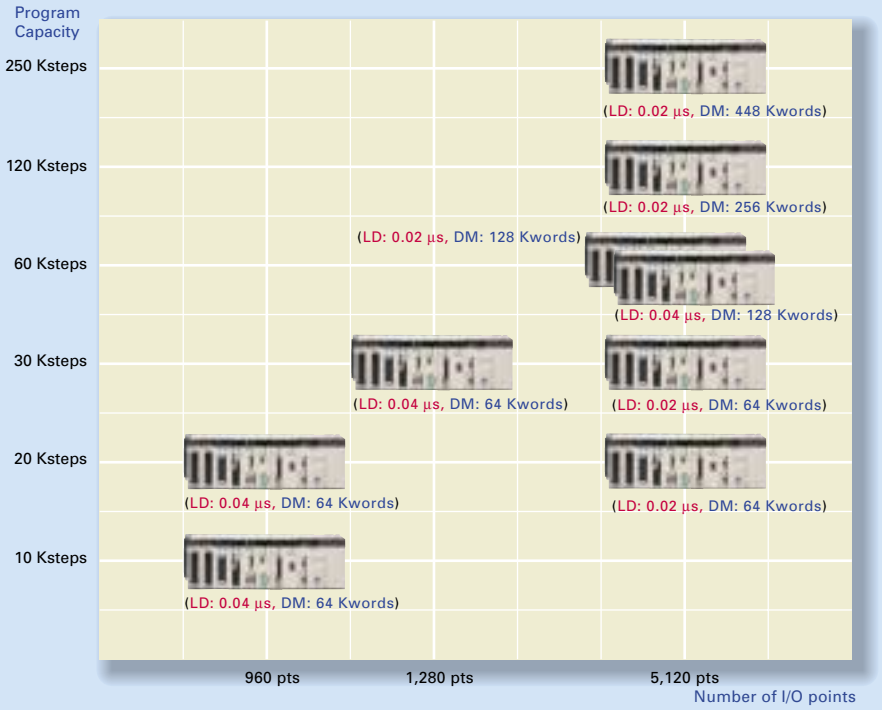
The CS1 provides a high level of space efficiency. As many as 960 I/O points can be controlled by simply mounting ten Basic I/O Units, with 96 I/O points each, to the CPU Rack. Alternatively, as many as 80 analog I/O points can be used by mounting five Analog Input Units and five Analog Output Units.



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.

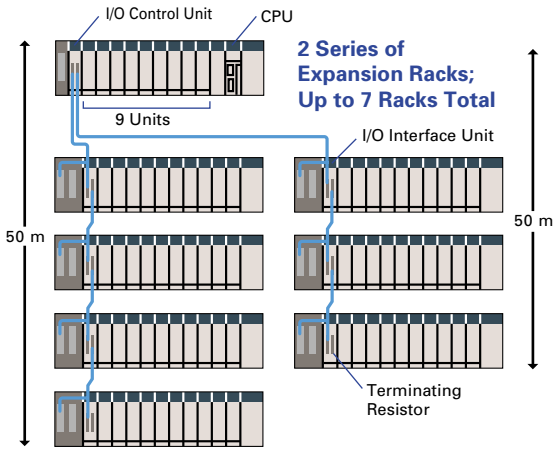
Product lineup (Example: LD instruction processing speed, DM capacity)



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

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

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



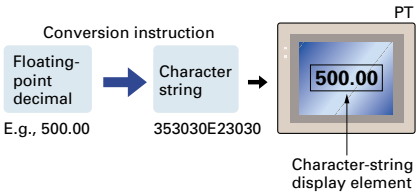
Equipped with functions demanded by the suit a variety of applications.

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

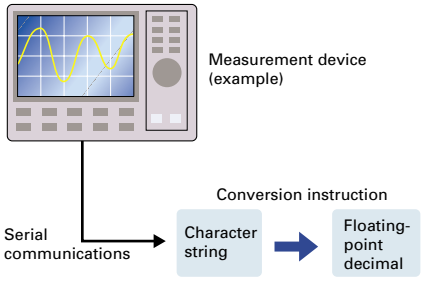
2

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.

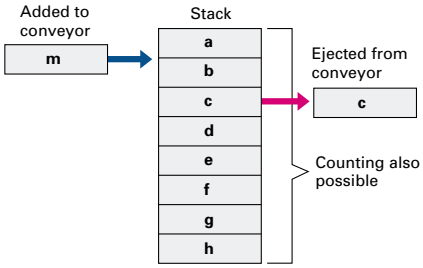


The new CS1 can convert ASCII character strings read from measurement devices by serial communications to floating-point decimal data for use in data processing.



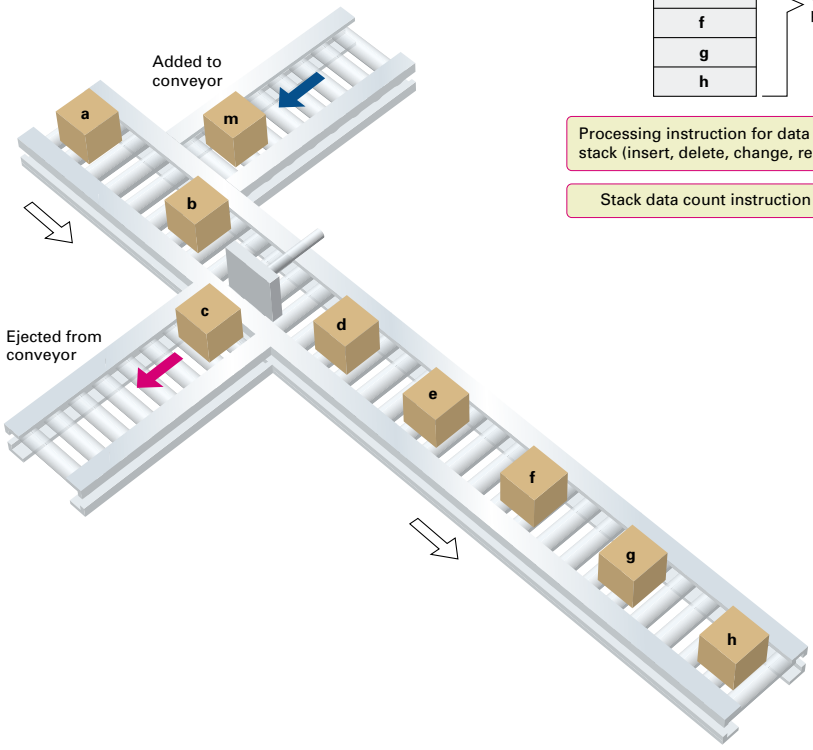
Realtime Control of Workpiece Information during Conveyor Transport and Other Operations

With conveyor systems, for example, where workpieces are added and ejected during conveyor transport, the new CS1 uses tables to perform realtime control of information about the workpieces on the conveyor.



Processing instruction for data n in stack (insert, delete, change, read).

Stack data count instruction



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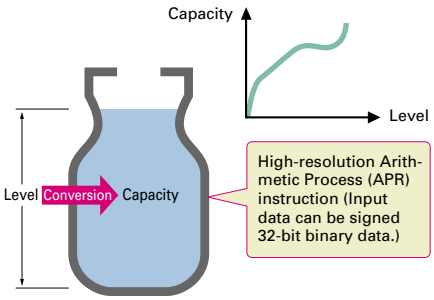
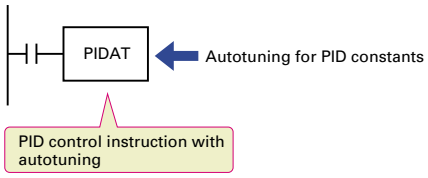
Fine Segment Approximation Possible

The new CS1 can make precise segment approximations (with high data resolution) for converting, for example, levels (in mm) to tank capacity (in l) in accordance with the shape of a tank.



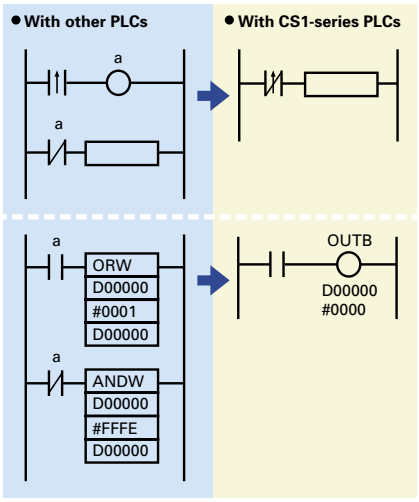
PID Autotuning

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.



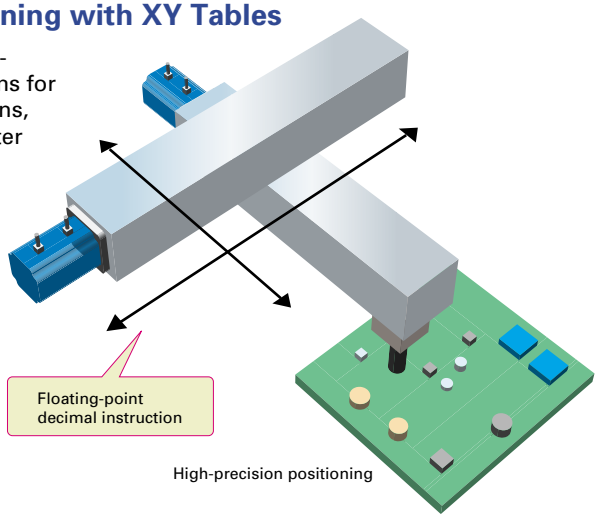
Simpler Ladder Programs

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.



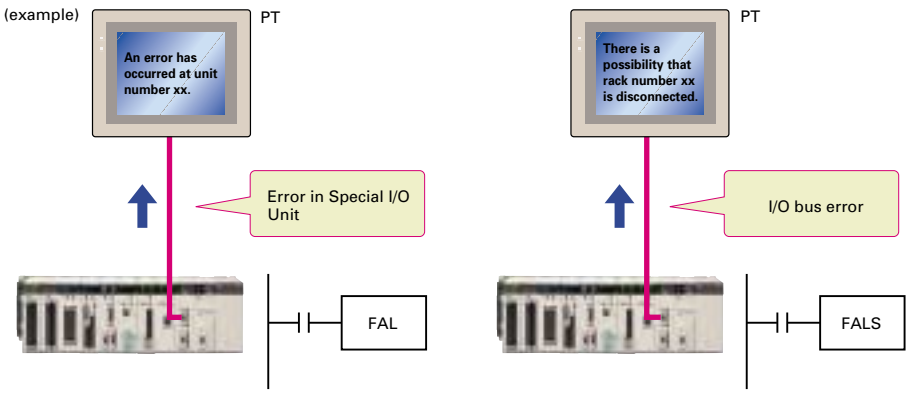
Highly Accurate Positioning with XY Tables

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



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.



Easier and more efficient design, developm Windows-based software and middleware.

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

3

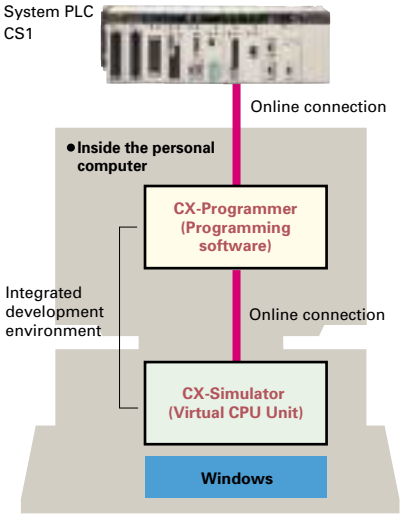
Improved Support Software for an Integrated Windows-based Development Environment

More efficient design and development using the CX-Programmer (Ver. 2.1) for programming and network configuration, and CX-Simulator for operation simulation.

CX-Programmer

CX-Simulator

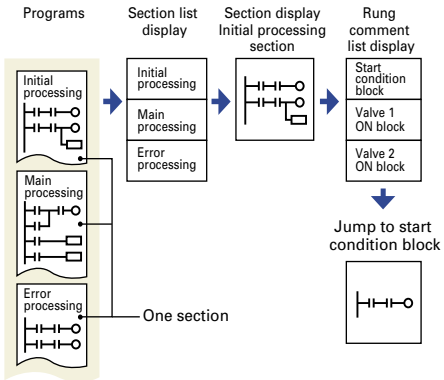
CX-Net Network Configuration Tool



CX-Programmer

Debug Details while Grasping the Whole Picture

With CX-Programmer version 2.1, ladder programs previously visible only in scroll form can now be handled in user-defined units called sections. As shown below, a program section can be jumped to by selecting it from a list. More specific points in the list can then be jumped to from a rung comment list. This simplifies the job of moving to and debugging program details while viewing the overall program.

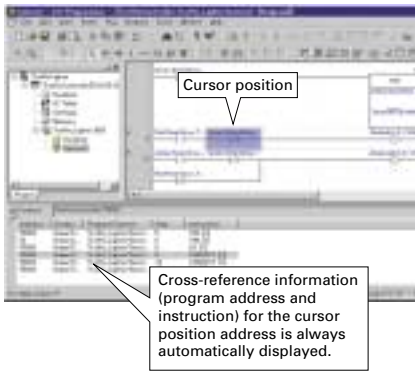


Two-way Compatibility between Spreadsheets and Variable Tables

I/O allocations tables, including symbols, addresses, and I/O comments, can be input into MS-Excel or other spreadsheets and then used with the CX-Programmer, or vice versa. This feature enables more efficient programming.

Greater Debugging Efficiency with Constant Display of Cross-reference Information

Cross-references (instruction position and instruction) for the cursor position address or specified address can be displayed constantly to improve debugging efficiency.



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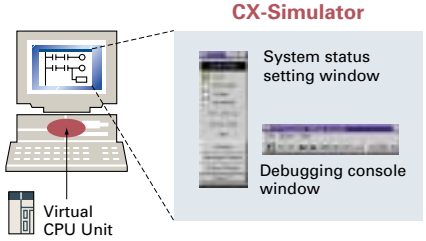
CX-Simulator

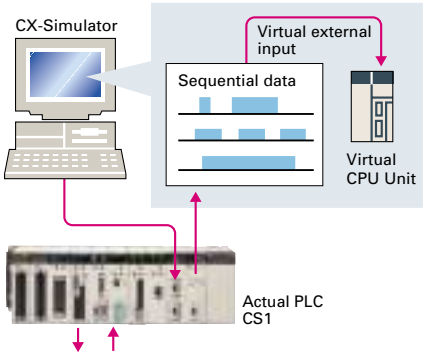
Programs Can Be Executed, Monitored, and Debugged without an Actual PLC

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



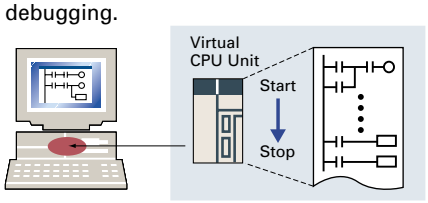
Data Logging On-site and Operation Verification in the Office

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



Comprehensive Debugging Functions Including Ladder Step Execution and Break Points

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



●Support Software

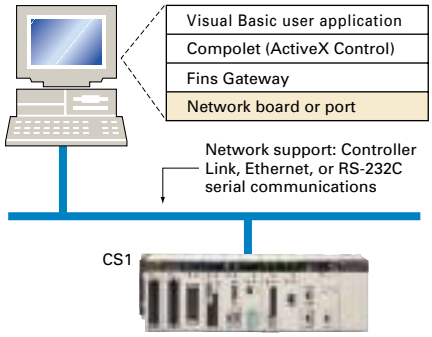
Product name	Model	Specifications		Corresponding operating system
CX-Programmer	WS02-CXPC1-EV2.1	For 1 license	Note: Can be connected to CPU Unit peripheral port and RS-232C port, and Serial Communications Board or serial communications RS-232C port.	Windows 95/98/NT 4.0/Me/2000
	WS02-CXPC1-EL03-V2.1	For 3 licenses		
	WS02-CXPC1-EL10-V2.1	For 10 licenses		
CX-Simulator	WS02-SIMC1-E	Simulation Software (Version 1.2)		Windows 95/98/NT 4.0/Me/2000
CX-Protocol (to be released soon)	WS02-PSTC1-E	Protocol Creation Software		Windows95/98/NT 4.0/Me/2000
CX-Motion	WS02-MCTC1-E	Motion Control Unit Support Software		Windows95/98/NT 4.0
CX-Position	WS02-NCTC1-E	Position Control Unit Support Software		Windows95/98/2000/NT4.0
CX-Process	WS02-LCTC1-E	Loop Control Unit Programming Software and Monitoring Software		Software: Windows 95, 98, or NT 4.0 Monitoring Software: Windows NT 4.0
License Key for CX-Process Monitoring Software	WS02-LCTK1-EL01	Monitoring Software Operation Hard Keys and Monitoring Software License		Windows95/98/NT 4.0
Support Software for Process I/O Unit	WS02-PUTC1-E	Process I/O Unit Settings Software		—
DeviceNet Configurator Software	WS02-CFDC1-E	DeviceNet Configuration Software		Windows95/98/NT 4.0/2000

Middleware to Support PLC-centered System Construction

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

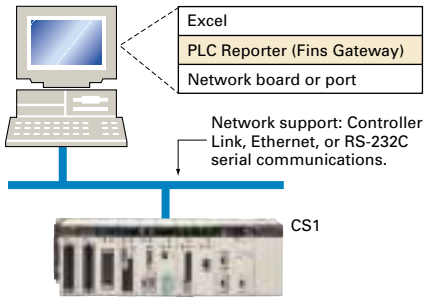
SYSMAC Compolet: ActiveX Control for Accessing the New CS1 for Visual Basic

Use SYSMAC Compolet ActiveX Control for communications with OMRON PLCs to greatly reduce development time of user applications for new CS1 I/O memory read and write, forced set/reset, and FINS message communications using Visual Basic 5.0 or 6.0.



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.



●Middleware

Product name	Model	Specifications	Corresponding operating system
SYSMAC Compolet	SCPL-SYSLT-V2E	ActiveX Control (Light Version)	Windows95/98/Me/NT 4.0
	SCPL-SYSFT-V2E	ActiveX Control (Full Version)	
PLC Reporter 32	SDKY-95HLK-E97	Simple Data Collection Software (host link version)	Windows98/Me/2000
	SDKY-95MLT-E97	Simple Data Collection Software (multi-network version)	Windows98/Me/2000

Further improvements to communications f
Seamless networks increase production site

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

4

Seamless Message Communications Across Network Levels

Networks are available for every level: Ethernet for information, Controller Link and SYSMAC LINK for controllers, and DeviceNet and CompoBus/S for components. Message communications can be performed smoothly across three network levels, dramatically accelerating the exchange of information at the production site.

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

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

Flexible System Building Based on the DeviceNet

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

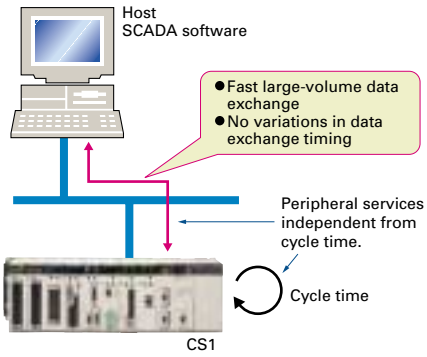
Functions for Better Ethernet Support

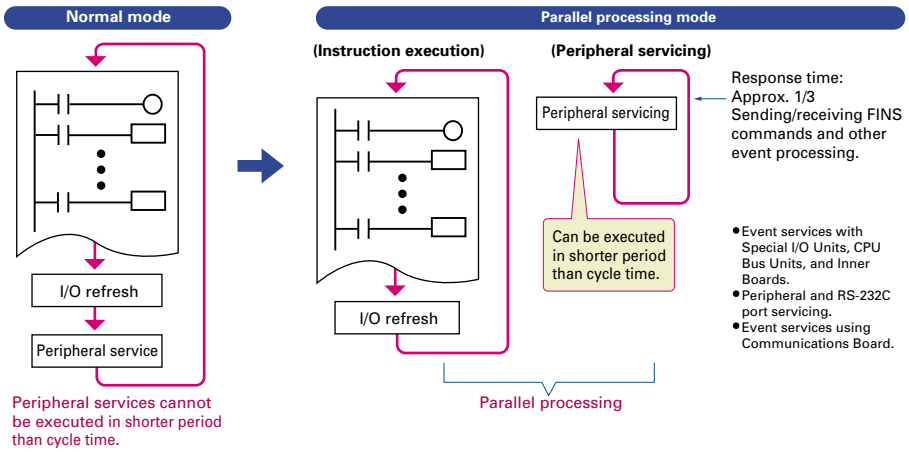
Ethernet is becoming an increasingly important standard for information networks. Up to eight socket interfaces for TCP/IP and UDP/IP are supported, in addition to FINS messages, FTP file transfers, and mail notification, so that production management can now be organically linked with the production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

High Event Responsiveness and High-speed Instruction Execution

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

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





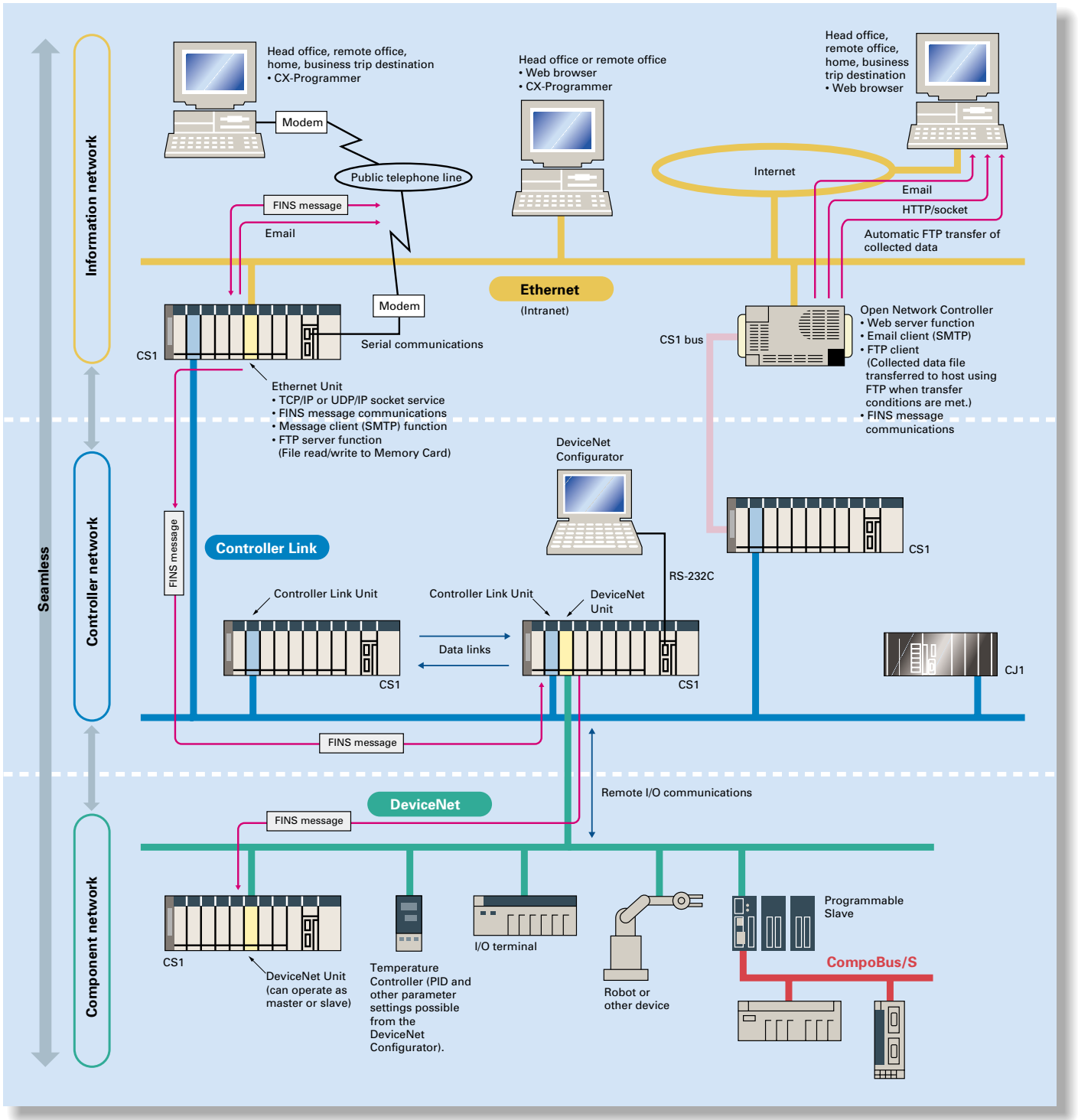
unctions.
transparency.

Optical Ring Controller Link Networks with Duplicated Transmission Paths

The new Optical Ring Systems enable transmission path duplication. This means that communications can be continued if there is a disconnection in the optical fiber by using the communications path going around the ring in the other direction, thus preventing operation failure.

Remote Monitoring via the Web

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



Construction of systems in multivendor env with protocol macros.

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

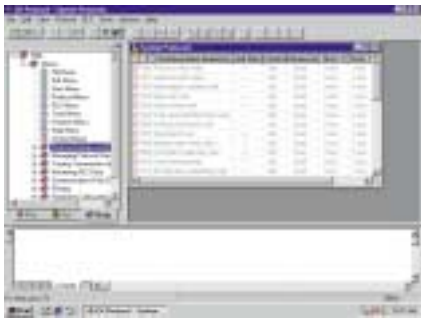
5

More Ports for Even More Serial Device Connections

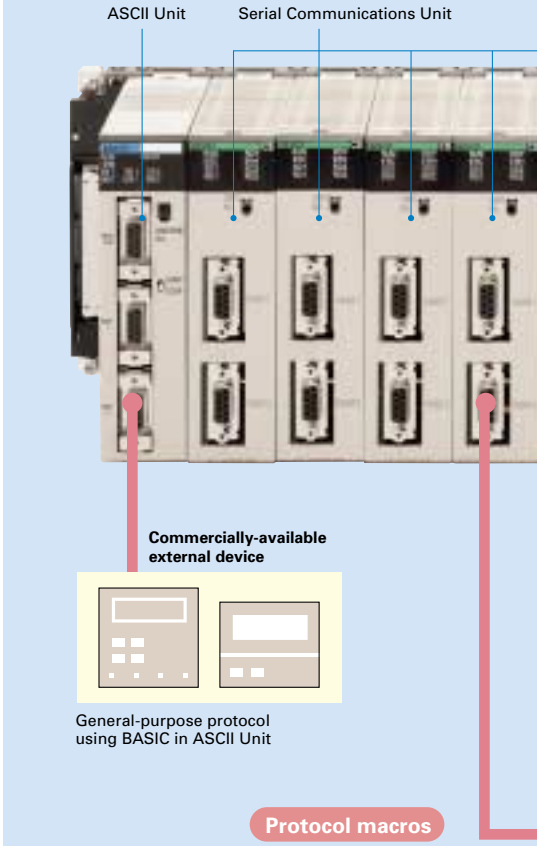
Protocol macros make it easy to create serial communications protocols (communications frames, error checks, retries, error processing, etc.) to match those of remote communications devices. Multiple ports are provided for this function. Each PLC supports up to 16 Serial Communications Units (32 ports 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.



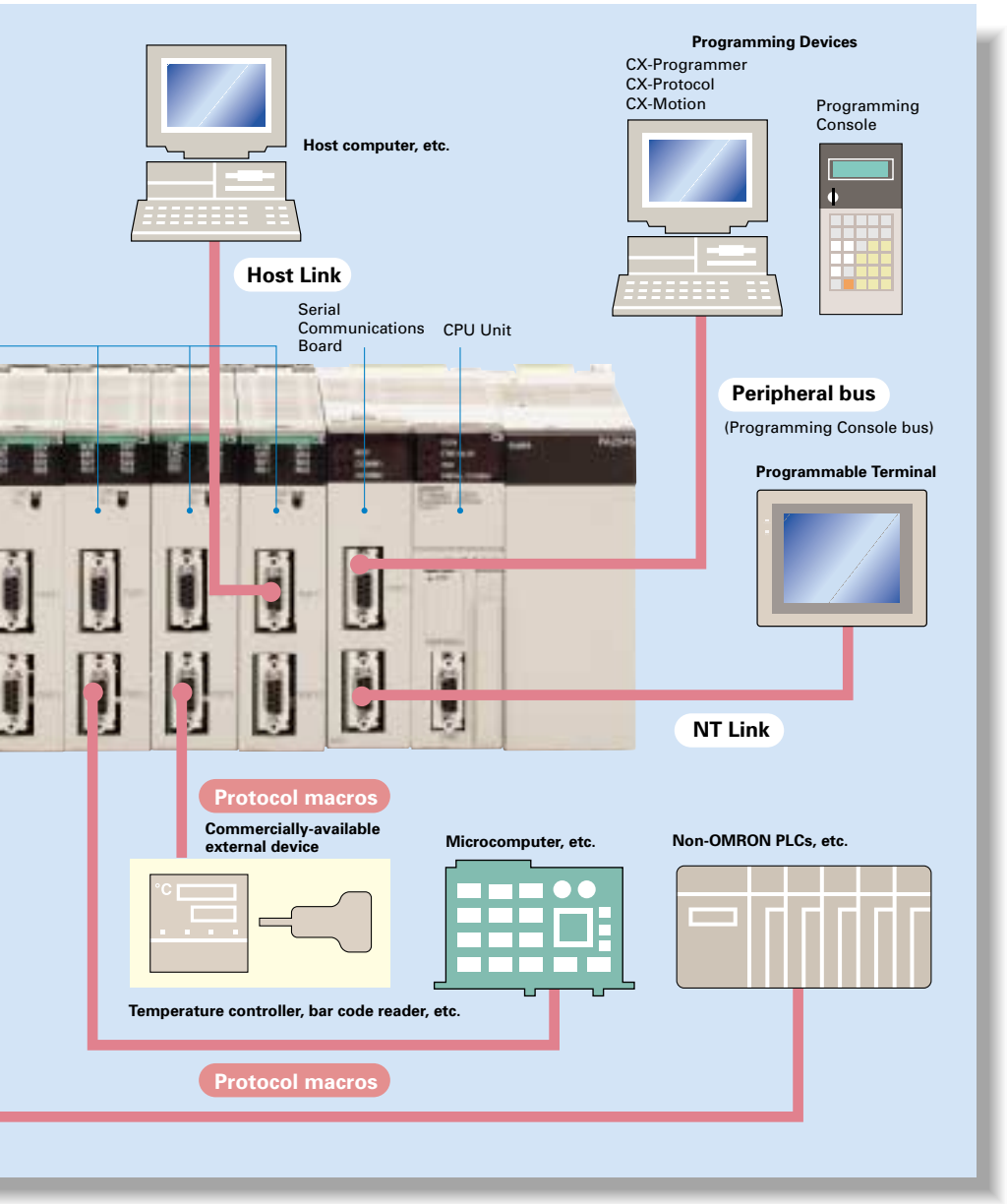
Serial Communications Configuration Example



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

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

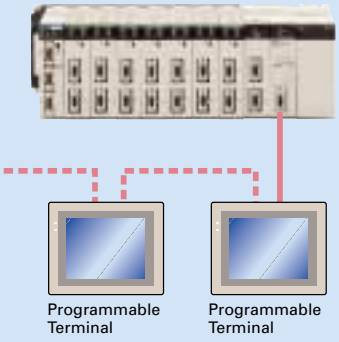
ironments simplified



Faster Communications with High-speed NT Links

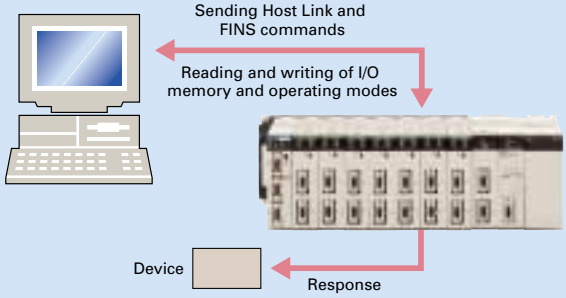
High-speed NT Link connections can be set up with an NT31/631-V2 Programmable Terminal. Combining NT Link technology with a communications speed of 115 Kbps enables high-speed response. The NT31/631 Series also supports the popular Programming Console function.

NT Links (1:N Mode)

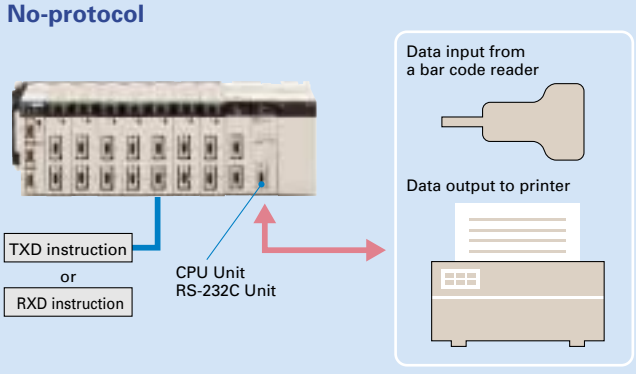


PLC-to-PT connection in NT Link (1:N mode) communications can be either one-to-one or one-to-many.

Host Links



No-protocol



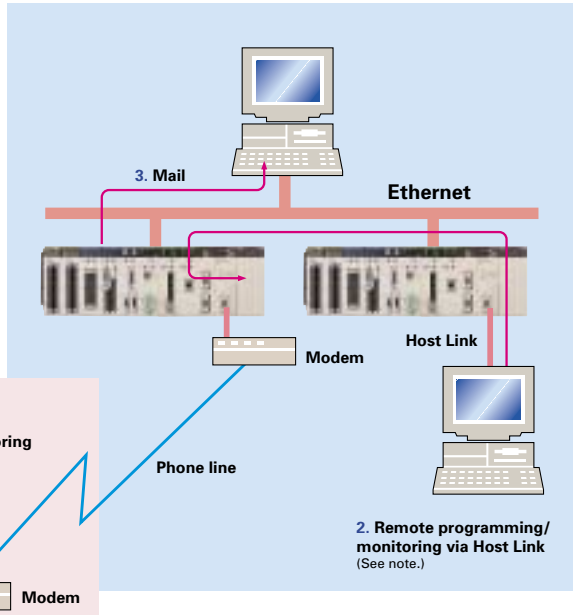
Advanced management and resource inheri maintenance and operation.

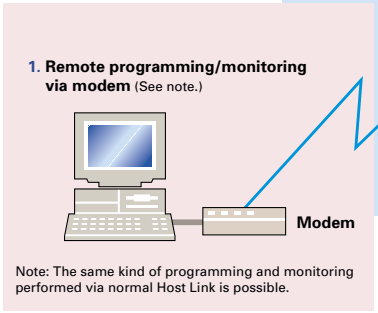
The evolution of the SYSMAC CS1 is accelerating advances in the production site.

6

Remote Maintenance

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

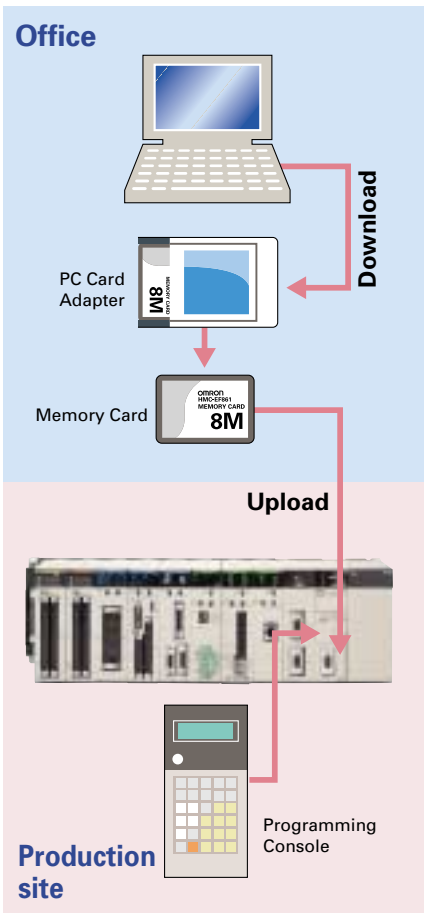




Note: The same kind of programming and monitoring performed via normal Host Link is possible.

Memory Cards for Data File Management

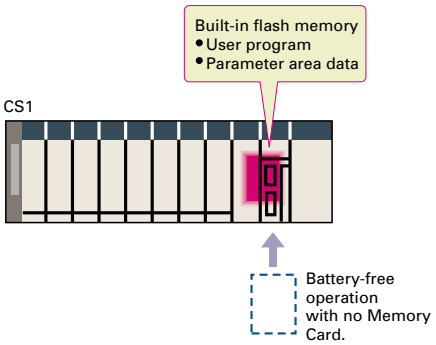
User programs, I/O memory, or system parameters can be converted to Windows-based files and stored in Memory Cards or in EM file memory in the CPU Unit. It is also possible to automatically read the user program and other data from the Memory Card to the CPU Unit at startup, replacing ROM operation.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



tance providing powerful support for

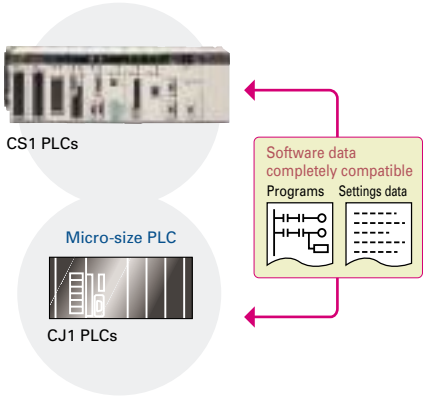
Internal Flash Memory-based Battery-free Operation

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.



PLC Selection Based on System Size

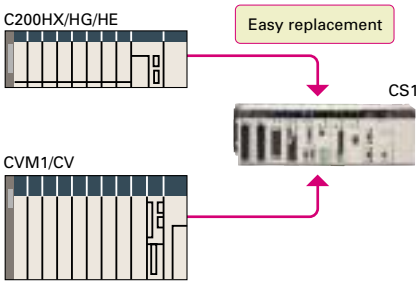
The architecture of the new CS1 is completely compatible with the micro-size CJ1 PLCs. The PLC most suitable for the scale of the machine or system can be selected and used together with the new CS1. Programs and other software data are also completely compatible, making it easy to standardize software.



Easy Replacement of Existing Models

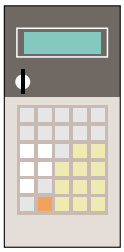
Programs designed for existing models (C200HX/HG/HE, CVM1, or CV-series PLCs) using the CX-Programmer can be converted for use with the new CS1. The following functions are available to make the conversion to the new CS1 even easier.

- 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.



Use Familiar Programming Consoles

The Programming Console can continue to be used with the CS1, and Programming Console operations can be customized using the standard accessory function key software.



Concern for a Healthy Environment

The CS1 contributes toward a healthy environment from an FA standpoint, through supporting low resource consumption, low energy usage, and recycling.

Quality Assurance That Meets Global Standards

The CS1 meets global standards such as UL, CSA, cULus, cUL, NK, Lloyd's standards, and EC directives. The applicable operation checks for machine CE markings are backed up.

Machine performance improved with high-speed, high-precision motion control.

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

7

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 and speeds 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.

Support Software

Easy Data Setting and Easy Programming with Support Software

Support Software is available for each type of Unit (Position Control Units: CX-Position; Motion Control Units: CX-Motion). Using the support software allows data and programs to be created, edited, printed, and monitored easily from a computer. Even when using more than one Unit, managing data as projects enables data settings and programming to be performed easily and efficiently.

Screen display for CX-Position

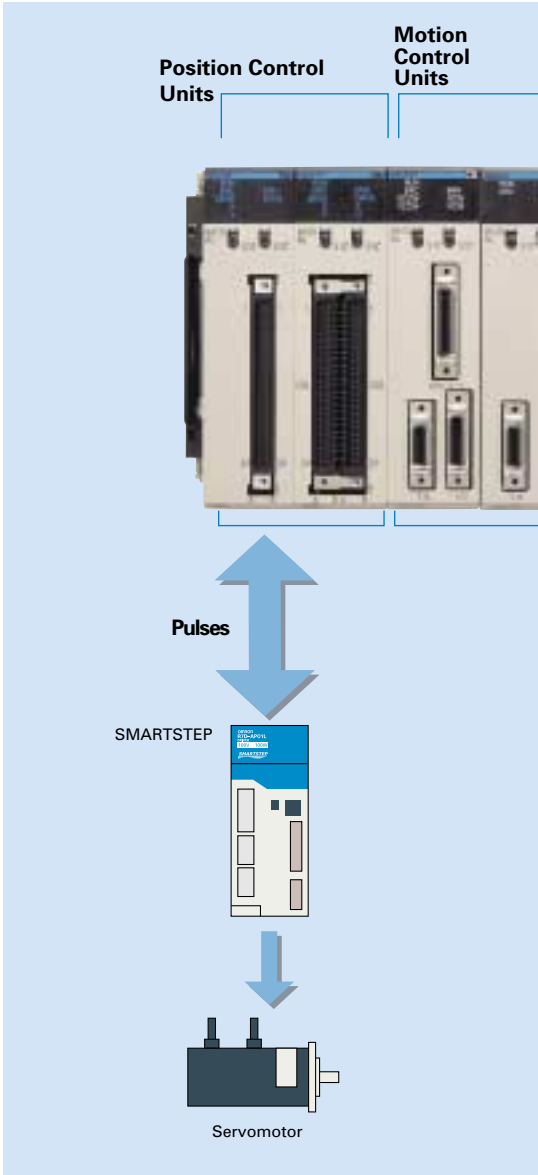
Motion Control Units

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

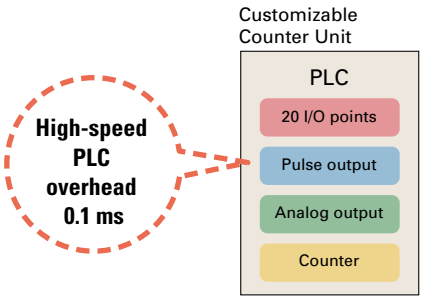
Interrupt programs can be executed from the motion control program using D codes (interrupt codes). Easy, fast interlocks ensure greater production efficiency.



● Customizable Counter Units

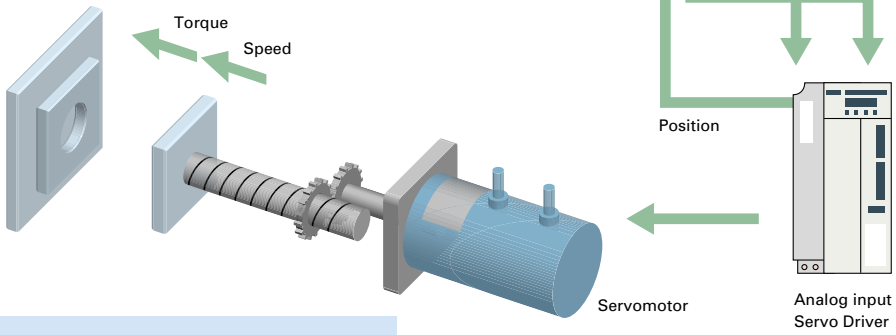
A Whole New Concept

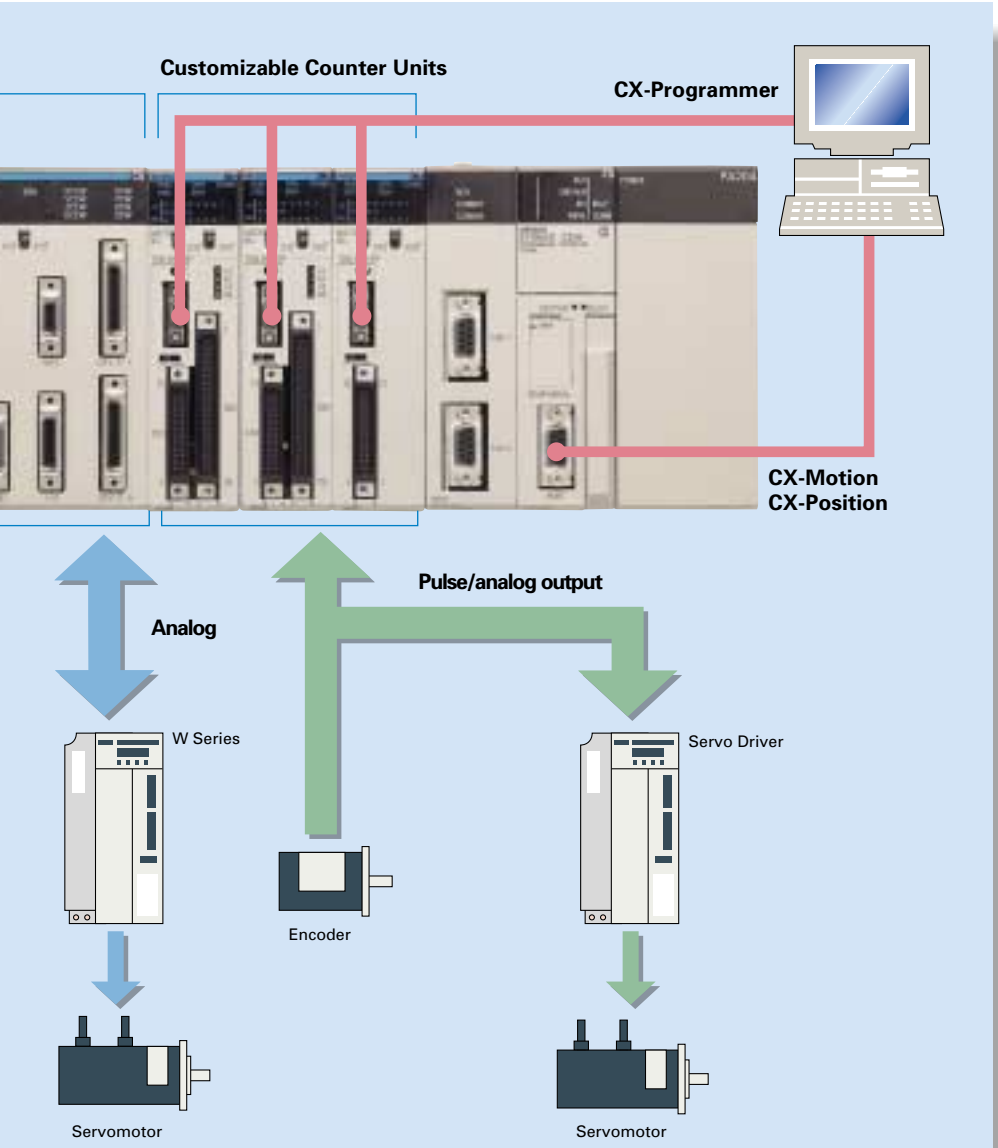
A high-speed PLC with 20 I/O points, a 2-axis high-speed counter, and 2 pulse or analog outputs have all been combined into 1 Unit. The Customizable Counter Units allow easy execution of complicated applications.



Easy Control for Bending and Pressing

It is possible to switch between speed control and torque control from the ladder program, enabling bending operation for metals and pressing operation for bonding.





Synchronous Control with Electronic Cam

Counter input and pulse output that previously could only be connected via a CPU Unit can now both be handled by the same Unit. The built-in high-speed PLC enables synchronous control of, for example, electronic cams. The cam curve that determines the relationship between counter input and pulse output can be defined freely using the line-segment approximation function from the ladder program.

Design Costs Reduced by Modularization

Ladder programs and I/O instructions to be re-used or shared by designers can be transferred from the main CPU Unit to the Units, allowing "modularization" that helps to reduce design costs. Up to 96 Units can be used, enabling easy system expansion in the future.

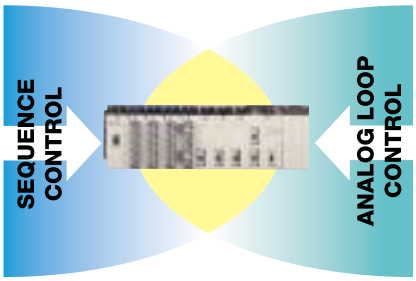
New concepts for PLC-based process autom a high degree of FA integration.

The evolution of the SYSMAC CS1 is accelerating DCS downsizing.

7

PLC-based Control System Reduces Cost, Space, and Labor

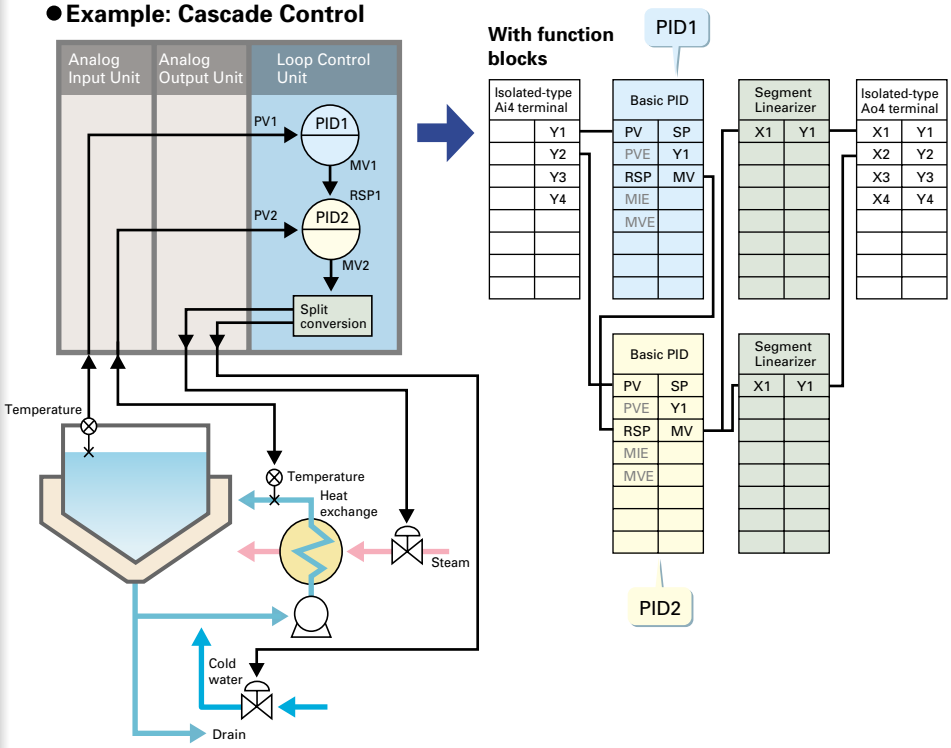
A control system can be constructed simply by installing a CPU Unit and a Loop Control Unit. The PA functions and performance available with a computer-based DCS are possible with a CS1-based system.
Construction time, labor requirements, as well as initial and running costs are significantly reduced compared to the previous type of DCS. Naturally, installation space requirements can be drastically reduced.



Easy Analog Control with Loop Control Unit

A Loop Control Unit with all of the DCS functions enables a combination of up to 32-loop PID operation and 250 operations for each process. All functions, including function block combination I/O specifications, are possible by software connection of function blocks. Also, by simply combining function blocks, special types of control such as cascade control, feed-forward control, and variable gain control are possible in addition to PID control.

● **Example: Cascade Control**



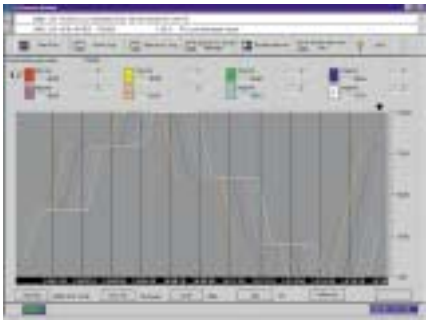
ation enable DCS downsizing and

A Wide Range of Units for Flexible System Construction

The CS1 provides a wide range of units, such as Loop Control Units and Isolated Process I/O Units. Combining these units can provide just the right size of system for the scale of application.

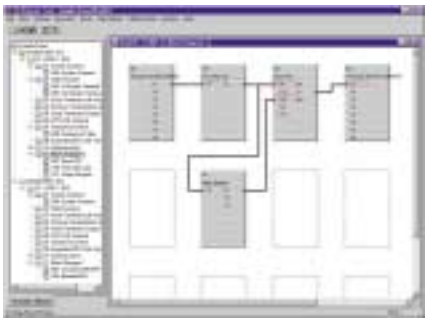
Monitor Software for Graphic and Alarm Monitoring

The CX-Process Monitor Software is used to monitor control status or change settings for the Loop Control Unit in PC screens that look like on-site instruments. Graphic monitoring, trend graphs, alarm monitoring, alarm history, and operation history are all available.

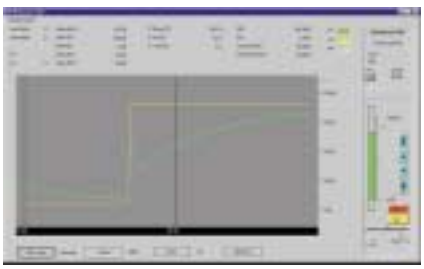


Easier Operation with Windows-based Programming Software

An MMI combining programming software and standard monitor displays similar to a DCS can be configured on Windows-based software. An easy-to-understand function block method is used for programming. Also, with CX-Process Tool Software versions 2.5 onwards, new functions have been added to make operation even easier. For example, a Tuning Screen has been installed, comments (user-set text strings) can be displayed and printed next to commands in function block diagrams and ladder diagrams, and CX-Server can be used as the communications driver.



Programming Software



Tuning Screen

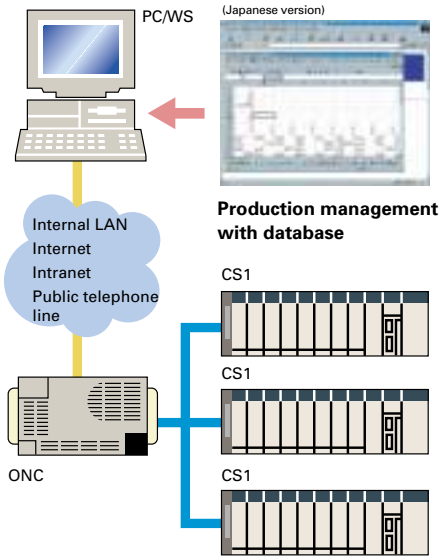
Dramatic improvements in on-site informati Web server and data collection functions.

The SYSMAC CS1 and ONC are accelerating advances in the production site.

7

A High Level of Support for On-site Information Management

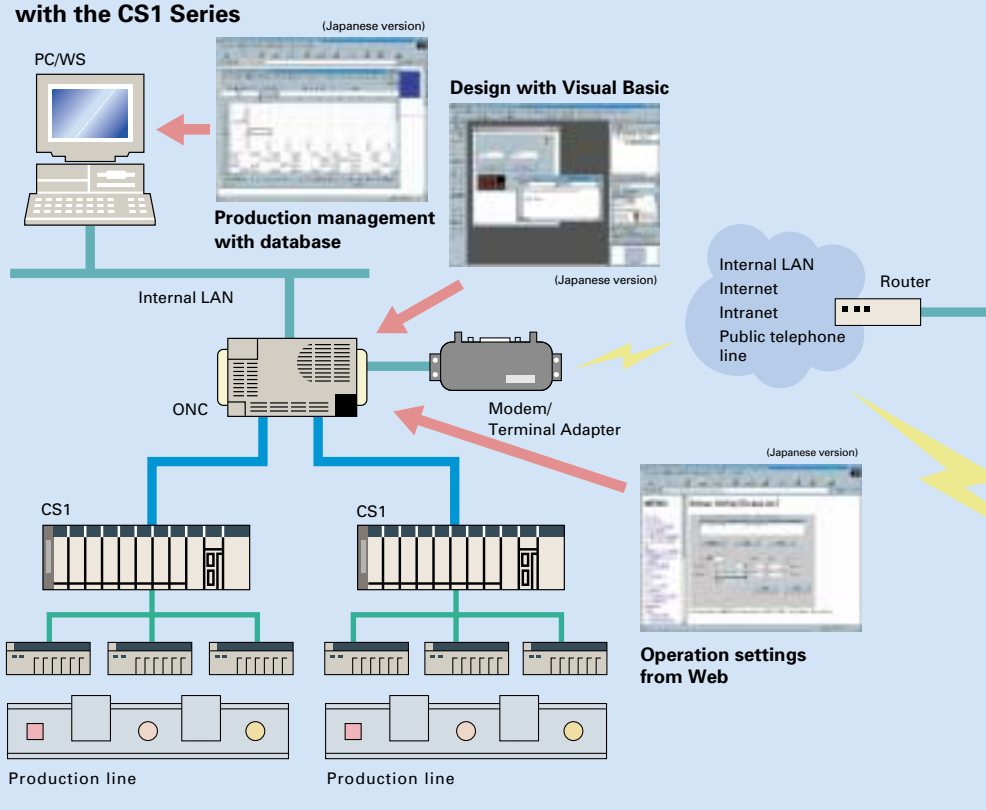
The Open Network Controller's (ONC) high-level information processing functions, such as Web server functions and functions for data collection, file management, automatic distribution, and automatic delivery of mail attachments, enable significant reductions in design costs. Also, using NX-Server for DeviceNet ONC Edition allows data on the DeviceNet network to be collected independently of I/O control at the CS1-series PLC. The ONC is capable of a high-level of interaction with the CS1 Series.



Ethernet – Creation of a Remote Monitoring Environment via the Web

The ONC's dial-up connection and PPP connection functions allow maintenance and monitoring of production site information from a computer in a remote location via an ordinary telephone line with, for example, a TA, modem, or dial-up router. The ONC, in combination with the CS1 Series, can be used for a variety of applications.

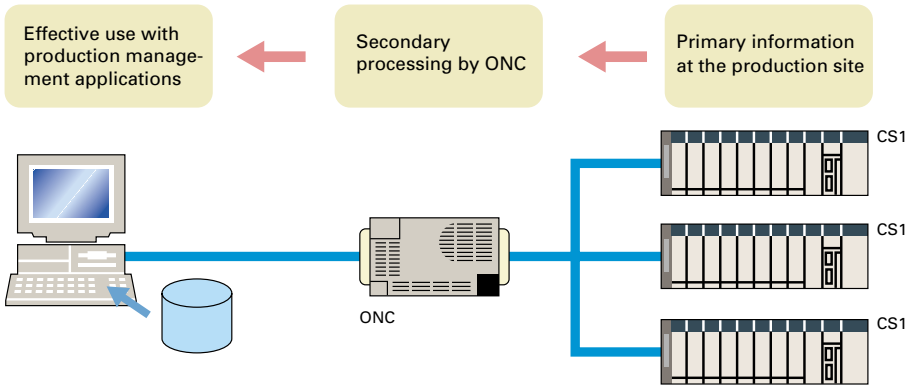
● **Example of Production Management and Remote Monitoring System Created with the CS1 Series**



on management achieved with

Use High-level Languages with Primary Production Information

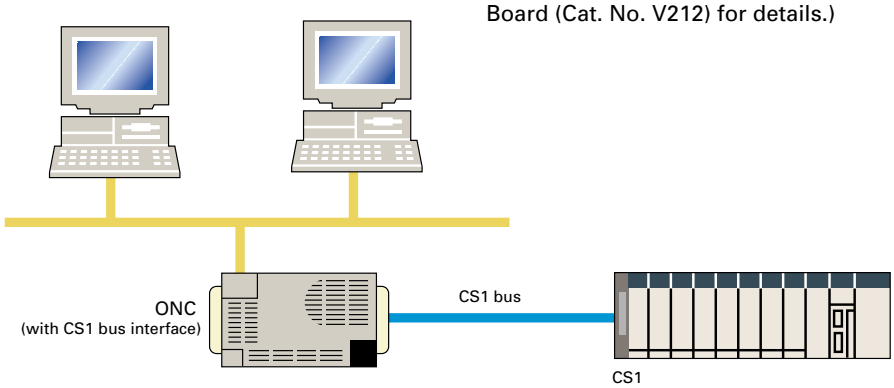
Using the ONC in combination with optional software (purchased separately), such as the Data Collection/Distribution Software or the RemoteKit Software, enables the processing, accumulation, and distribution of primary production site information. If a higher level of information processing is required, user applications can be created using high-level languages, such as Visual Basic, Java, C, or Perl (available soon). By transferring information after secondary processing at the production site end, distribution of the workload between the CS1 and production management system and links to the production management database enable a smooth flow of information.

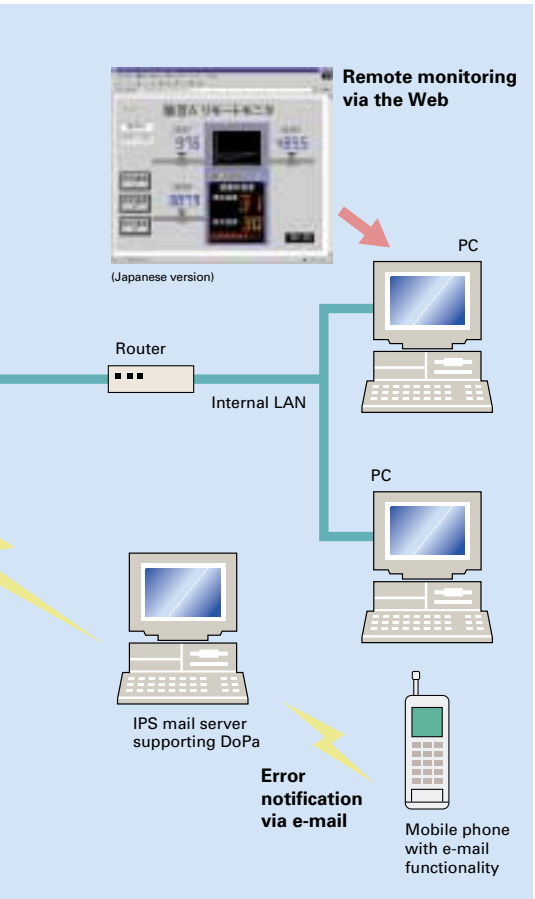


Expanded Role as CS1 Computer Unit

Using an expandable ONC model with a CS1 bus interface (ITNC-EIS01-CST and ITNC-EIX01-CST) allows connection to the CS1 via a high-speed CS1 bus.

The ONC acts as a CS1 Computer Unit allowing the CS1 to be used in applications not possible with a CS1 PLC alone. (Refer to CS1 Bus Interface Board (Cat. No. V212) for details.)



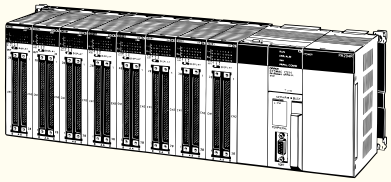


CE

Conformance to EC Directives

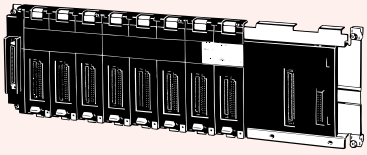
A Complete Lineup of Units for Optimum C

CPU Rack



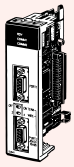
Note: Connection is not possible to a 2-slot CPU Backplane.

CPU Backplane



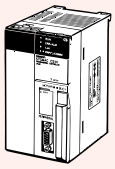
(Available soon)
CS1W-BC□□2
(2, 3, 5, 8, or 10 slots)
Note: Expansion is not possible for 2-slot Backplanes. These Backplanes are for CS1 Units only.
Use a CS1W-BC□□3 Backplane (currently available) for C200H Units.

Serial Communications Board



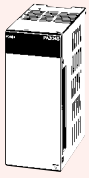
CS1W-SCB21
CS1W-SCB41

CPU Units



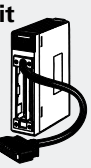
CS1H-CPU□□H
CS1G-CPU□□H

Power Supply Units



C200HW-PA204/ PA204R/ PA204S/PA209R/PD024

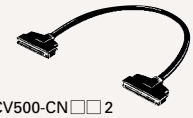
I/O Control Unit



CS1W-IC102

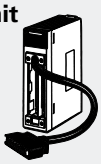
Note: C200H Units cannot be mounted on the Long-distance Expansion Racks.

Long-distance Expansion Connecting Cable



CV500-CN□□2

I/O Interface Unit



CS1W-II102

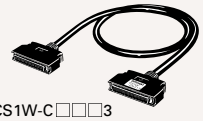
Terminating Resistor

CV500-TER01
(Two provided with CS1W-IC102.)

Memory Card

HMC-EF861/171/371/571

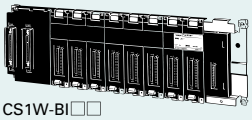
CS1 I/O Connecting Cable



CS1W-C□□□3
(30 or 70 cm; 2, 3, 5, 10, or 12 m)

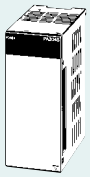
CS1 Expansion Rack

CS1 Expansion Backplane



CS1W-BI□□
(3, 5, 8, or 10 slots) **(Available soon)**
Note: These Expansion Backplanes are for CS1 Units only. Use a CS1W-BI□□3 Backplane (currently available) for C200H Units.

Power Supply Units

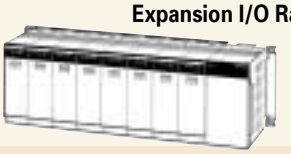


C200HW-PA204/ PA204S/ PA209R/ PD024

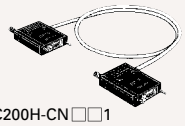
CS1 to C200H I/O Connecting Cable

CS1W-CN□□□
(30 or 70 cm; 2, 3, 5, 10, or 12 m)

C200HX/HG/HE Expansion I/O Rack



C200H I/O Connecting Cable



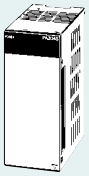
C200H-CN□□1
(30 or 70 cm; 2, 5, or 10 m)

C200HX/HG/HE Expansion I/O Rack

C200HX/HG/HE Expansion I/O Backplane

C200HW-BI□□1(-V1)
(3, 5, 8, or 10 slots)

Power Supply Units



C200HW-PA204/ PA204S/ PA204R/ PA209R/ PD024

CS1 CPU Bus Units

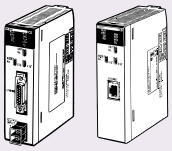
Loop Control Unit

CS1W-LC001

Serial Communications Unit

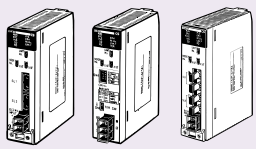
CS1W-SCU21

Ethernet Unit



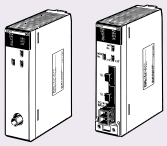
CS1W-ETN01/11

Controller Link Unit



CS1W-CLK12/21/52

SYSMAC Link Unit (coaxial, optical)



CS1W-SLK21/SLK11

DeviceNet Unit

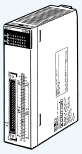
CS1W-DRM21

ontrol.

Basic I/O Units

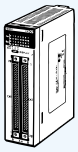
C200H Basic I/O Unit

16 pts
Input Unit:
CS1W-ID211



32 pts
Input Unit:
CS1W-ID231

64 pts
Input Unit:
CS1W-ID261



96 pts
Input Unit:
CS1W-ID291

16 pts
Output Unit:
CS1W-OD21□

32 pts
Output Units:
CS1W-OD23□

64 pts
Output Units:
CS1W-OD26□

96 pts
Output Units:
CS1W-OD29□

32 inputs/32 outputs
I/O Unit:
CS1W-MD26□

48 inputs/48 outputs
I/O Units:
CS1W-MD29 □

16 pts
AC Input Units:
CS1W-IA111/211

8 pts
Triac Output Unit:
CS1W-OA201

16 pts
Triac Output Unit:
CS1W-OA211

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

16 pts
Relay Output Unit:
CS1W-OC211

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

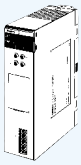
Interrupt Input Unit

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

16 pts
CS1W-INT01

C200H Interrupt Input Unit can also be used.

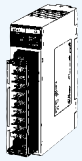
Analog Timer Unit



C200H-TM001

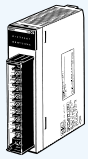
B7A Interface Units

16 pts
C200H-B7A11/O1



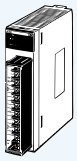
Group-2 Unit
C200H-B7A02/12/21/22

High-speed Input Unit



16 pts
CS1W-IDP01

Safety Relay Unit



CS1W-SF200

Special I/O Units

CS1 Special I/O Unit

Process I/O Unit
CS1W-P□□□

Analog Input Unit
CS1W-AD041/AD081

Analog Output Unit
CS1W-DA041/
DA08V/DA08C

Analog I/O Unit
CS1W-MAD44

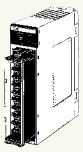
Position Control Unit
CS1W-NC□□□

Motion Control Unit
CS1W-MC221/
MC421

High-speed Counter Units
CS1W-CT021/041

Customizable Counter Units
CS1W-HCP22/
HCA22/HIO01

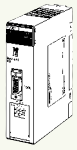
C200H Special I/O Units



Temperature Sensor Units
C200H-TS□□□

Temperature Control Unit
C200H-TC□□□
C200H-TV□□□

PID Control Units
C200H-PID0 □



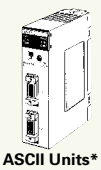
Fuzzy Logic Unit*
C200H-FZ001

Cam Positioner Unit*
C200H-CP114

Position Control Units*
C200HW-NC□□□

2-axis Motion Control Unit*
C200H-MC221

ID Sensor Units*
C200H-IDS□□



ASCII Units*
C200H-ASC□□

Voice Unit
C200H-OV001

DeviceNet I/O Link Unit
C200HW-DRT21

CompoBus/S Master Unit
C200HW-SRM21-V1

PC Link Unit
C200H-LK401

High-speed Counter Units*
C200H-CT□□□

Note: There are restrictions 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.

Note: Do not use this document to operate the Unit.

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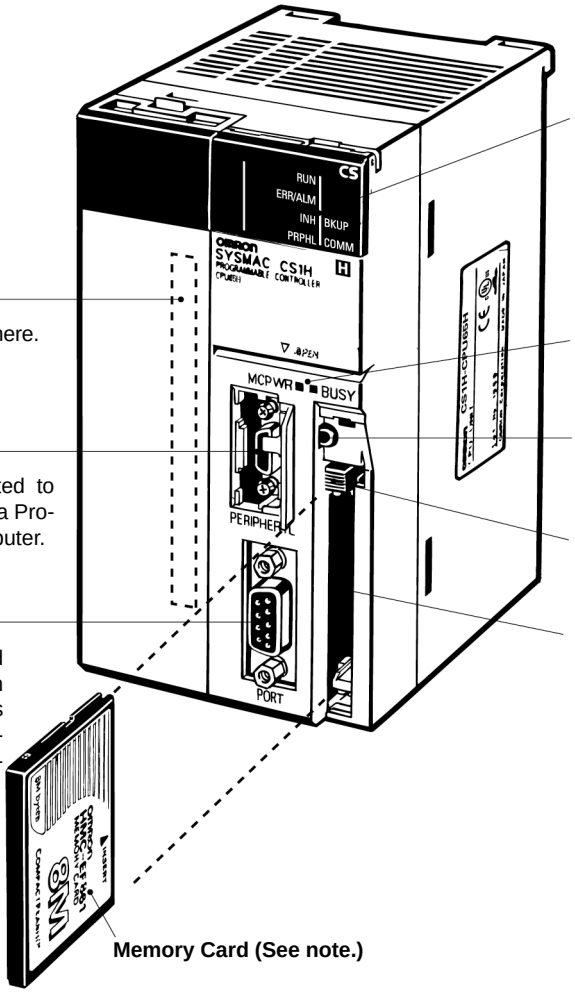
Authorized Distributor:

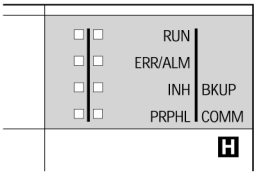
Note: Specifications subject to change without notice.

Cat.No.P047-E1-04
Printed in Japan
0302-2M

CPU Unit Overview



Indicators



Inner Board Compartment

An Inner Board can be mounted here.

Memory Card Indicators

The MCPWR indicator lights green when power is being supplied. The BUSY indicator lights orange when the Memory Card is being accessed.

Peripheral Port

The peripheral port is connected to Programming Devices, such as a Programming Console or host computer.

Memory Card Power Supply Switch

The Memory Card power supply switch is pressed to turn OFF power before removing the Memory Card.

Memory Card Eject Button

Press the Memory Card eject button to remove the Memory Card.

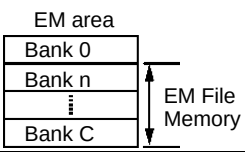
Memory Card Connector

RS-232C Port

The RS-232C port is connected to Peripheral Devices other than Programming Consoles, such as host computers, general-purpose external devices, and Programmable Terminals.

Memory Card (See note.)

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	8 MB	HMC-EF861
		15 MB	HMC-EF171
		30 MB	HMC-EF371
		48 MB	HMC-EF571
EM File Memory 	RAM	EM Area capacity of CPU Unit (Max. capacity for CS1H-CPU67: 832 KB).	From the specified bank in the EM area of I/O memory to the last bank (specified in PC Setup).

Note: Memory Card Adapter: HMC-AP001 (The Memory Card Adapter can be used to mount Memory Cards in PLC card slots to use the Cards on a personal computer. Refer to page 44 for details.)

Specifications

CPU Units

Model	I/O bits	Program capacity	Data memory capacity (See Note.)	LD instruction processing speed	Built-in ports	Options
CS1H-CPU67H	5,120 bits (Up to 7 Expansion Racks)	250K steps	448K words	0.02 µs	Peripheral port and RS-232C port.	Memory Cards Inner Board such as Serial Communications Board
CS1H-CPU66H		120K steps	256K words			
CS1H-CPU65H		60K steps	128K words			
CS1H-CPU64H		30K steps	64K words			
CS1H-CPU63H		20K steps				
CS1G-CPU45H	5,120 bits (Up to 7 Expansion Racks)	60K steps	128K words	0.04 µs		
CS1G-CPU44H	1,280 bits (Up to 3 Expansion Racks)	30K steps	64K words			
CS1G-CPU43H	960 bits (Up to 2 Expansion Racks)	20K steps				
CS1G-CPU42H		10K steps				

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

Common Specifications

Item		Specification
Control method		Stored program
I/O control method		Cyclic scan and immediate processing are both possible.
Programming		Ladder diagram
Instruction length		1 to 7 steps per instruction
Ladder instructions		Approx. 400 (3-digit function codes)
Execution time		Basic instructions: 0.02 µs min., Special instructions: 0.04 µs min.
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		Scheduled Interrupts: Interrupts generated at a time scheduled by CPU Unit's built-in timer. I/O Interrupts: Interrupts from Interrupt Input Units. Power OFF Interrupts: Interrupts executed when CPU Unit's power is turned OFF. External I/O Interrupts: Interrupts from Special I/O Units, CS1 Special Units, or Inner Board.
CIO (Core I/O) Area (The CIO Area can be used as work bits if not used as shown here.)	I/O Area	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.
	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.

Specifications

Item			Specification
CIO (Core I/O) Area, contd. (The CIO Area can be used as work bits if not used as shown here.)	I/O Terminal Area		512 (32 words): CIO 310000 to CIO 313115 (words CIO 3100 to CIO 3131) I/O Terminal bits are allocated to I/O Terminal Units (but not to Slave Racks) connected to SYSMAC BUS Remote I/O Master Units. (1 word per Terminal, 32 Terminals max.)
	C200H Special I/O Unit Area		8,196 (512 words): CIO 000000 to CIO 051115 (words CIO 0000 to CIO 0511) C200H Special I/O Unit bits are allocated to C200H Special I/O Units and allow access separate from I/O refreshing.
		DeviceNet Area	1,600 (100 words): Outputs: CIO 005000 to CIO 009915 (words CIO 0050 to CIO 0099) Inputs: CIO 035000 to CIO 039915 (words CIO 0350 to CIO 0399) DeviceNet bits are allocated to Slaves according to DeviceNet remote I/O communications.
		PC Link Area	64 bits (4 words): CIO 027400 to CIO 025015 (words CIO 0247 to CIO 0250) When a PC Link Unit is used in a PC Link, use these bits to monitor PC Link errors and operating status of other CPU Units in PC Link.
Internal I/O Area			4,800 (300 words): CIO 120000 to CIO 149915 (words CIO 1200 to CIO 1499) 37,504 (2,344 words): CIO 380000 to CIO 614315 (words CIO 3800 to CIO 6143) These bits in CIO Area are used as work bits in programming to control program execution. They cannot be used for external I/O.
Work Area			8,192 bits (512 words): W00000 to W51115 (words W000 to W511) Control programs only. (I/O from external I/O terminals is not possible.) **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.
Auxiliary Area			Read only: 7,168 bits (448 words): A00000 to A44715 (words A000 to A447) Read/write: 8,192 bits (512 words): A44800 to A95915 (words A448 to A959) Auxiliary bits are allocated specific functions.
Temporary Area			16 bits (TR00 to TR15) Temporary bits are used to store ON/OFF execution conditions at program branches.
Timer Area			4,096: T0000 to T4095 (used for timers only)
Counter Area			4,096: C0000 to C4095 (used for counters only)
DM Area			32K words: D00000 to D32767 Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in DM Area maintain their status when PLC is turned OFF or operating mode is changed. Internal Special I/O Unit DM Area: D20000 to D29599 (100 words × 96 Units). Used to set parameters. CS1 CPU Bus Unit DM Area: D30000 to D31599 (100 words × 16 Units). Used to set parameters. Inner Board DM Area: D32000 to D32099. Used to set parameters for Inner Boards.
EM Area			32K words per bank, 13 banks max.: E0_00000 to EC_32767 max. (Not available on some CPU Units.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in EM Area maintain their status when PLC is turned OFF or operating mode is changed. The EM Area is divided into banks, and addresses can be set by either of following methods. Changing current bank using EMBC(281) instruction and setting addresses for current bank. Setting bank numbers and addresses directly. EM data can be stored in files by specifying number of first bank. (EM file memory)
Data Registers			DR0 to DR15. Store offset values for indirect addressing. Data registers can be used independently in each task. One register is 16 bits (1 word).
Index Registers			IR0 to IR15. Store PLC memory addresses for indirect addressing. Index registers can be used independently in each task. One register is 32 bits (2 words).
Task Flag Area			32 (TK0000 to TK0031). Task Flags are read-only flags that are ON when corresponding cyclic task is executable and OFF when corresponding task is not executable or in standby status.
Trace Memory			4,000 words (500 data trace samples at the maximum sample size of 31 bits and 6 words)
File Memory			Memory Cards: Compact flash memory cards can be used (MS-DOS format). EM file memory: Part of EM Area can be converted to file memory (MS-DOS format). OMRON Memory Cards with 8-MB, 15-MB, 30-MB, or 48-MB capacities can be used.

Function Specifications

Item	Specification
Constant cycle time	1 to 32,000 ms (Unit: 1 ms)
Cycle time monitoring	Possible (Unit stops operating if cycle is too long): 1 to 40,000 ms (Unit: 10 ms)
I/O refreshing	Cyclic refreshing, immediate refreshing, refreshing by IORF(097).
I/O memory holding when changing operating modes	Possible (Depends on ON/OFF status of IOM Hold Bit in Auxiliary Area.)
Load OFF	All outputs on Output Units can be turned OFF.
Input time constant setting	Time constants can be set for inputs from CS1 Basic I/O Units. The time constant can be increased to reduce influence of noise and chattering or it can be decreased to detect shorter pulses on inputs. (CS1 Basic I/O Units only)
Mode setting at power-up	Possible
Memory Card functions	Automatic reading programs from Memory Card (autoboot).
	Memory Card Storage Data — User program: Program file format (binary) PC System Setup: Data file format (binary) I/O Memory: Data file format (binary), text format, CSV format
	Memory Card Read/Write User program instructions , Peripheral Devices (such as Programming Console), Host Link computer.
Filing	Memory Card data and EM (Extended Data Memory) Area can be handled as files.
Debugging	Force-set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed), instruction error tracing.
Online editing	One or more program blocks in user programs can be overwritten when CPU Unit is in PROGRAM or MONITOR mode. This function is not available for block programming areas.
Program protection	Overwrite protection: Set using DIP switch. Copy protection: Password set using Peripheral Device.
Error check	User-defined errors (i.e., user can define fatal errors and non-fatal errors) The FPD(269) instruction can be used to check execution time and logic of each programming block.
Error log	Up to 20 errors are stored in error log. Information includes error code, error details, and time error occurred.
Serial communications	Built-in peripheral port: Peripheral Device (including Programming Console), Host Links, NT Links Built-in RS-232C port: Peripheral Device (excluding Programming Console), Host Links, no-protocol communications, NT Links
	Communications Board (sold separately): Protocol macros, Host Links, NT Links
Clock	Provided on all models. **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	Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of counter Completion Flags and present values. **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 turned ON, contents of CIO Area, Work Area, part of Auxiliary Area, timer Completion Flag and PVs, Index Registers, and Data Registers will be saved.
Sending commands to a Host Link computer	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.
Three-level communications	Host Link communications can be used for remote programming and remote monitoring from devices on networks up to two 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 or EM file memory.
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).

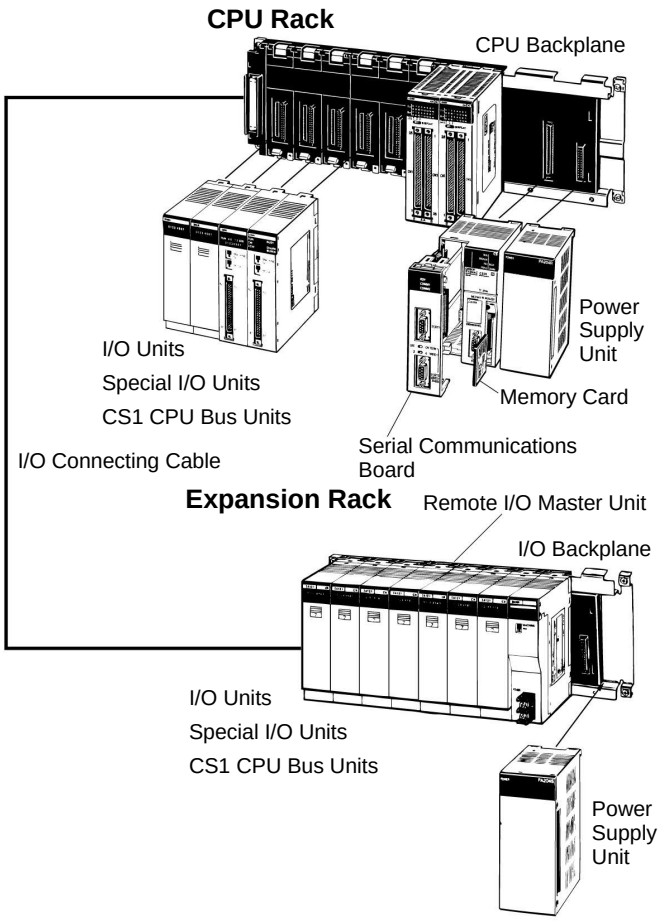
Specifications

General Specifications

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

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.

Basic System Configuration



CPU Rack

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

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

Expansion Racks

Both C200H and CS1 Expansion Racks can be used.

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

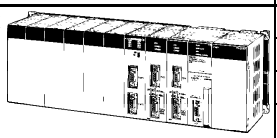
An Expansion Rack consists of a Power Supply Unit, a CS1 or C200H Expansion I/O Backplane , Basic I/O Units, Special I/O Units, and a CS1 CPU Bus Units.

Long-distance Expansion Racks

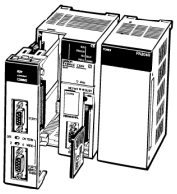
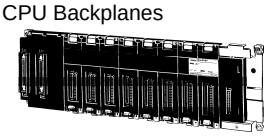
An I/O Control Unit and I/O Interface Units can be used to extend the normal limit of 12 m to 50 m for each of two series of CS1 Expansion Racks. The following Units can be mounted to Long-distance Expansion Racks: CS1 Basic I/O Units, CS1 Special I/O Units, and CS1 CPU Bus Units. (C200H Units cannot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

CPU Rack

■ Configuration

Name	Configuration	Remarks
CPU Rack 	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	
CPU Units 	CS1H-CPU67H	I/O bits: 5,120, Program capacity: 250K steps Data Memory: 448K words (DM: 32K words, EM: 32K words x 13 banks)	
	CS1H-CPU66H	I/O bits: 5,120, Program capacity: 120K steps Data Memory: 256K words (DM: 32K words, EM: 32K words x 7 banks)	
	CS1H-CPU65H	I/O bits: 5,120, Program capacity: 60K steps Data Memory: 128K words (DM: 32K words, EM: 32K words x 3 banks)	
	CS1H-CPU64H	I/O bits: 5,120, Program capacity: 30K steps Data Memory: 64K words (DM: 32K words, EM: 32K words x 1 bank)	
	CS1H-CPU63H	I/O bits: 5,120, Program capacity: 20K steps Data Memory: 32K words (DM: 32K words, EM: 32K words x 1 bank)	
	CS1G-CPU45H	I/O bits: 5,120, Program capacity: 60K steps Data Memory: 128K words (DM: 32K words, EM: 32K words x 3 banks)	
	CS1G-CPU44H	I/O bits: 1,280, Program capacity: 30K steps Data Memory: 64K words (DM: 32K words, EM: 32K words x 1 banks)	
	CS1G-CPU43H	I/O bits: 960, Program capacity: 20K steps Data Memory: 64K words (DM: 32K words, EM: 32K words x 1 bank)	
	CS1G-CPU42H	I/O bits: 960, Program capacity: 10K steps Data Memory: 64K words (DM: 32K words, EM: 32K words x 1 bank)	
CPU Backplanes 	CS1W-BC022	2 slots (Connection is not possible to Expansion Backplane.)	These Backplanes (available soon) are for CS1 Units only. Use CS1W-BC□□3 Backplanes (currently available) for C200H Units.
	CS1W-BC032	3 slots	
	CS1W-BC052	5 slots	
	CS1W-BC082	8 slots	
	CS1W-BC102	10 slots	
Power Supply Units 	C200HW-PA204	100 to 120 VAC or 200 to 240 VAC, Output capacity: 4.6 A, 5 VDC	
	C200HW-PA204S	100 to 120 VAC or 200 to 240 VAC (0.8 A 24 VDC service power) Output capacity: 4.6 A, 5 VDC	
	C200HW-PA204R	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 4.6 A, 5 VDC	
	C200HW-PD024	24 VDC, Output capacity: 4.6 A, 5 VDC	
	C200HW-PA209R	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 9 A, 5 VDC	
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-EF861	Flash memory, 8 MB	
	HMC-EF171	Flash memory, 15 MB	
	HMC-EF371	Flash memory, 30 MB	
	HMC-EF571	Flash memory, 48 MB	
	HMC-AP001	Memory Card adapter	
Serial Communications Boards	CS1W-SCB21	2 x RS-232C ports, protocol macro function	
	CS1W-SCB41	1 x RS-232C port + 1 x RS-422/485 port, protocol macro function	
Programming Consoles	CQM1-PRO01-E	An English Keyboard Sheet (CS1W-KS001-E) is required.	
	C200H-PRO27-E		
Programming Console Connection Cables	CS1W-CN114	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)	
	CS1W-CN224	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)	
	CS1W-CN624	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)	

Name	Model	Specifications
CX-Programmer	WS02-CXPC1-EV2	Windows-based Support Software for Windows 95/98/Me or Windows NT/2000 **Note:** Can connect through peripheral port or through RS-232C port on CPU Unit or Serial Communications Board.
	WS02-CXPC1-EV2L03 (For 3 licenses)	
	WS02-CXPC1-EV2L10 (For 10 licenses)	
Programming Device Connecting Cables (for peripheral port)	CS1W-CN118	Connects DOS computer, D-Sub 9-pin receptacle (Length: 0.1 m)
	CS1W-CN226	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m)
	CS1W-CN626	Connects DOS computer, D-Sub 9-pin (Length: 6.0 m)
	XW2Z-200S-CV	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m)
	XW2Z-500S-CV	Connects DOS computer, D-Sub 9-pin (Length: 5.0 m)
Programming Device Connecting Cables (for RS-232C port)	XW2Z-200S-V	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m) (For Host Link connection)
	XW2Z-500S-V	Connects DOS computer, D-Sub 9-pin (Length: 5.0 m) (For Host Link connection)
CX-Simulator	WS02-SIMC1-E	Windows-based Support Software for Windows 95, 98, Me, NT, or 2000 **Note** Simulates operation for CS1 CS1H/CS1G-CPU□□ CPU Units without “V1” at the end of the model number.
CX-Protocol	WS02-PSTC1-E	Windows-based Support Software for Windows 95, 98, Me, 2000 or NT Used to create and manage protocol macros.
Battery Set	CS1W-BAT01	For CS1 Series only. **Note** Use a replacement battery that is no more than 2 years old from the date of manufacture.

Expansion Racks

■ Expansion Rack Configuration

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

■ Products Used in Expansion Racks

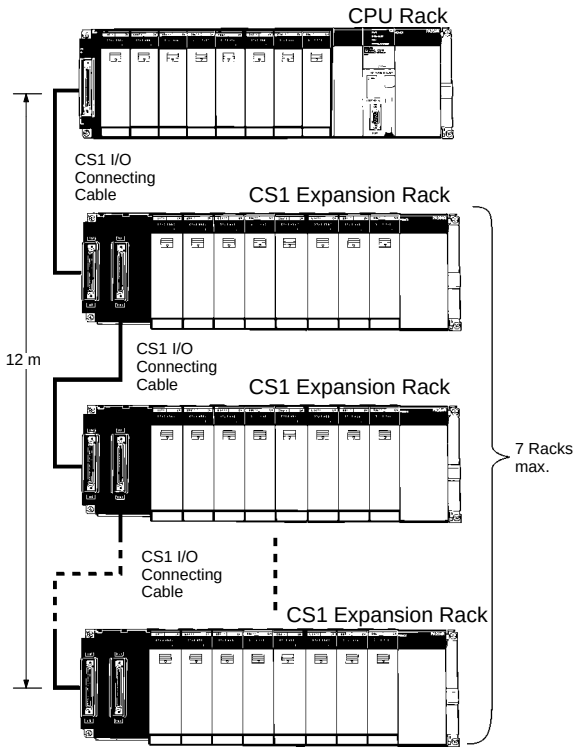
Name	Model	Specifications		Cable Length
CS1 Expansion I/O Backplanes	CS1W-BI032	3 slots	These Backplanes (available soon) are for CS1 Units only. Use CS1W-BI□□3 Backplanes (currently available) for C200H Units.	---
	CS1W-BI052	5 slots		
	CS1W-BI082	8 slots		
	CS1W-BI102	10 slots		
C200H Expansion I/O Backplanes	C200HW-BI031	3 slots		
	C200HW-BI051	5 slots		
	C200HW-BI081-V1	8 slots		
	C200HW-BI101-V1	10 slots		
Power Supply Units	C200HW-PA204	100 to 120 VAC or 200 to 240 VAC Output capacity: 4.6 A, 5 VDC		
	C200HW-PA204S	100 to 120 VAC or 200 to 240 VAC (with power output terminal: 0.8 A, 24 VDC) Output capacity: 4.6 A, 5 VDC		
	C200HW-PA204R	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 4.6 A, 5 VDC		
	C200HW-PD024	24 VDC		
	C200HW-PA209R	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 9 A, 5 VDC		
I/O Interface Unit	CS1W-II102	Connects CS1 Expansion Racks. Must be used together with I/O Control Unit to connect Long-distance Expansion Racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.		---
CS1 I/O Connecting Cables	CS1W-CN313	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes. 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. **Reading the production number** □□□□ Year (e.g., 1997=7) Month (1 to 9, X (10), Y (11), Z (12)) Day (01 to 31)		0.3 m
	CS1W-CN713			0.7 m
	CS1W-CN223			2 m
	CS1W-CN323			3 m
	CS1W-CN523			5 m
	CS1W-CN133			10 m
	CS1W-CN133-B2			12 m

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

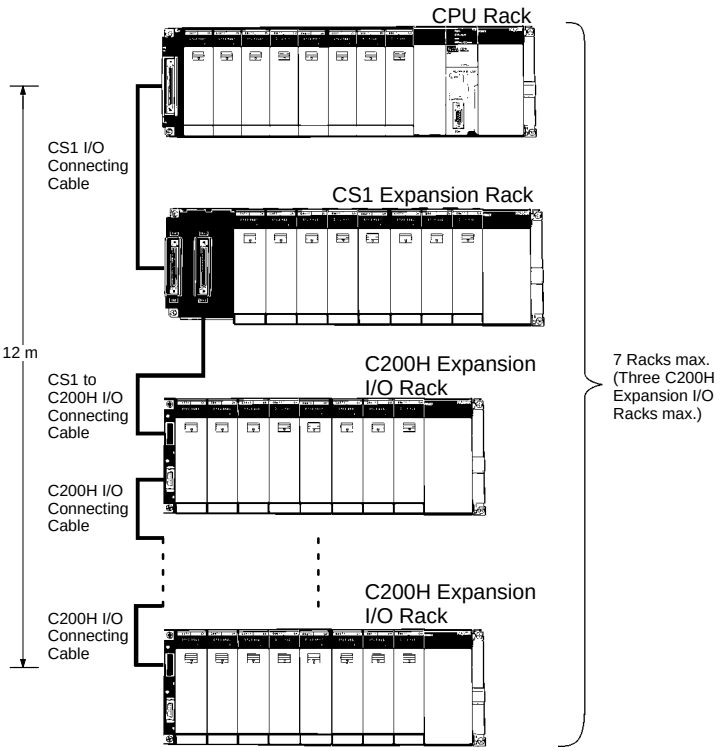
■ Expansion Rack Patterns

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

CPU Rack with CS1 Expansion Racks

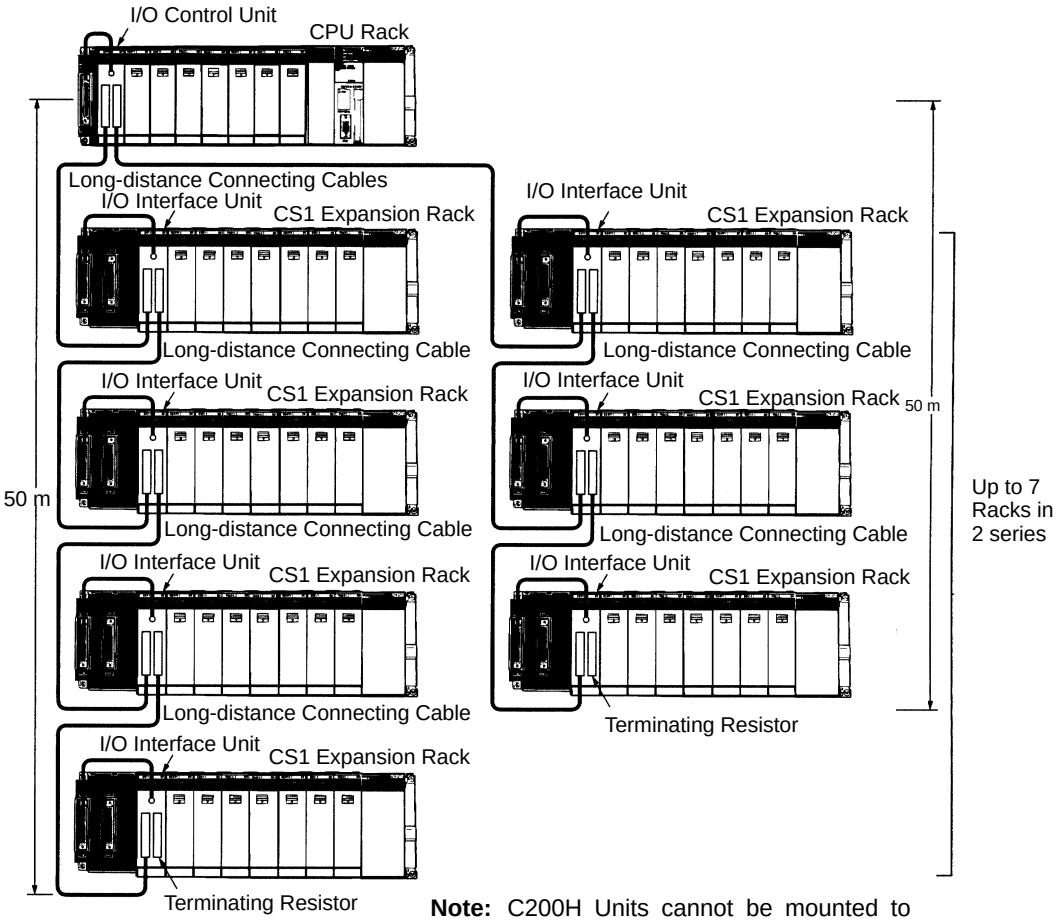


CPU Rack with CS1 Expansion Racks and C200H Expansion I/O Racks



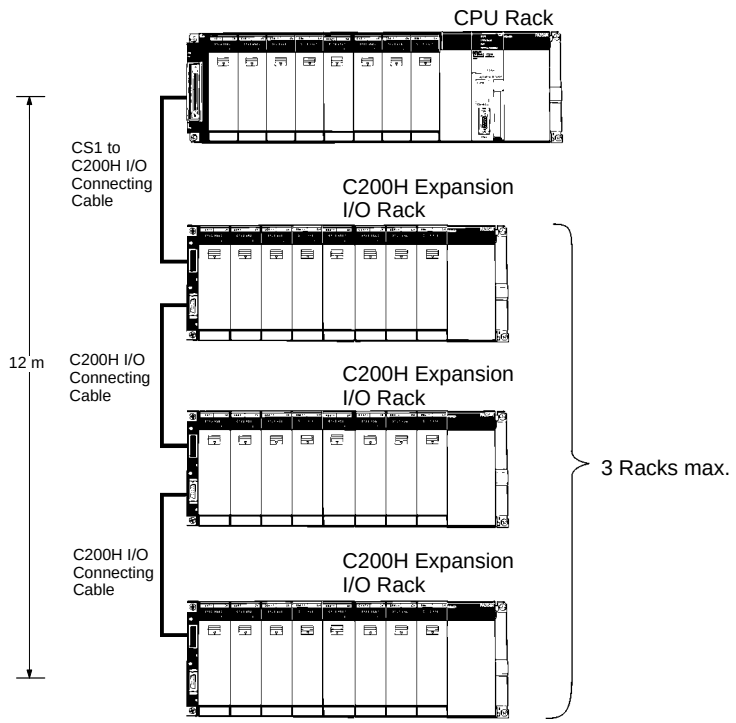
Expansion Racks

CPU Rack with CS1 Long-Distance Expansion Racks

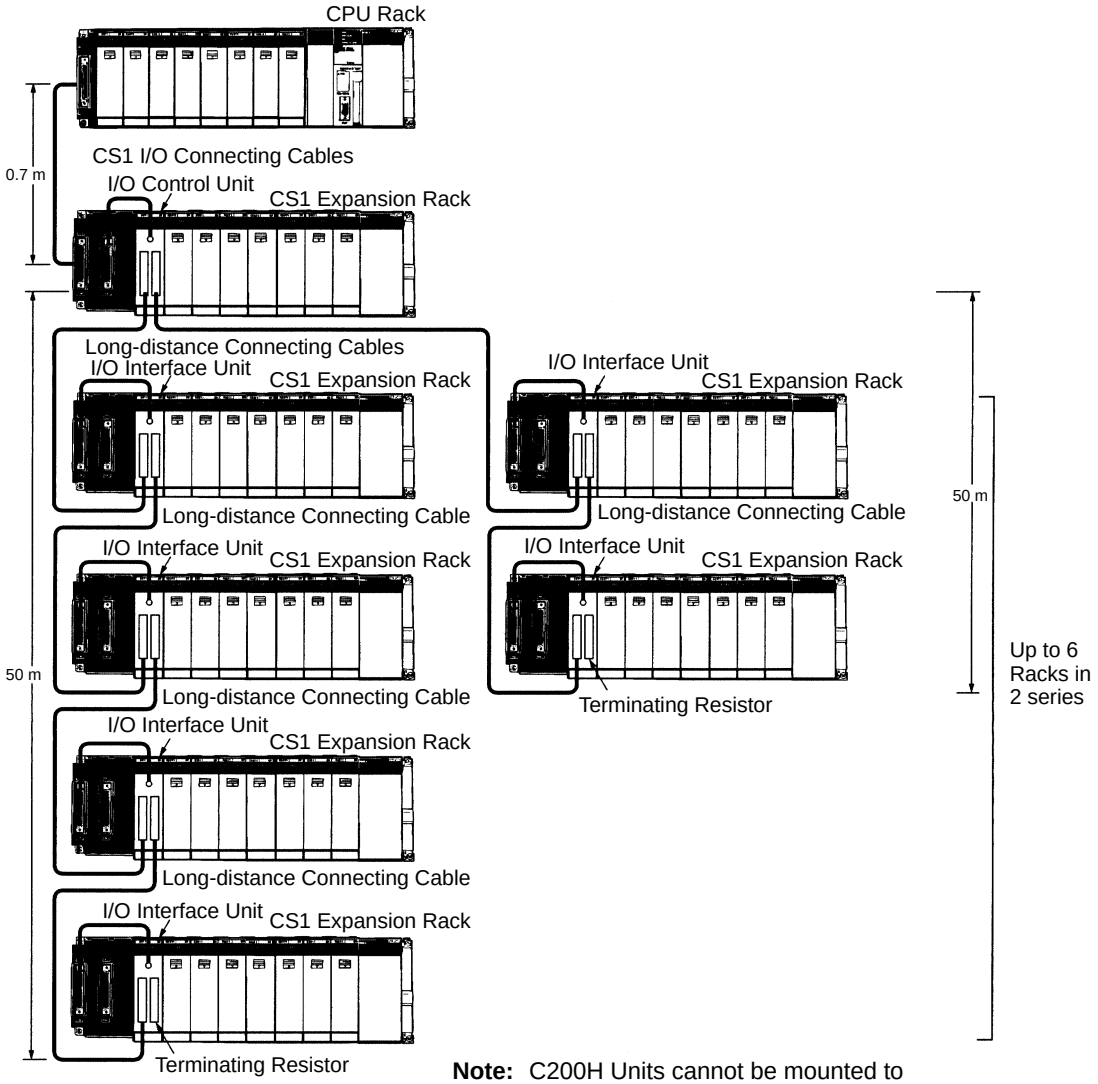


Note: C200H Units cannot be mounted to Long-distance Expansion Racks.

CPU Rack with C200H Expansion I/O Racks



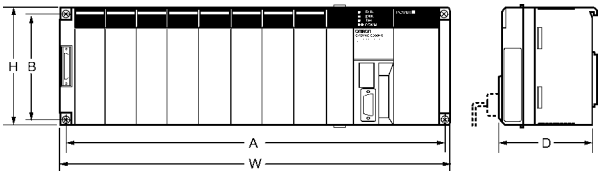
CPU Rack with CS1 Expansion Rack and CS1 Long-Distance Expansion Racks



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

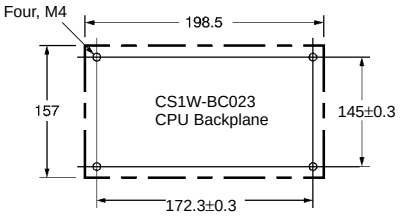
Mounting Dimensions

■Dimensions



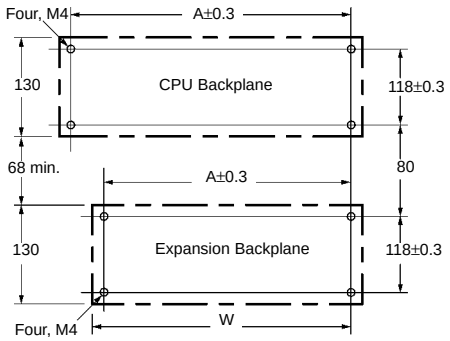
■ Backplanes

CPU Backplane with 2 Slots



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

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



Unit: mm

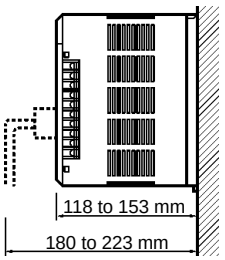
Backplane	Model	A	W
CPU Backplanes	CS1W-BC023 (2 slots)	172.3	198.5
	CS1W-BC033 (3 slots)	246	260
	CS1W-BC053 (5 slots)	316	330
	CS1W-BC083 (8 slots)	421	435
	CS1W-BC103 (10 slots)	491	505
CS1 Expansion Backplanes	CS1W-BI033 (3 slots)	246	260
	CS1W-BI053 (5 slots)	316	330
	CS1W-BI083 (8 slots)	421	435
	CS1W-BI103 (10 slots)	491	505
C200H Expansion I/O Backplanes	C200HW-BI031 (3 slots)	175	189
	C200HW-BI051 (5 slots)	245	259
	C200HW-BI081-V1 (8 slots)	350	364
	C200HW-BI101-V1 (10 slots)	420	434

Unit: mm

Backplane	A	B	W	H	D
CS1W-BC023 (2 slots)	172.3	145	198.5	157	123
CS1W-BC033 (3 slots)	246	118	260	130	
CS1W-BC053 (5 slots)	316		330		
CS1W-BC083 (8 slots)	421		435		
CS1W-BC103 (10 slots)	491		505		

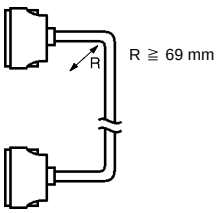
■ Mounting Height

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

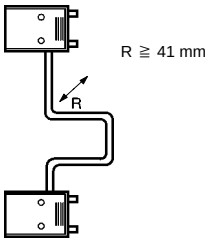


Note: I/O Connecting Cables are 12 m long max. and require sufficient space to maintain the min. bending radius.

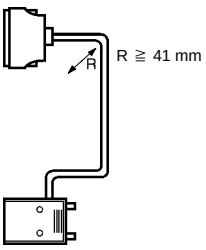
CS1 I/O Connecting Cable
(Cable diameter: 8.6 mm)



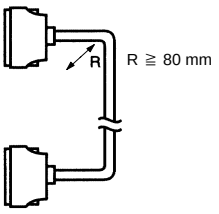
C200H I/O Connecting Cable
(Cable diameter: 5.1 mm)



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



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



Better Basic Performance

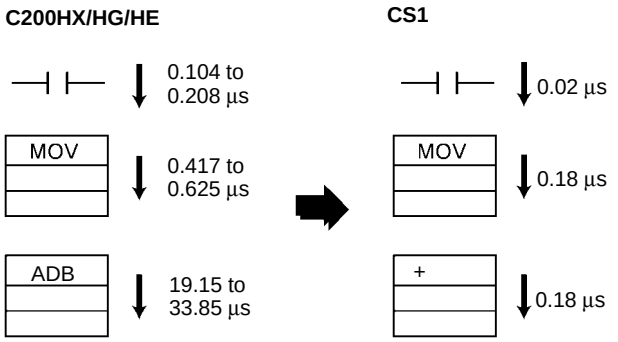
Large Program, Memory, and I/O Capacity; High-speed Instructions and Peripheral Servicing

■ Better Machine Performance with High-speed Processing

CS1 PLCs provide ample speed for advanced machine interfaces, communications, and data processing.

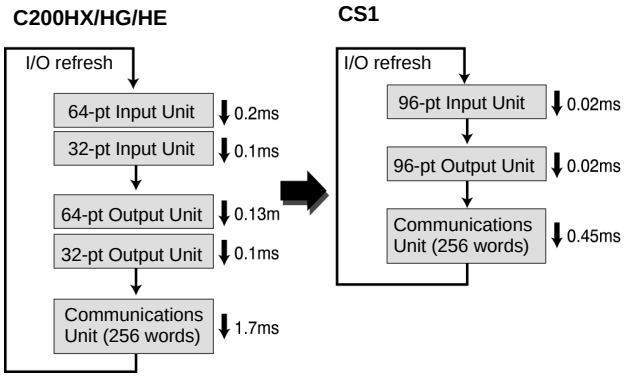
Execution Times from 20 ns

Faster instruction processing includes 0.02 μs for LD and 0.18 μs for MOV. And special instructions are processed almost as fast as basic ones (e.g., as fast as 0.18 μs for some instructions).



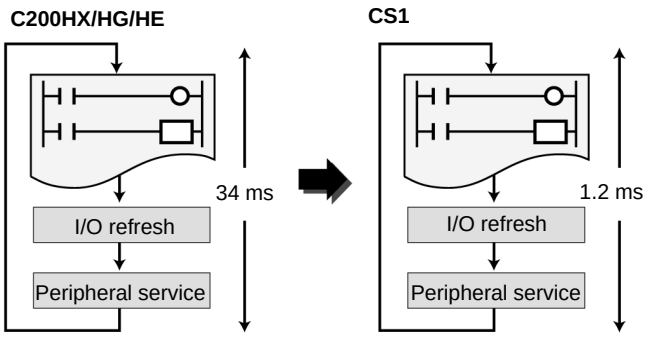
4 Times the Peripheral Servicing and I/O Refresh Speed

CS1 refresh time for 96 input points: 0.02 ms (15 times faster)
For 96 output points: 0.02 ms (10 times faster)
For 256 words for Communications Unit: 0.45 ms (4 times faster)



30 Times the Overall Cycle Speed

The following examples are for 30K-step programs (basic instructions: 50%; MOV instructions: 30%; arithmetic operation instructions: 20%).

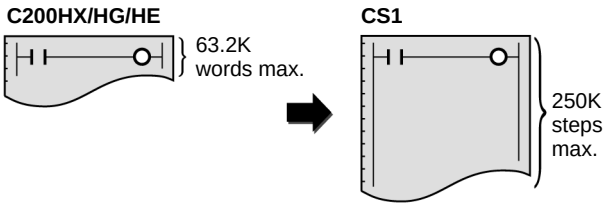


■ Large Capacities to Do the Job

CS1 PLCs also provide ample capacity for advanced machine interfaces, communications, and data processing.

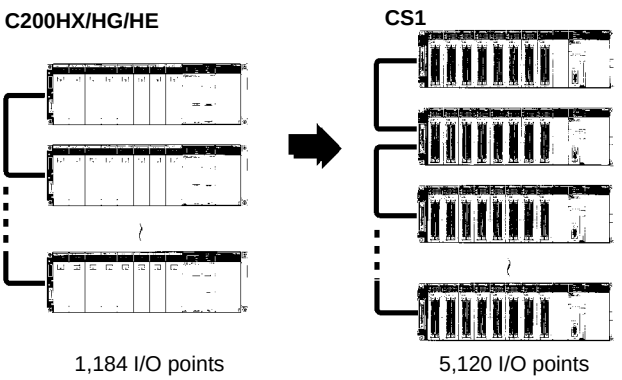
4 Times the Program Capacity

Create programs with up to 250K steps.



4.3 Times the I/O Capacity

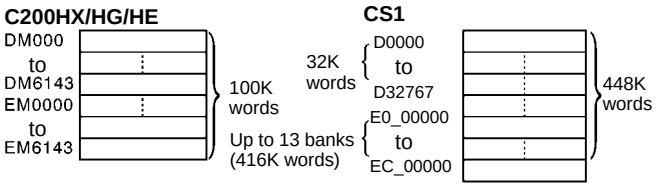
Handle up to 5,120 I/O points.



Better Basic Performance

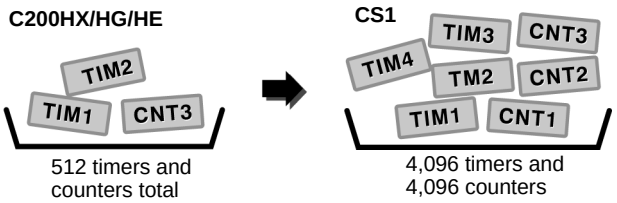
4.5 Times the Data Memory

Use up to 448K words of data memory (word data).



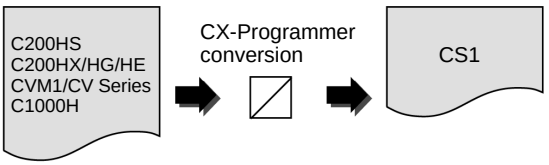
16 Times the Number of Timers/Counters

Program up to 4,096 timers and 4,096 counters.



■ Use Legacy Programs

The CX-Programmer can be used to convert programs from other OMRON PLCs.



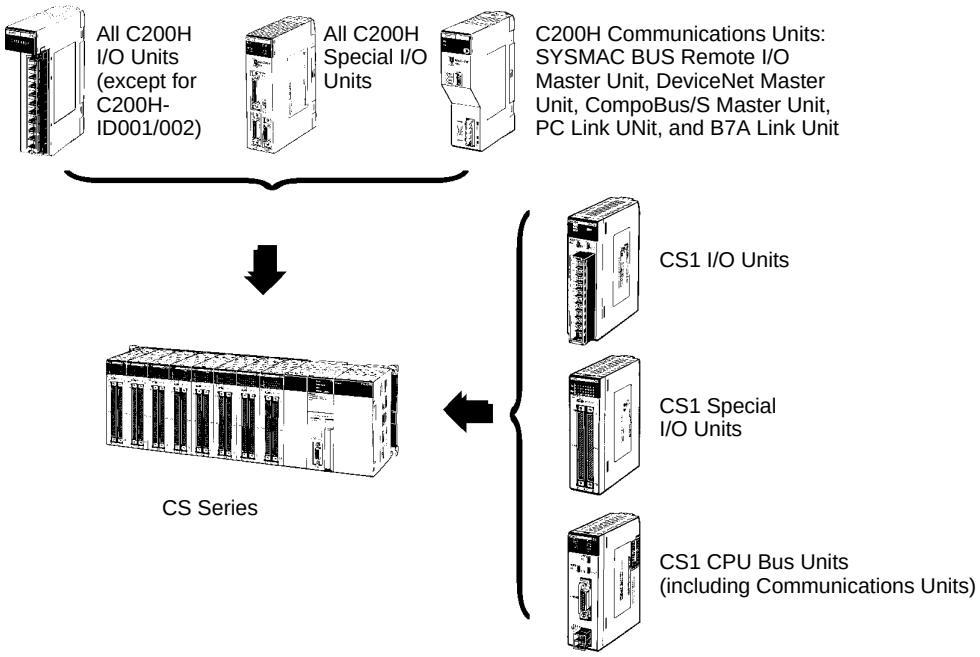
■ Large Capacity Data Handling with Each Instruction

The basic operand specifications have been converted from BCD to binary to increase data handling capacity.

Item	C200HX/HG/HE	CS1
Block transfers	0 to 6655 words	0 to 65535 words
Indirect addressing range	DM 00000 to DM 9999	D00000 to D32767

■ Use C200H Units

All of the I/O Units and Special I/O Units and a portion of the Communications Units used for the C200H, C200HS, and C200HX/HG/HE can be used, as can C200HX/HG/HE Expansion I/O Racks. (Only CS1 Units can be used on long-distance Expansion I/O Racks using I/O Control Units or I/O Interface Units.)



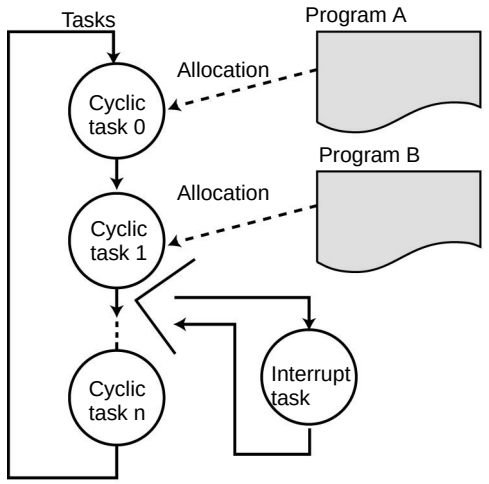
Note: There are restrictions in data transfers with the CPU Unit for CIO and DM Area specifications (e.g., address of transfer source or transfer destination) for the C200H Special I/O Units, as well as in data transfers programmed from these Units (e.g., using PC READ or PC WRITE instructions). Refer to CS1 PLC manuals (in particular, information on restrictions in using C200H Special I/O Units) for details.

Better Design/Development Efficiency

Structured Programming and Team Program Development with Tasks

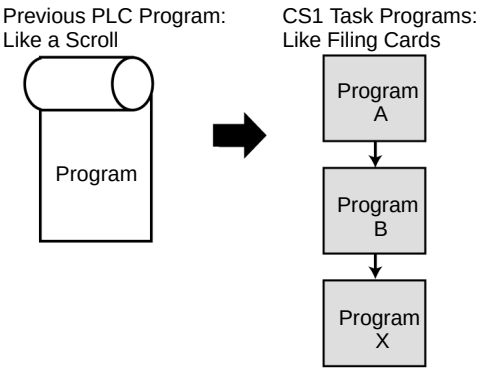
■ Task Programming

With CS1 PLCs, programs can be divided into programming units called tasks. There are both cyclic tasks, which are executed each cycle in a specified order, and interrupt tasks, which are executed when an interrupt occurs.



Comparison to Previous PLCs

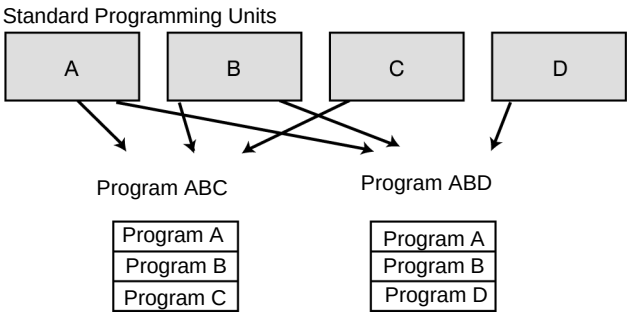
Although previously a PLC program was something like one long scroll, task programs more like separate cards arranged in order of execution.



Advantages

Program Standardization

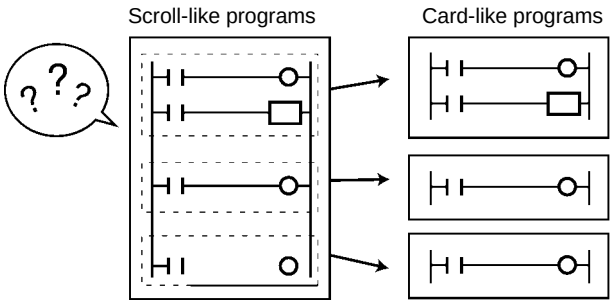
Task programs are created in units divided by functionally by purpose. These functional units can be easily reused when programming new PLCs or systems with the same functionality.



Easier-to-understand Programs

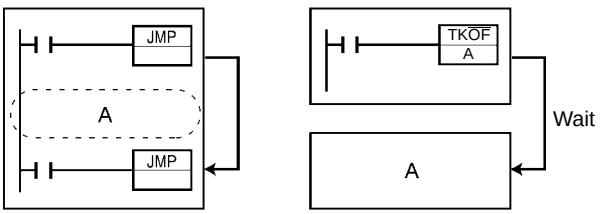
With scroll-like programs, individual functional units are extremely difficult to find just by looking at the program.

Tasks are used to separate a program functionally and make the program much easier to understand.



Shorter Cycle Times

With a scroll-like program, many jump and similar instructions had to be used to avoid executing specific parts of the program. This not only slows down the programs, but makes them more difficult to understand. With task programming, special instructions enable controlling the execution of tasks so that only the require tasks are executed during any particular cycle.

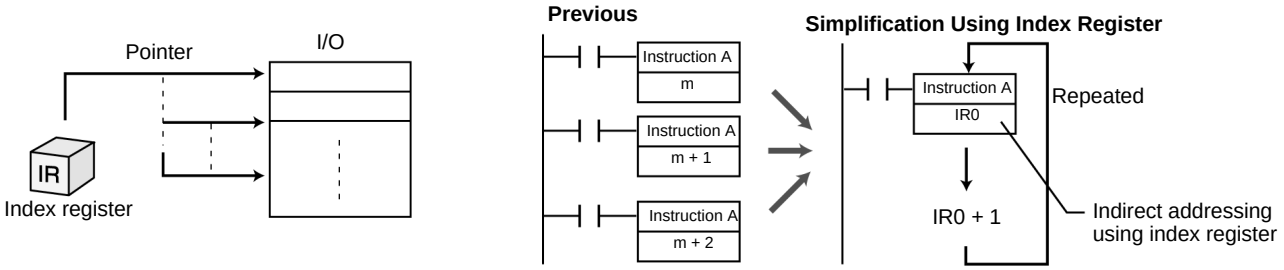


Simple, Easy-to-Understand Programs

Index Registers, Table Data, Repeat Instructions, Block Programs, Text Strings, and More.

■ Simplify Programs with Index Registers

Index registers can be used as memory pointers to enable easily changing the addresses specified for instructions. Using an index register can often enable one instruction to preform the processing previously performed by many instructions.

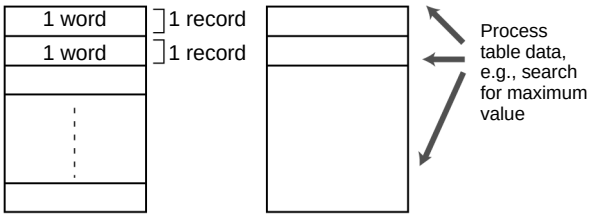


■ Easily Handle Table Data

Table Data Instructions

One-word Records

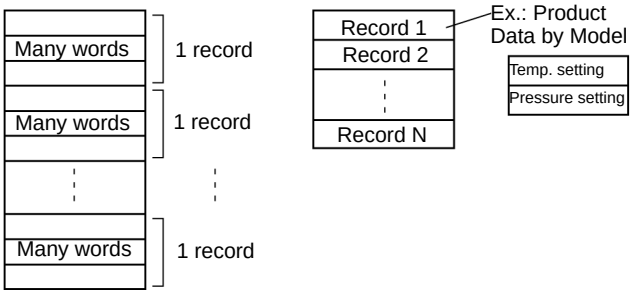
Instructions are provided to find the maximum value, minimum value, and search values.



Multi-word Records

Areas of memory can be defined as tables with the specified record size (words). Index registers can be used with such tables to easily sort records, search for values, or otherwise process the records in the table.

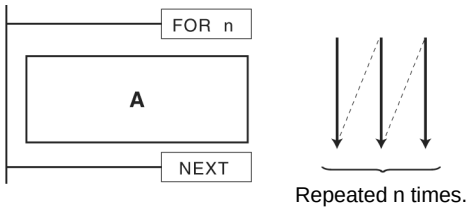
For example, the temperature, pressure, and other settings for each model of a product can be set in separate records and the data handled by record.



Simple, Easy-to-Understand Programs

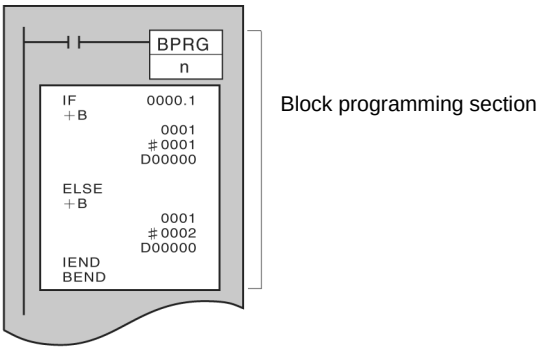
■ Easily Repeat Processing

Instructions are provided that let you easily repeat sections of the program. Repeat execution can also be ended for a specified condition.



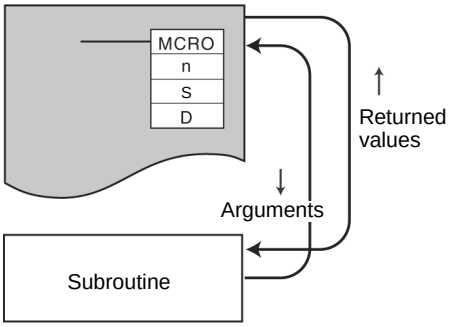
■ Easily Program Logic Flow Control with Block Programming Sections

A block of mnemonic programming instructions can be executed as a group based on a single execution condition. IF/THEN, WAIT, TIMER WAIT, and other instructions can be used inside the block programming section to easily program logic flow control that is difficult to program with ladder diagrams.



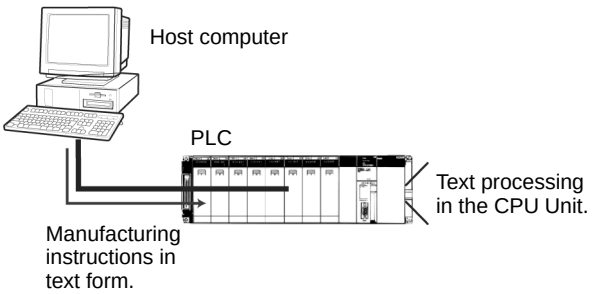
■ Macro (MCRO) Instruction

Macro instructions can be used to execute the same subroutine program with different operands from different locations in the programs (subroutine instruction with argument).



■ Easily Handle Text Strings

Manufacturing instruction can be obtained from a host computer or other external source, stored in memory, and then manipulated as text strings as required by the applications. The text strings can be searched, fetched, reordered, or other processed in the CPU Unit of the PLC.



Maintenance and Management

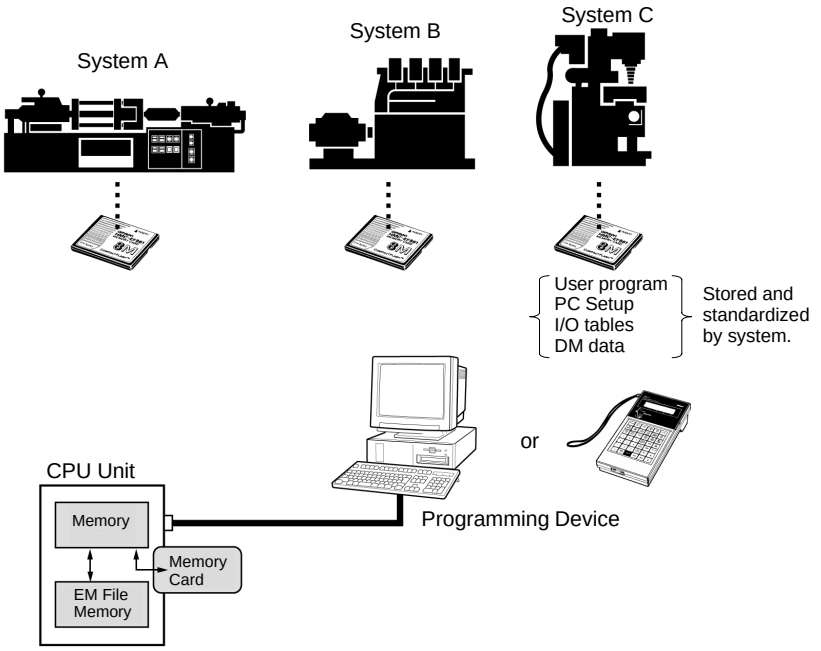
Use Memory Cards to Handle Files Containing Various Types of Data

■ File Applications

Manipulate PLC File Data Using Windows Files

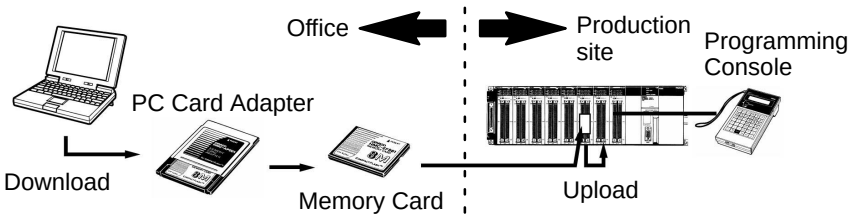
- The user program, parameters, I/O memory, names, I/O comments, and block comments can all be handled as file data. File data can be used to standardize programs and initialization data for each system, and comments can be stored as file data on Memory Cards.
- The CX-Programmer or a Programming Console can be connected to a CS1 PLC to transfer files between the CPU Unit's memory and Memory Cards (or EM File Memory).
- As Windows files, file icons can be dragged and dropped to a Memory Card or computer storage device to easily copy the files.

Note: A Memory Card Adapter can be used to mount Memory Cards into a PC card slot on a computer to use them as computer storage devices.



Handle File Data Onsite with Programming Consoles

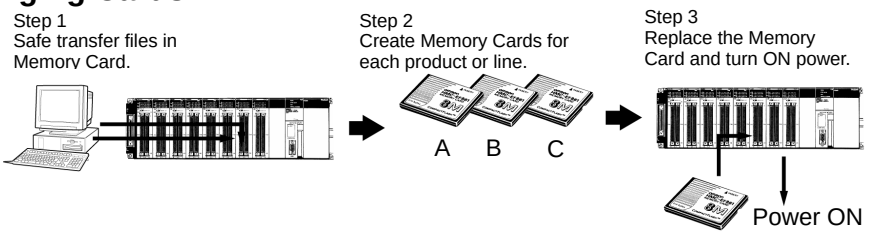
- A Programming Console can be connected to the PLC to transfer files between between the CPU Unit's memory and Memory Cards (or EM File Memory).
  A Programming Console and Memory Cards are all you need to change data onsite.



Note: Program and setup data can be easily backed up onsite using only the CPU Unit, without a Programming Device. Also, programmed replacement of programs designated in Memory Cards is also possible without a Programming Device.

Change Program Simply by Changing Cards

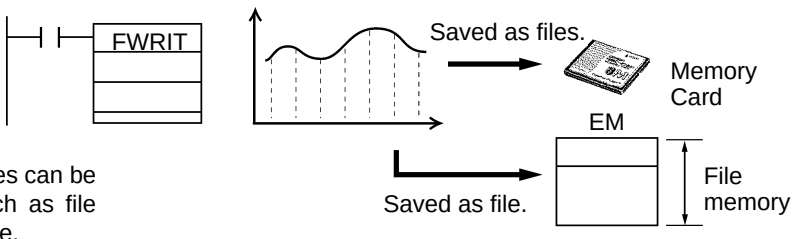
- File data can be automatically transferred from Memory Card to the CPU Unit when power is turned ON, enabling Memory Cards to be used for operation in the same way as is possible with ROM.



Manipulate Files During Operation

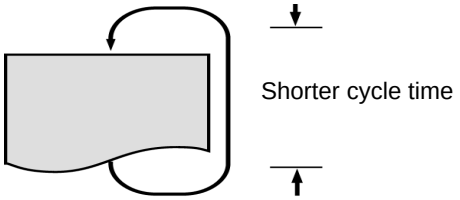
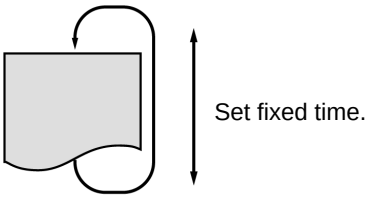
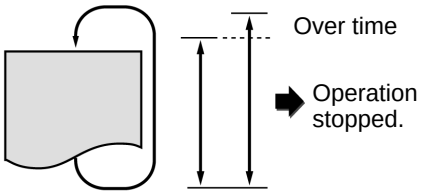
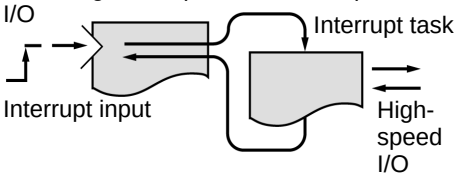
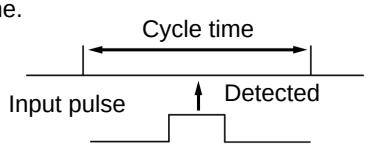
- File read and write instructions can be used during operation to transfer files between the CPU Unit's memory and Memory Cards (or EM File Memory). Trend data, quality control data, other data from memory can be stored during operation in Memory Cards or EM File Memory.

Note: With EV1-version CPU Units, CSV and text files can be saved, and programmed file operations, such as file name changes and deletions, are also possible.



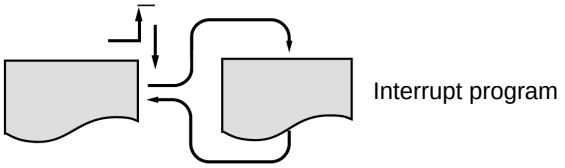
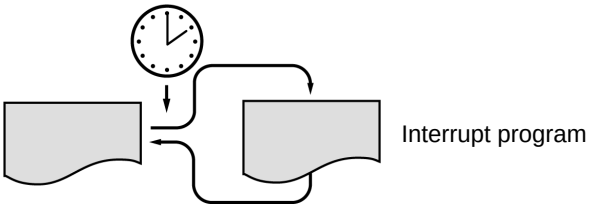
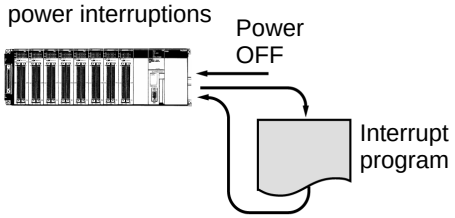
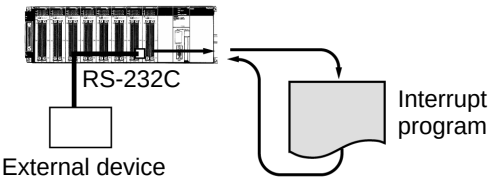
■ A Wide Range of Special Functions

Cycle Time Functions

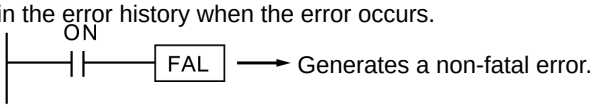
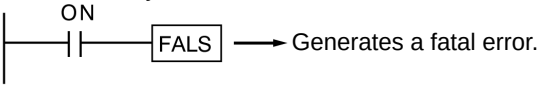
Requirements	Solutions
Reducing the cycle time 	• Place tasks that are not being executed on standby. • Create subroutines for portions of tasks executed only under special conditions. • Disable cyclic refreshing for Special I/O Units when not required each cycle.
Eliminating deviations in I/O response time	• Set the cycle time to a fixed time. 
Stopping operation for long cycle times 	• Use the cycle time monitoring function to stop operation when the cycle time is too long.
Reducing I/O response time for specific I/O 	• Use an I/O interrupt task to execute an interrupt program when a specific input turns ON and then directly refresh external I/O when the appropriate instruction is executed in the interrupt program. External I/O can be directly refreshed either by using immediate refreshing for instruction operands or by using the IORF instruction to refresh all or a specified portion of external I/O.
Inputting signals (e.g., from photomicro-sensors) that are shorter than the cycle time. 	• Use the high-speed pulse input function of the C200H High-density I/O Units (C200H Special I/O Units). These Units can detect 1-ms or 4-ms pulses (except C200H-OD501/OD215,) • Use the IORF instruction to refresh inputs during program execution to further increase processing speed.

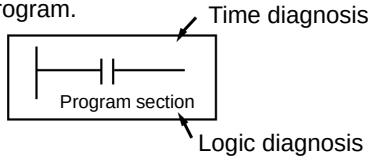
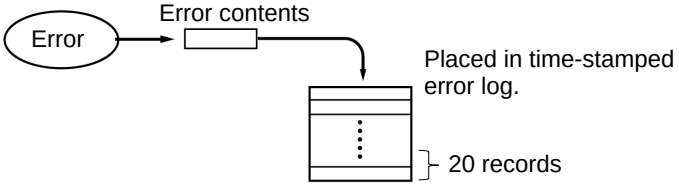
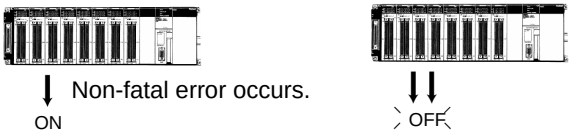
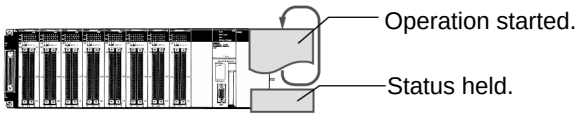
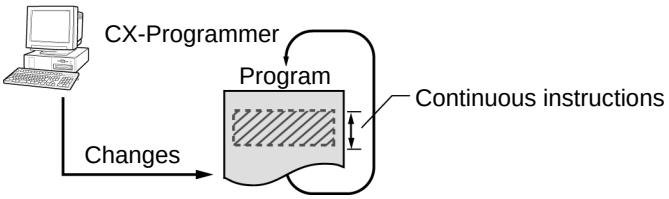
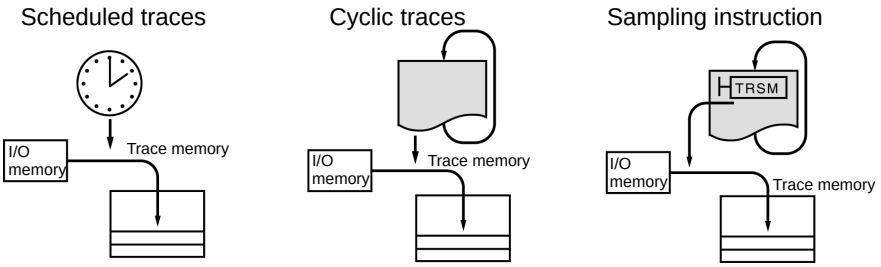
Maintenance and Management

Interrupt Functions

Requirements	Solutions
Executing programming without being affected by the cycle time	• Use I/O interrupt tasks to execute interrupt programs when specific inputs turn ON. 
Monitoring operating conditions at a specific interval	• Use a scheduled interrupt task to execute an interrupt program at a specific interval. 
Executing emergency processing for power interruptions 	• Use the power OFF interrupt task to execute an interrupt program before the CPU stops. Immediate refreshing can be used inside this interrupt program to refresh specified outputs.
Generating CPU Unit interrupts when data is received from a serial port	• Use an interrupt from the Serial Communications Board to execute an interrupt program when a specific messages received by the Board. 

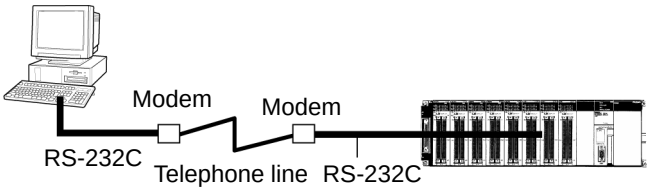
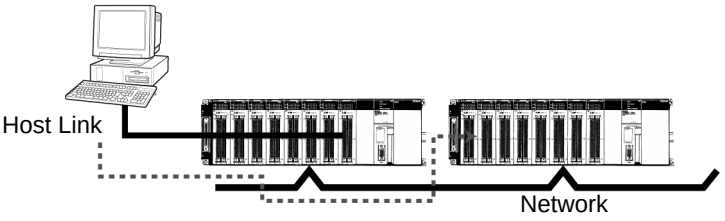
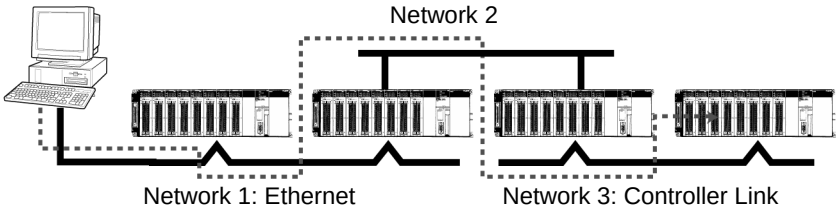
Maintenance and Debugging Functions

Requirements	Solutions
Creating a user-defined error for specific conditions (e.g., errors or specific signals from the controlled system) but allow the CPU Unit to continue running.	• Use the FAL instruction to create a non-fatal user-defined error. An entry can also be left in the error history when the error occurs.  • FAL can also be used just to leave error history records for specific conditions that are not necessarily errors.
Creating a user-defined error for specific conditions (e.g., errors or specific signals from the controlled system) and stop the CPU Unit as a result.	• Use the FALS instruction to create a fatal user-defined error. An entry can also be left in the error history when the error occurs.  • FALS can also be used to automatically stop operation for specific conditions that are not necessarily errors.

Requirements	Solutions
Determining if a specific output turns ON within a specified time after an input turns ON, generating an error if the output does not turn ON, and determining the address in the program responsible for the output not turning ON.	• Use the FPD instruction to perform time or logic diagnosis of a specified portion of the program. 
Creating a history of user-defined and system errors that have occurred.	• Use the error log to record up to 20 time-stamped error records.
Creating an external output when a non-fatal error occurs.	• Use the Non-fatal Error Flag. 
Turning OFF all output from Output Units for specific conditions. Turning OFF all output from Output Units during trial system operation.	• Use the Load OFF Bit. 
Maintaining I/O memory status when starting operation	• Use the I/O memory hold function to start program execution with the same I/O memory status as the last time the program was executed. 
Correcting the program during operation	• Use the CX-Programmer to change the program as required during operation. 
Sampling specified I/O memory bits or word data. • Scheduled sampling • Sampling once per cycle • User-defined sampling	• Use the data tracing function. 

Maintenance and Management

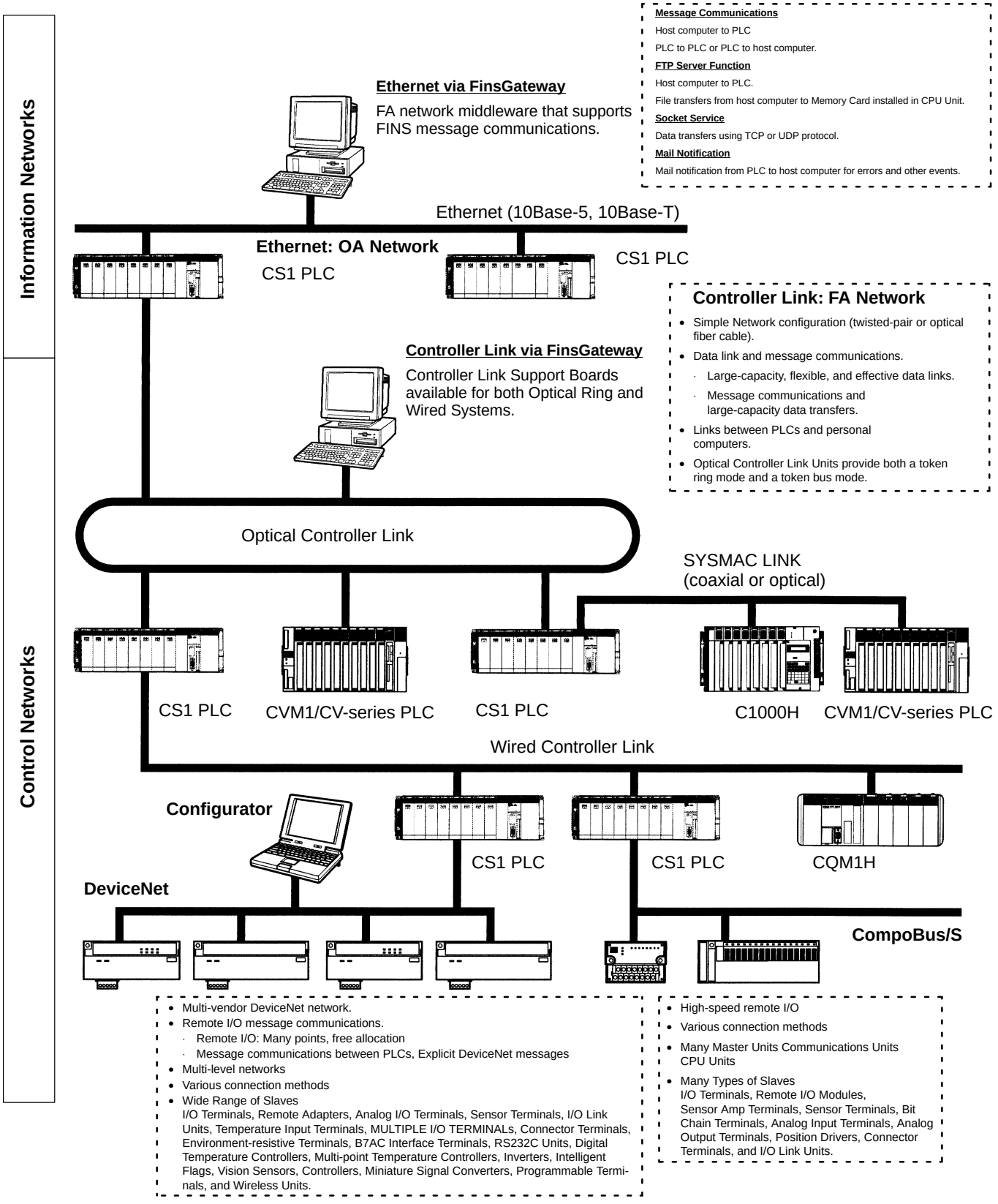
Remote Programming and Monitoring

Requirements	Solutions
Monitoring and editing online for remote PLCs using telephone lines	• Perform online programming and monitoring from a CX-Programmer running on a computer connected to the PLC via a modem. 
Monitoring and editing online from the CX-Programmer for a remote PLC connected to a network	• Use a Serial Communications Board or Unit, connect to a PLC via a modem, use an instruction to switch to host link mode, and then program or monitor from the CX-Programmer. (It's not necessary to cut the connection during the procedure.) • Use the host link gateway function to program or monitor any PLC connected to a Controller Link or Ethernet Network to which the PLC connected to the computer running the CX-Programmer is connected (via RS-232C). 
Programming and editing a PLC on a remote network	• Use the gateway function to edit any PLC connect to a network up to two networks away (3 networks including the local network). For example, a PLC on the Controller Link Network shown below can be accessed from the CX-Programmer running on a computer connected to a PLC on the Ethernet Network. 

Seamless Communications between Information and Control Systems

Seamless Network Communications

Network hierarchies stretch from component networks through top-level Ethernet networks and, with FINS commands, provide seamless inter-network communications. Multi-vendor support is also now better than ever before.



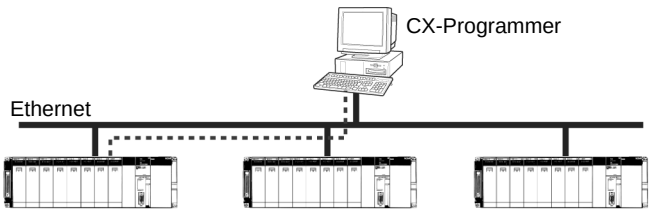
Seamless Communications between Information and Control Systems

■ Ethernet: Information Network

Use an Ethernet Network to organically link production management with the production site using various communications services.

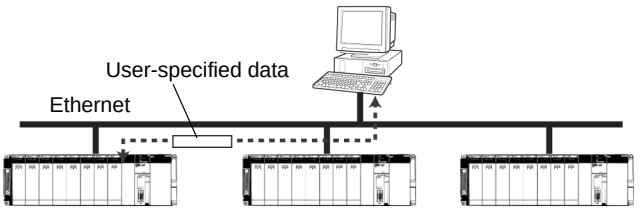
Remote Programming and Monitoring

CX-Programmer running on a computer connected to the Ethernet Network can be used to program and monitor all the PLCs connected to the Ethernet Network.



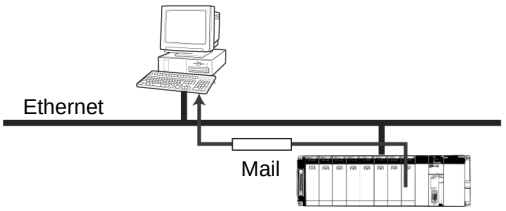
Socket Service

Transfer data using either UDP or TCP protocol.



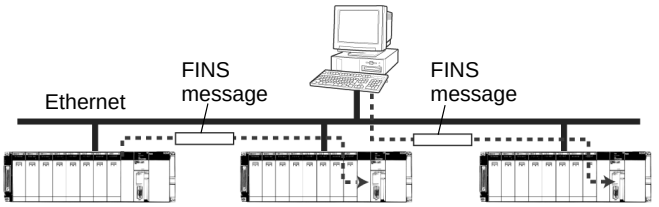
Mail Service

Send electronic mail from the PLC to a host computer when a flag turns ON, when an error occurs, or at scheduled times.



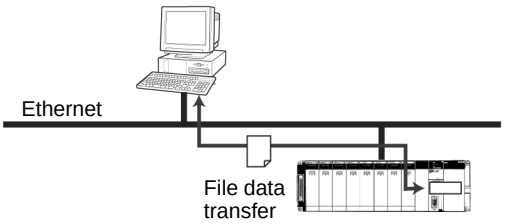
FINS Message Service

Send FINS message between PLCs or between PLCs and host computers. The Ethernet FinsGateway can be used to handle messages from applications without having to program FINS commands directly.



FTP Service

Use the FTP to transfer files between Memory Cards in the CPU Unit and computer memory.



Seamless Communications between Information and Control Systems

■ Controller Link and SYSMAC LINK: Control Networks

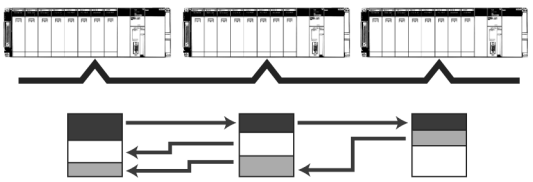
Controller Link or SYSMAC LINK can easily connect PLCs at the factory site in a fully functional FA network.

Controller Link:
Easy Network Construction with Twisted-pair or Optical Cables – Use Either H-PCF Cables or GI Cables for Optical Ring Systems

SYSMAC LINK:
Easy Network Construction with Coaxial or Optical Cables

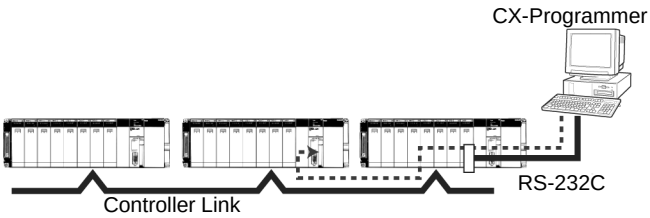
Data Links

Efficient, large-capacity data links can be flexibly created between PLCs and between PLCs and host computers. The Controller Link FinsGateway can be used to handle data links from applications without having to program FINS commands directly.



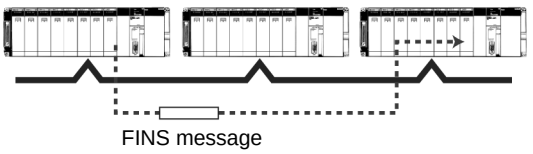
Remote Programming and Monitoring

CX-Programmer connected via RS-232C can be used to program and monitor PLCs on the Controller Link Network.



FINS Message Communications

Large volumes of data can be transferred between PLCs and host computers whenever necessary. The Controller LInk FinsGateway can be used to handle messages from applications without having to program FINS commands directly.



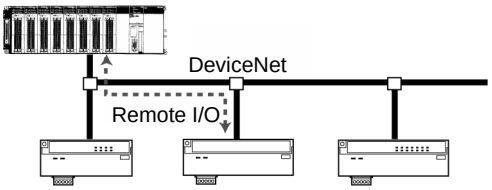
Seamless Communications between Information and Control Systems

■ DeviceNet: Component Network

Create a multi-vendor network for multibit communications for lower-level PLCs that need to handle both control signals and data.

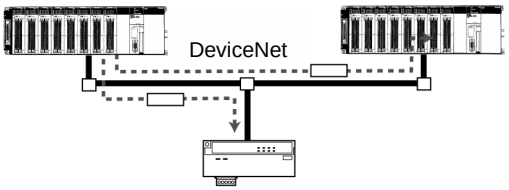
Remote I/O Communications

Large-capacity remote I/O can be freely allocated according to application needs.



Message Communications

Send FINS messages between OMRON PLCs and Explicit message between OMRON PLCs and devices from other makers.



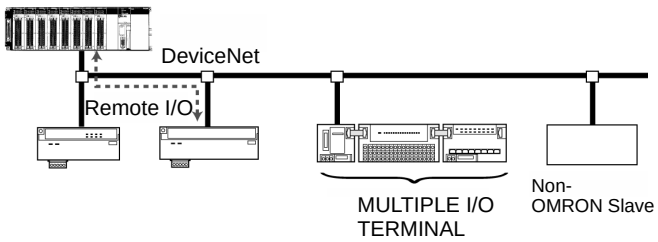
Select from a Wide Range of Slaves

Connect contact I/O, analog I/O, temperature inputs, sensor (photoelectric or proximity) inputs, and small PLCs (e.g., CQM1).

Use MULTIPLE I/O TERMINALs as DeviceNet Slaves

I/O can be expanded through one-step connections. Special I/O and explicit messages are also supported.

Connect to DeviceNet Products from Other Manufacturers



■ CompoBus/S: High-speed ON/OFF Bus

Create a high-speed remote I/O system connected under a PLC to reduce wiring to sensors and actuators in machines.

High-speed or Long-distance Communications (Switchable)

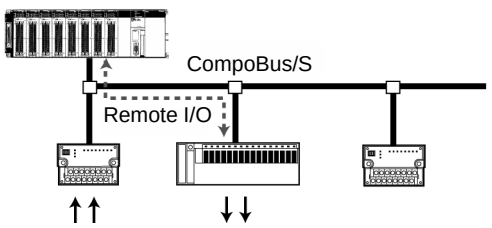
- High-speed Mode (previous mode):
  750 Kbps, 100 m with 2-core VCTF cable
- Long-distance Mode:
  93.75 Kbps, 500 m with 2-core VCTF cable

Faster Wiring with Special Cables

Connections are easily made with special flat cables or VCTF cables.

High-speed Remote I/O Communications: 1 ms Maximum

Link up to 32 slaves with 128 inputs and 128 outputs and a communications cycle time of 1 ms or less. (Cycle time is 0.5 ms for 16 slaves with 64 inputs and 64 outputs.)



Many Slaves Available

Connect contact I/O, contact I/O modules, and sensor (photoelectric or proximity) inputs. Also available are Analog I/O models.

Flexible Branching with Long-distance Communications Mode

By using a special flat cable or 4-core VCTF cable, you can wire up to 200 m total with essentially any required wiring layout.

Better Connectivity and Compatibility

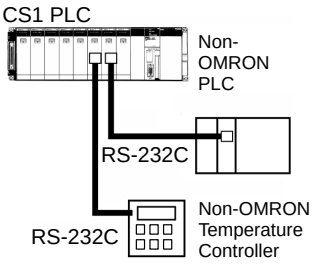
More Serial Communications Ports, More Protocols.
Up to 34 Port Connections with Protocol Setting for Each Port.

■ Protocol Macros

Data transfer protocol for serial communications vary with the manufacturer and with devices. Differences in protocols can make communications between devices by different manufactories very difficult, even when electrical standards are the same.

OMRON's protocol macros solve this problem by enabling easy creation of protocol macros designed to match the protocol of a connected device. Protocol macros will let you communicate with essentially any device with an RS-232C, RS-422, or RS-485 port without having to write a special communications program.

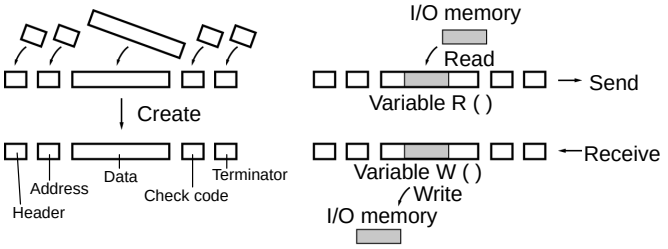
PLCs with Protocol Macros



The Two Main Functions of Protocol Macros

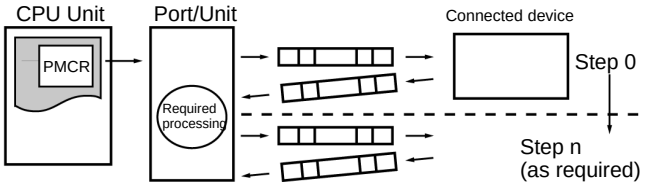
1. Creating Communications Frames

The communications frames can be easily created according to the specifications required by the connected device. Data from I/O memory in the CPU Unit can be easily included as part of a communications frame to read from or write to I/O memory.



2. Creating Frame Send/Receive Procedures

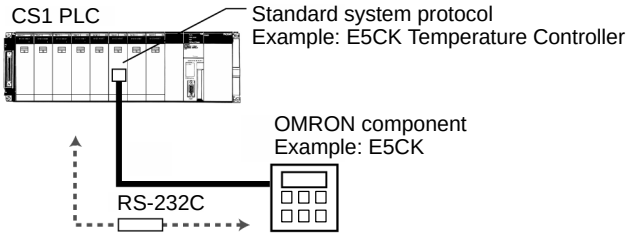
The required processing, including sending and receiving communications frames, can be performed one step at a time according to the results of the previous step, and then CX-Protocol can be used to trace send and receive data.



Application Examples

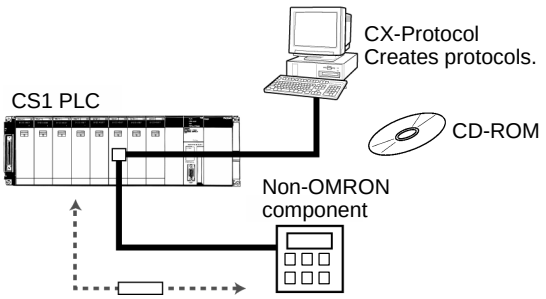
Standard System Protocols

Data transfers with OMRON components can be easily performed using standard system protocols. There is no need to develop your own protocols in this case.



User-created Protocols

Data transfers with non-OMRON components can be easily created just by defining parameters using the CX-Protocol Windows tool.



Better Connectivity and Compatibility

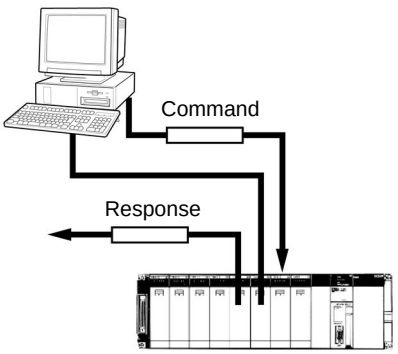
■ Other Protocols

OMRON provides all of the capabilities and capacity you need for the advanced programming required for human-machine interfaces, communications, data processing, and other required applications.

- **Host Links**

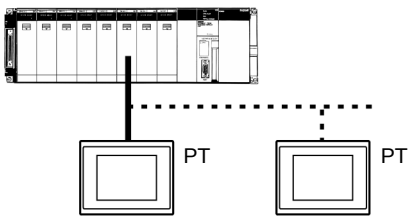
Host Link (C-mode) commands or FINS commands placed within host link headers and terminators can be sent to a host computer to read/write I/O memory, read/control the operating mode, and perform other operations for the PLC.

Unsolicited messages can also be sent from the PLC to the host computer by sending FINS commands from the ladder program using the SEND(090), RECV(098), and CMND(490) instructions.



- **1:N NT Links**

The PLC can be connected to a Programmable Terminal (PT) via RS-232C or RS422A/485 ports, and I/O memory in the PLC can be allocated to various PT functions, including status control areas, status notifications areas, touch switches, lamps, memory tables, and other objects.



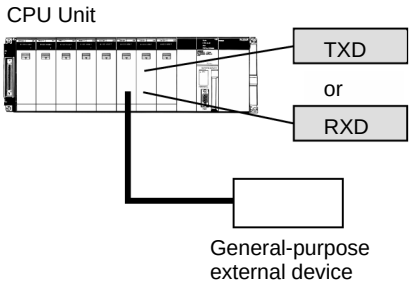
Note: Either one or up to eight PTs can be connected to a PLC in for 1:N NT Links.

- **High-speed NT Links**

High-speed NT Links that are three times faster than standard NT Links are possible with NS-series PTs. This speed is particularly important when connecting to more than one PT.

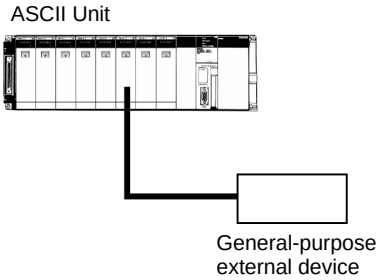
- **Custom Protocols**

I/O instructions for communications ports (TXD(236) and RXD(235)) can be used for simple data transfers (custom protocols), such as to input data from bar code readers or output data to a printer. Start/end codes can be specified, and RS, CS, and other control signals can be handled. (Custom protocols can be used only for the CPU Unit's built-in RS-232C port.)



- **General-purpose Protocols Using BASIC**

An ASCII Unit can be used to create essentially any protocol for an external device using the BASIC language, providing the ability to handle applications for which protocol macros cannot be created.



Better Connectivity and Compatibility

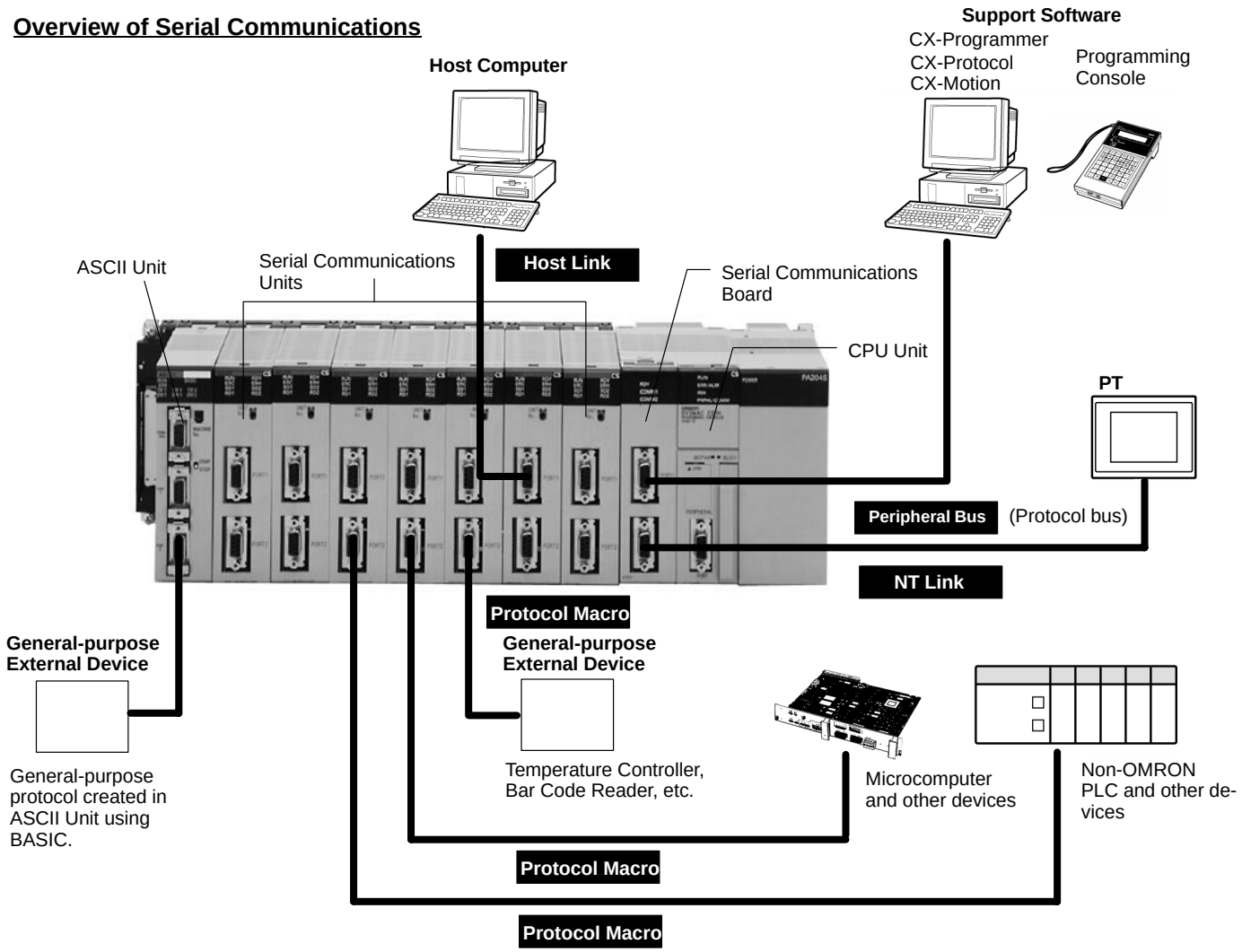
Protocol List

The following protocols are supported for serial communications

Protocol	Main destinations	Outline	Commands/Instructions
Host Link (SYSMAC WAY)	Computers, OMRON Programmable Terminals (PTs)	Communications between host computers and PLCs.	Host Link commands or FINS commands (unsolicited messages supported)
Custom	General-purpose devices	Custom communications with general-purpose external devices.	TXD and RXD instructions
Protocol Macros	General-purpose devices (including OMRON components)	Sending/receiving messages (communications frames) matched to the communications specifications of external devices.	PMCR instruction
1:N NT Links	OMRON Programmable Terminals (PTs)	High-speed communications with Programmable Terminals.	None
Peripheral bus	Support Software	Communications with Support Software tools running on host computers.	None
General (written in BASIC)	General-purpose devices	Unrestricted communications with external devices.	BASIC

Note: Refer to *Serial Communications* on page 104 for the ports that can be used for each protocol.

Overview of Serial Communications



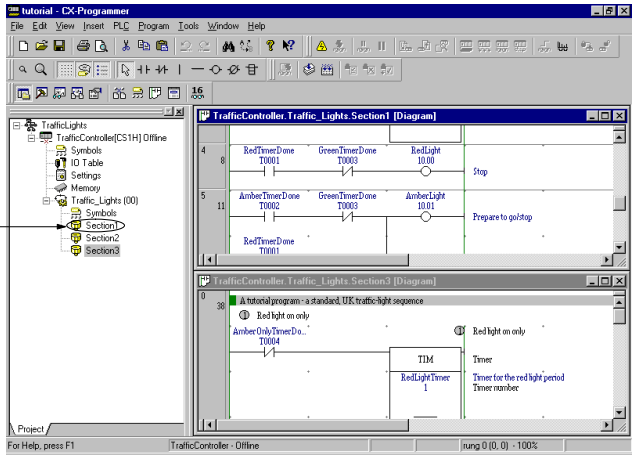
CX-Programmer

Programming Simplified with CX-Programmer Support Software

■ Divide Programs into Sections for Easier Visual Confirmation and Reuse

Programs can be created and displayed in as many sections as required to make them easier to confirm visually. Program sections can also be moved or copied on the project tree to make them easier to reuse. Programs can also be uploaded by sections (CVM1, CV, or CS1/CJ1 PLCs only) or edited online by section.

Copy and paste by section

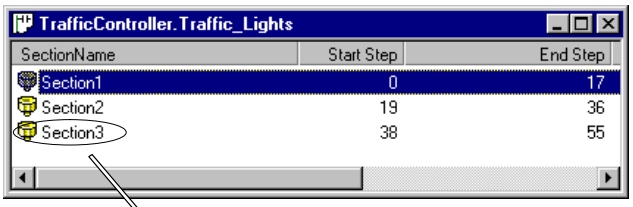


Section 1: Initialization

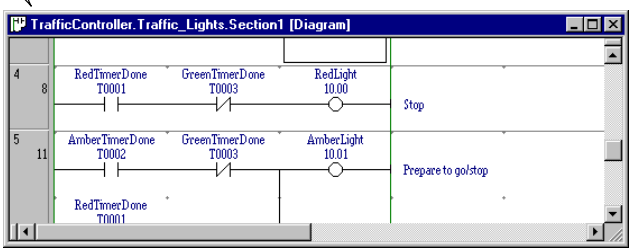
Section 3: Error processing

■ Jump to Sections from the Section List

You can understand of overall program structure from the section list and then jump to the required section.

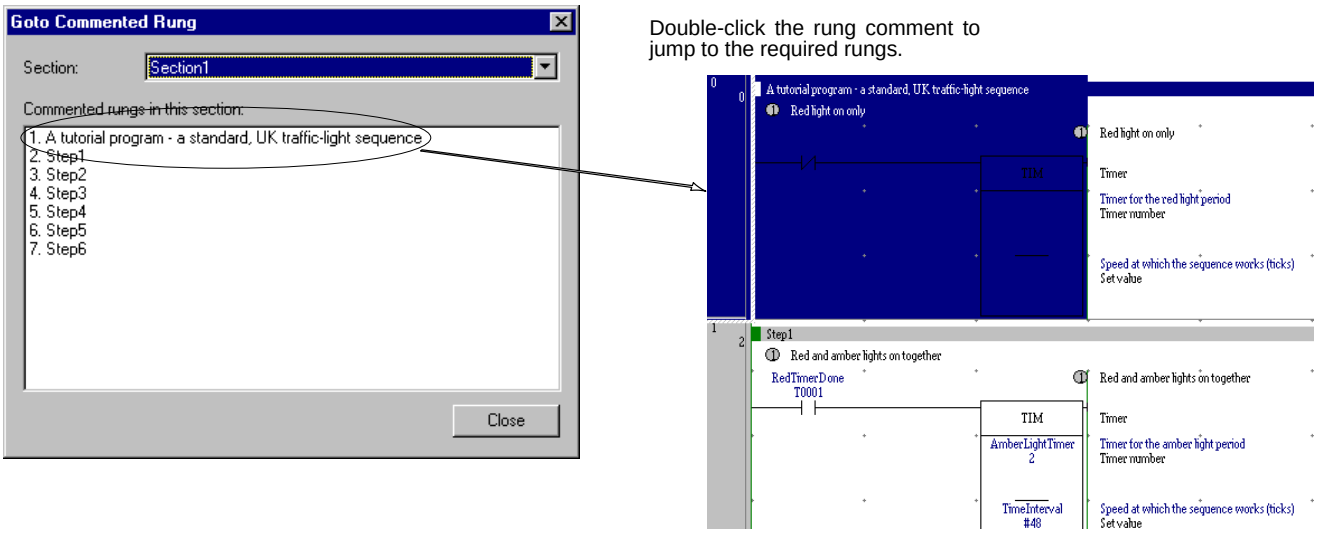


Double-click the section name to jump to the section.



■ Jump to Specific Rungs from the Rung Comment List

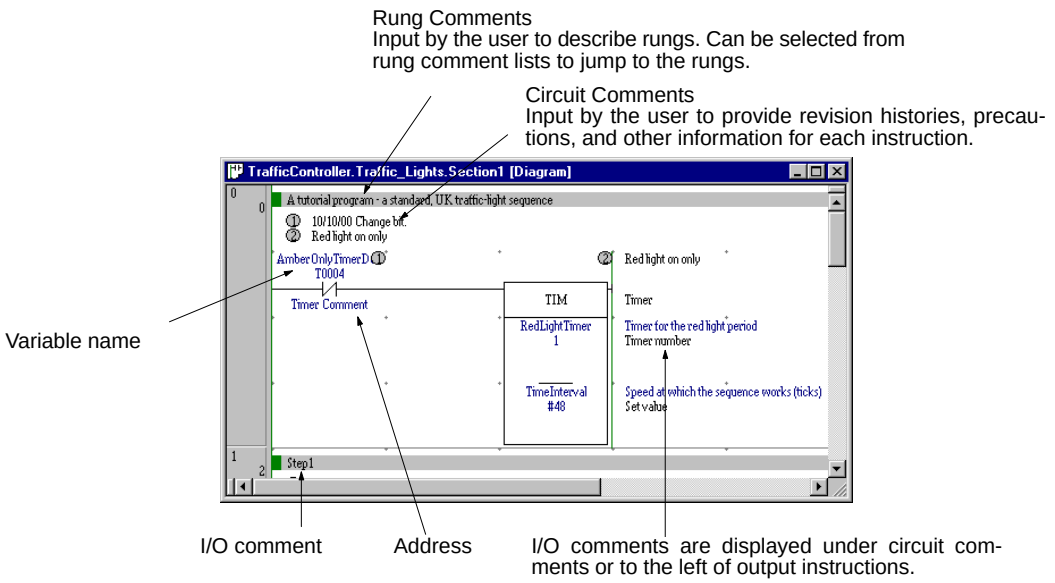
You can understand the overall structure of the section from the rung comment list and then jump to the required rungs.



■ Display Various Comments

Create Easy-to-understand Programs with User-defined Comments

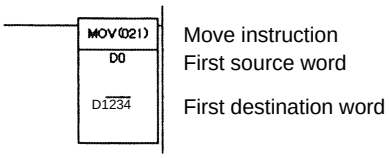
The following three types of user-defined comments can be displayed for element labels in the programming window.



- Rung comments: Comments left for individual rungs.
- Circuit comments: Comments left for individual instructions. Numbered on the ladder programming window for list display.
- I/O comments: Comments left for addresses and variables. Displayed to the right of the symbol for OUT instructions and special instructions.

System Comments for Special Instructions

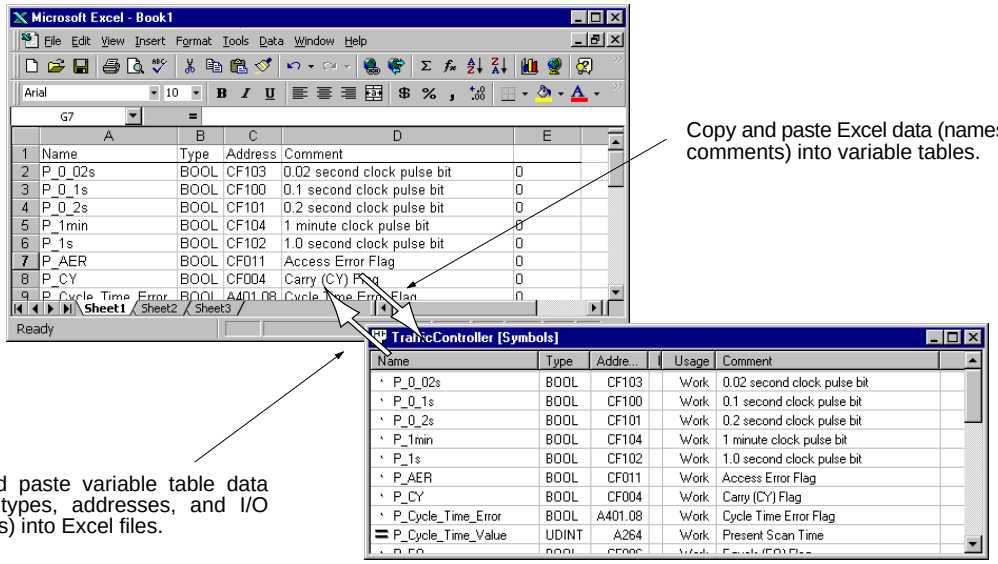
System-defined comments are automatically displayed to the right of special instructions to provide the instruction and operand names.



CX-Programmer

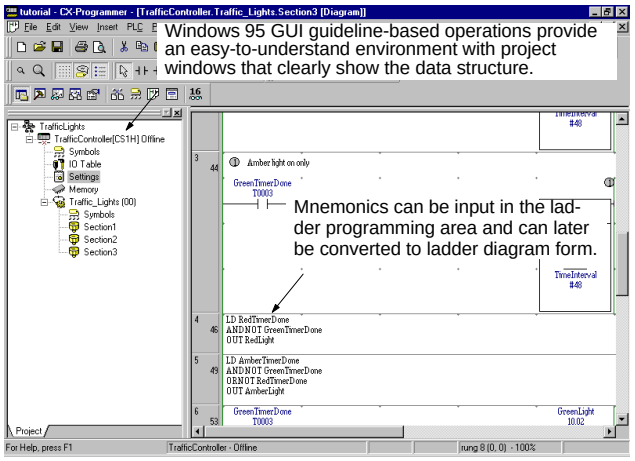
■ Output I/O Allocations to or Input I/O Allocations from Spreadsheets

I/O allocations tables, including symbols, address, and I/O comments,can be input into a standard spreadsheets, such as MS-Excel, and then used with the CX-Programmer. CX-Programmer I/O allocations tables can also be output in tab-delineated form for pasting into spreadsheets.



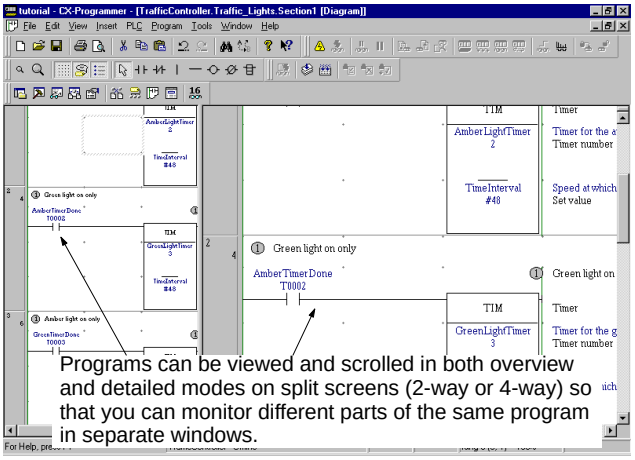
■ Check Mnemonics on Ladder Programming Screens

Mnemonics can be displayed and input in the ladder programming areas and can later be converted to ladder diagram form.



■ Efficient Programming and Monitoring Using Split Screens

A ladder programming screen can be split into a 2-way or 4-way screen. This allows monitoring of different parts of the same program in separate areas of the screen.

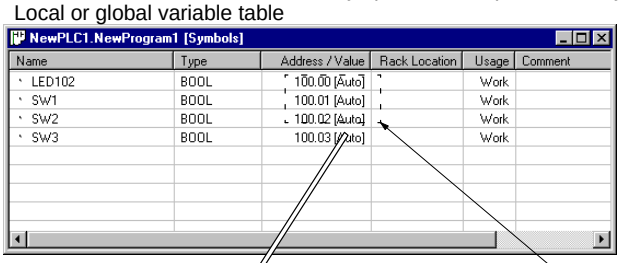


CX-Programmer

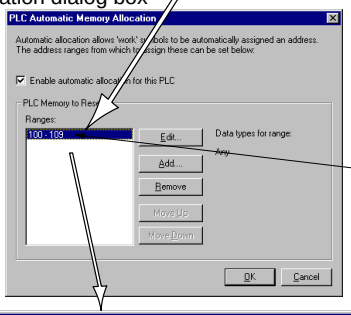
■ Automatic Address Allocations for Increased Efficiency

Addresses can be automatically allocated to bits whose addresses do not require any special consideration, such as temporary bits. This feature enables greater design efficiency. With version 2.00, it is possible to specify ranges for automatic address allocation that contain words from different areas. Also, certain areas can be automatically specified for specific data types (e.g., input bit = Boolean).

Local or global variable table

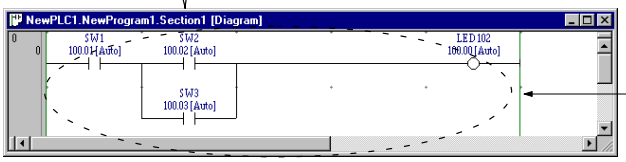


Automatic address allocation dialog box



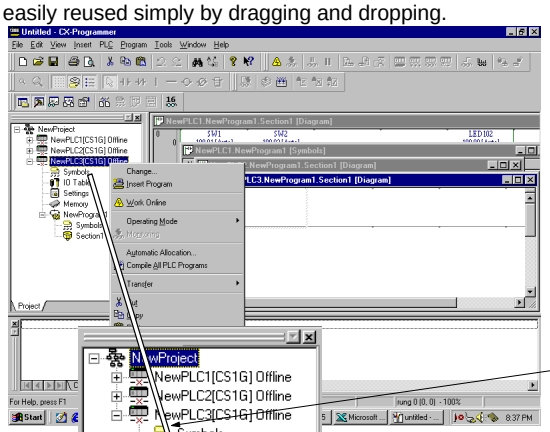
1. Input symbols into the variable table, omitting specific addresses.

2. Specify allocation word ranges in the automatic address allocation dialog box.

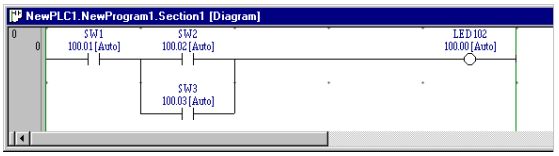


3. Addresses will be automatically allocated to local or global variables.

Programs can be easily reused simply by dragging and dropping.



Copy and paste programs to easily reuse them using menu commands or drag and drop.



If addresses have been automatically allocated when programs are copied, the automatic allocations will still be effective, allowing similar program sections to be easily created.

■ Jump Operations, such as Jumping to Rung Comments

Jump to the Specified Rung Comment

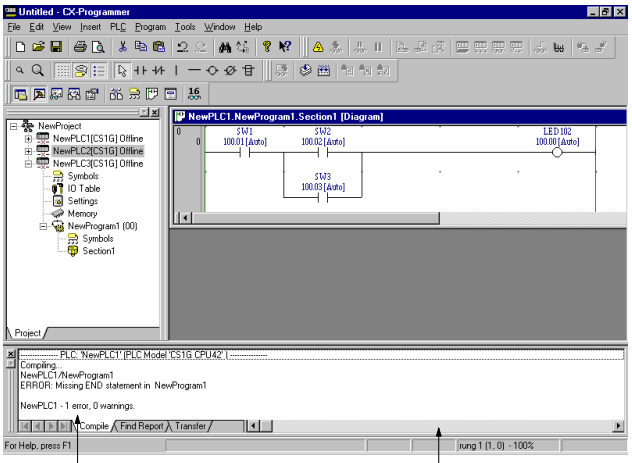
Understand the overall structure of the program from the rung comment list and then jump to the required comment.

Jump between Input and Output with the Same Address

Easily finds the output instruction with the same operand as an input condition, or vice versa.

Jump to Error Locations

When checking the results of program checks, you can jump to the error location directly.



2. Jump automatically to the error location.

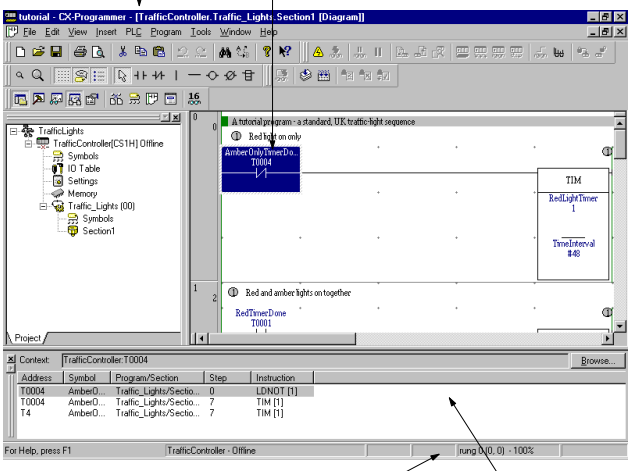
1. Double-click on the program check results.

Jump to Addresses Used as Operands

Either move the cursor to an input condition or output instruction, or input the address, to generate a cross-reference list of other instructions using the same address as an operand. You can then jump to any of the instructions or sort the instructions.

2. Select the menu command for the cross-reference pop-up.

1. Move the cursor to the operand.

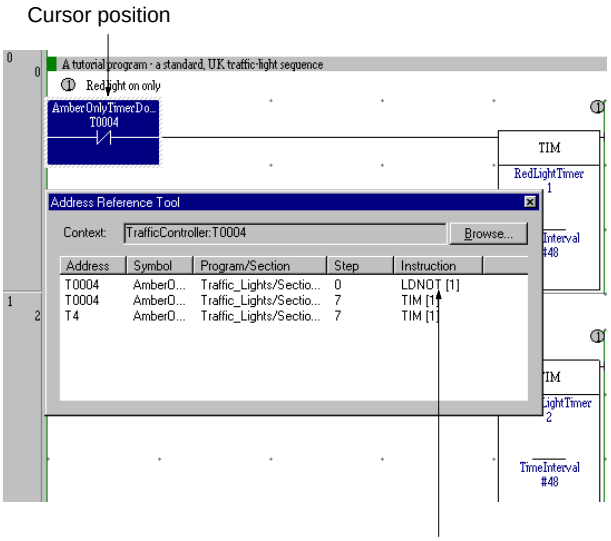


4. Jump to any instruction just by double-clicking it in the list.

3. The cross-reference pop-up will show the instructions using the same address as an operand along with the program addresses.

■ Multi-Window Display of Cross-references

You can continuously display cross-references for the address at the cursor or a specified address.



Cross-reference information for address at cursor (here, 0.01) is automatically displayed (program address and instruction).

■ One-key Instruction Inputs for Better Input Efficiency

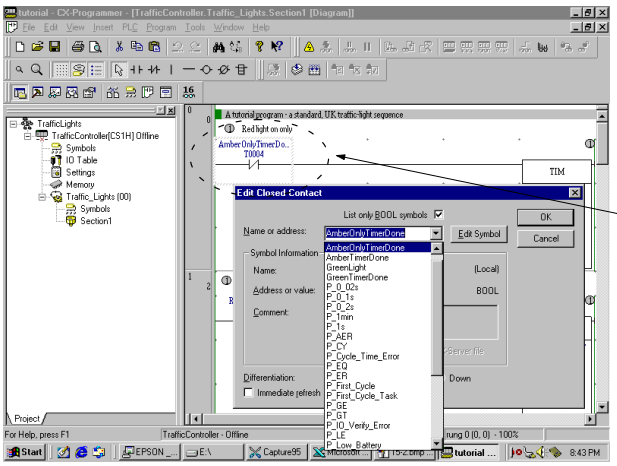
Input conditions and basic output instruction can be input with a single key stroke.

= LD ➡ "C" Key

= OUT ➡ "O" Key

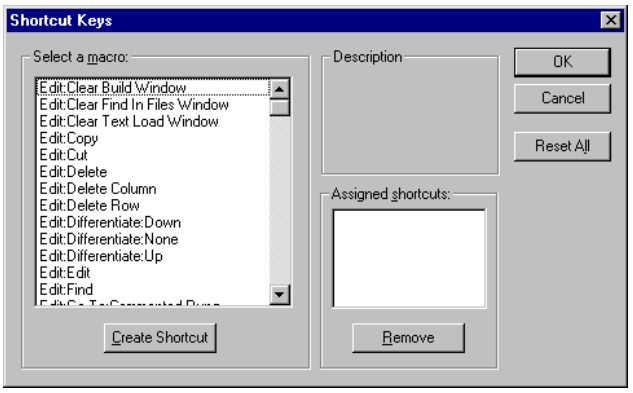
= LD NOT ➡ "/" Key

= OUT NOT ➡ "Q" Key



■ Customize with Shortcut Keys

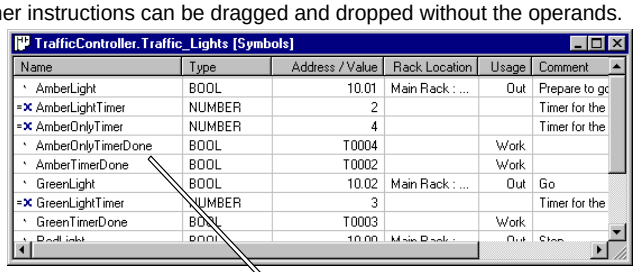
Shortcut keys can be defined or changed by the user for CX-Programmer functions. You can thus customize the interface to use the key operations you are accustom to.



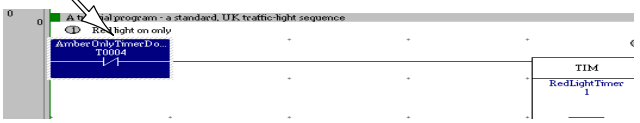
■ Input Instructions and Operand by Dragging and Pasting from Variable Tables

You can drag and drop data from global or local variable tables into the ladder programming window.

- NO input conditions can be dragged and dropped along with the operands.
- Other instructions can be dragged and dropped without the operands.



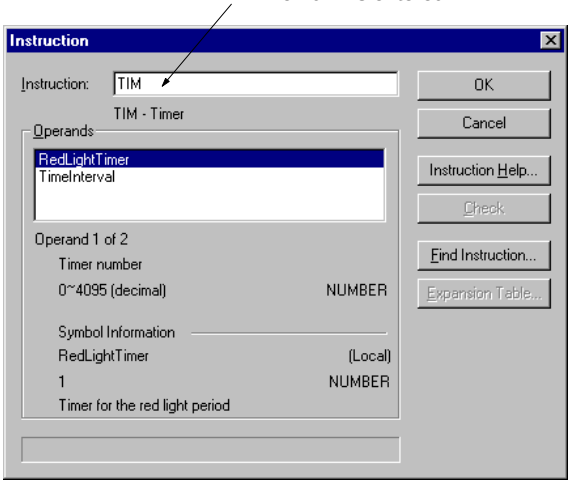
Drag and drop instructions. With NO input conditions, you can drag and drop both the instruction and the operand.



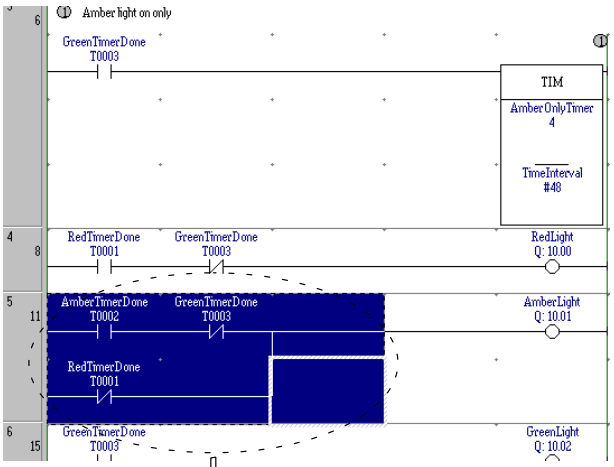
■ Input Special Instructions Directly with Function Codes

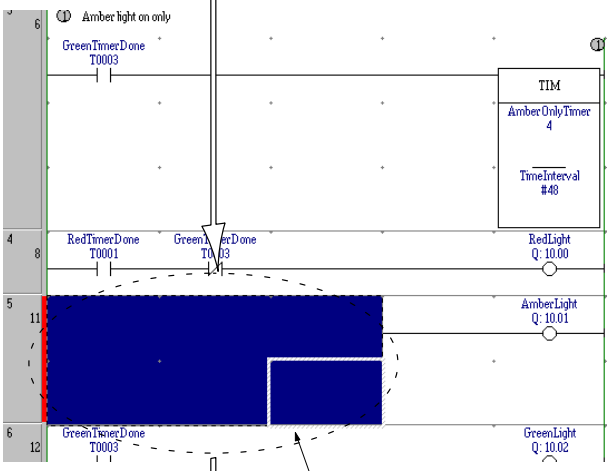
You can now input special instructions simply by inputting their function codes.

MOV displayed automatically when 021 is entered.

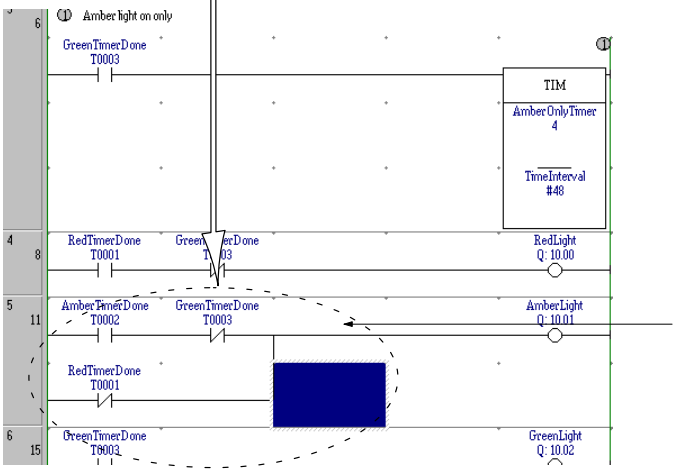


■ Undo Programming Actions

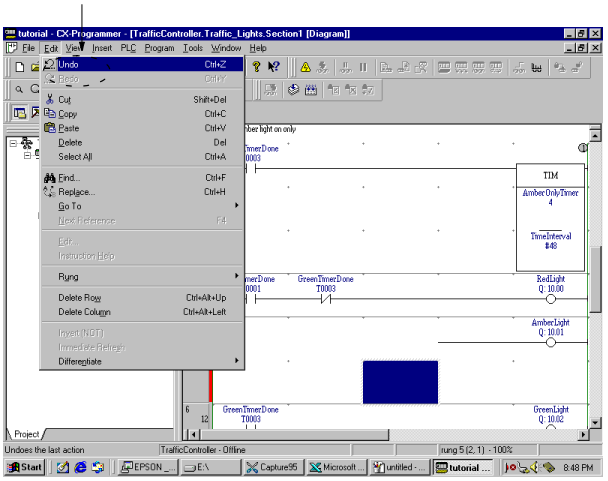




1. If you delete programming by mistake....



2. Just select the Undo command.

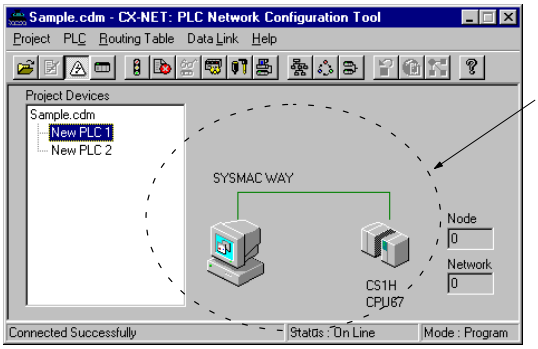


3. The deleted instruction will be restored.

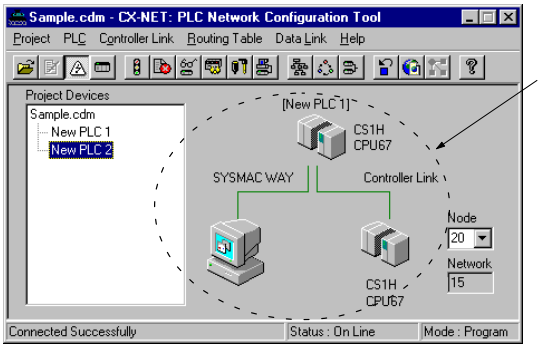
■ Easy Online Connections

Connect to a PLC on a Network Simply by Inputting Its Name

You can connect to any PLC on a network simply by inputting the PLC name of the target and gateway PLC to access or monitor not only the local, but also remote PLCs.



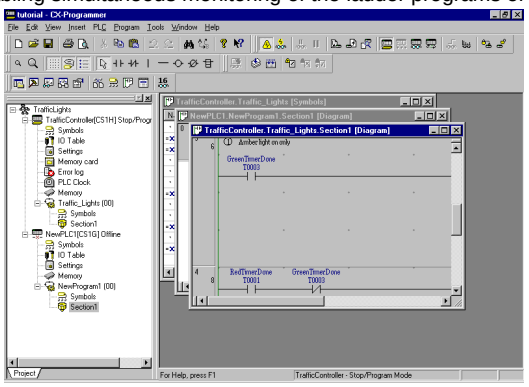
Easily connect to local PLCs...

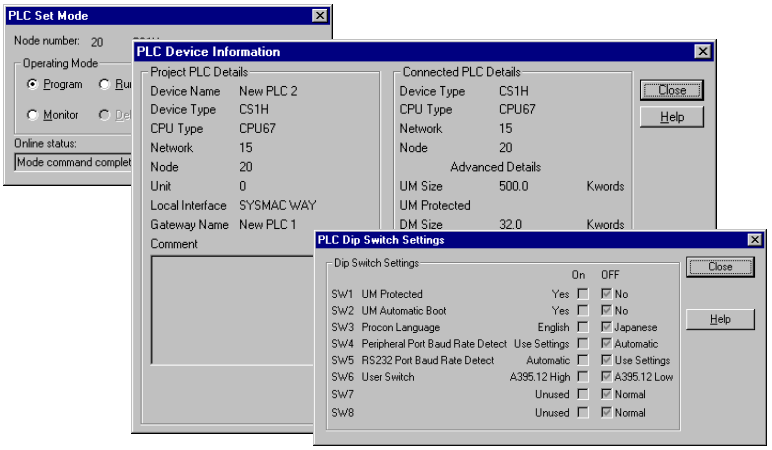


Or connect just as easily to PLCs on complex networks using PLC names.

Access Information from or Control Remote PLCs

You can access the DIP switch settings, operating modes, or other information from PLCs on remote networks. You can also go online with more than one PLC at the same time, enabling simultaneous monitoring of the ladder programs or I/O memory data for more than one PLC.





CX-Programmer

■ Better Monitoring with Easier Debugging

Discriminate between Field Inputs and Outputs

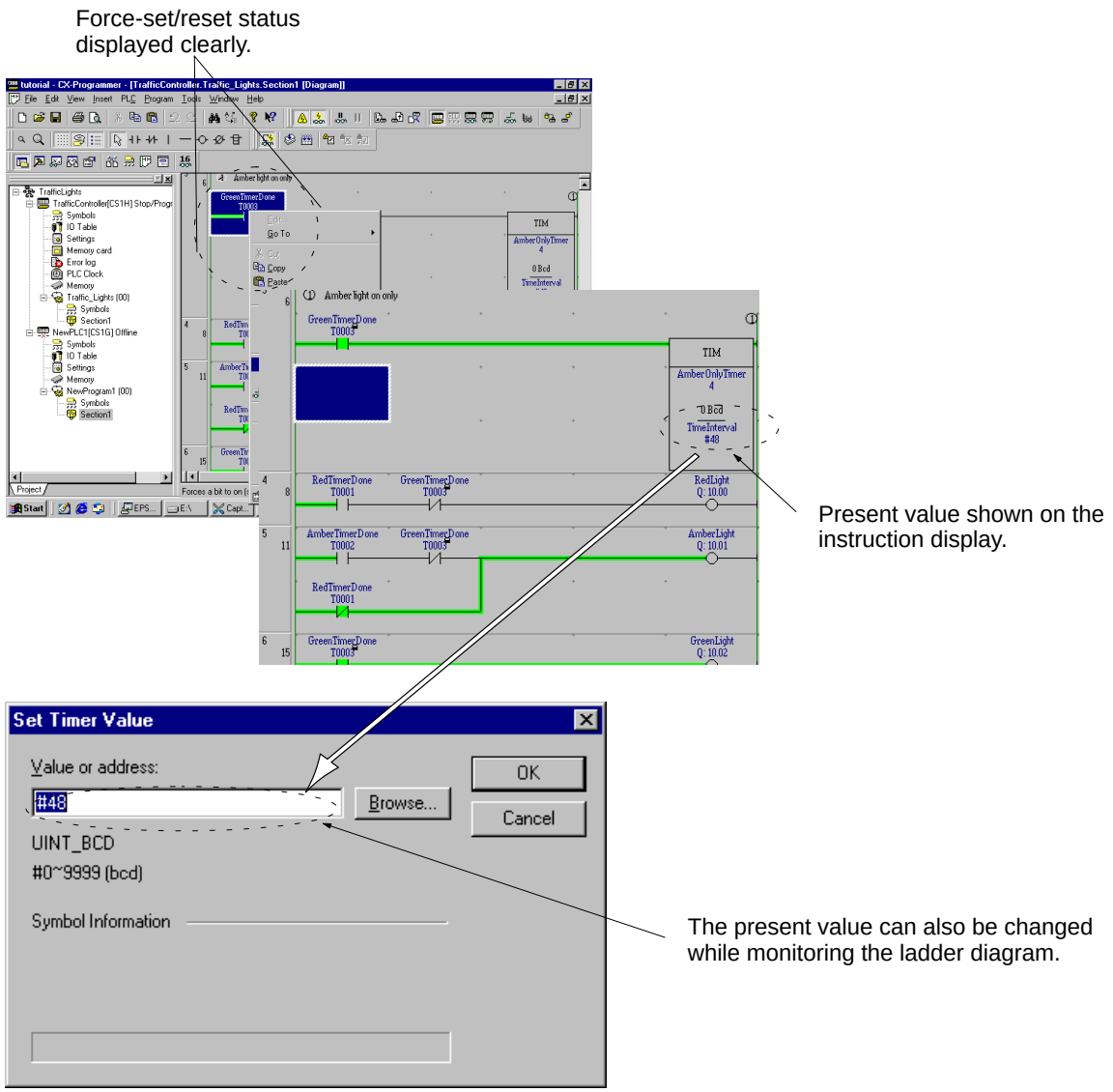
Field inputs are automatically displayed with an “I,” field outputs with an “Q,” to differentiate them.

Visual Confirmation of Force-set/reset Status

Bits that are force-set or force-reset are displayed for easy recognition.

Monitor or Change Present Values from Instructions

When monitoring a ladder diagram, the present values of operands can be monitored or changed right on the display.

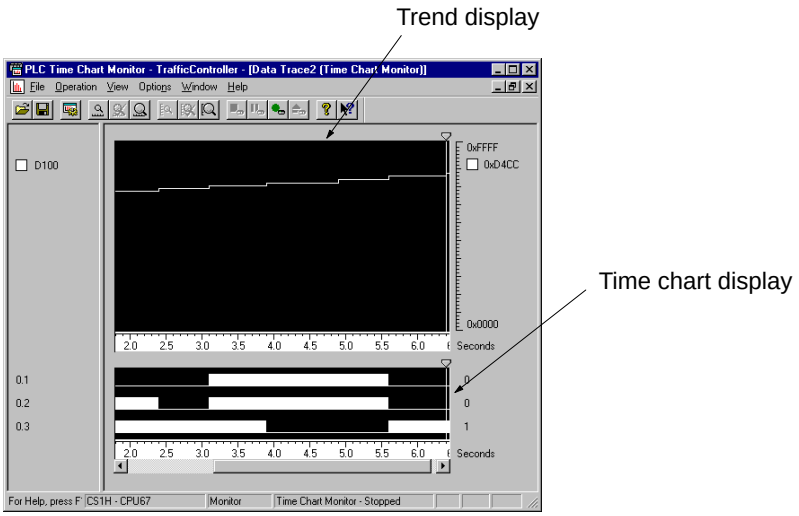


Stop Monitoring

The display can be frozen when instructed by the user either unconditionally or when a condition is met (bit turning ON/OFF, specified value of a word, etc.). This enables the execution conditions of the program and I/O memory at the time the program was stopped to be easily confirmed.

Graphic Displays for Data Tracing and Time Chart Monitoring

Trend or time chart graphic displays are now possible for trace memory data stored at high-speed in the CPU Unit during a data trace or form sample data stored with the CX-Programmer for time chart traces. Traces can be displayed for more than one PLC at the same time to enable confirming data links and timing between PLCs.



CX-Simulator

Use the CX-Simulator to Perform Online Debugging of Virtual PLCs

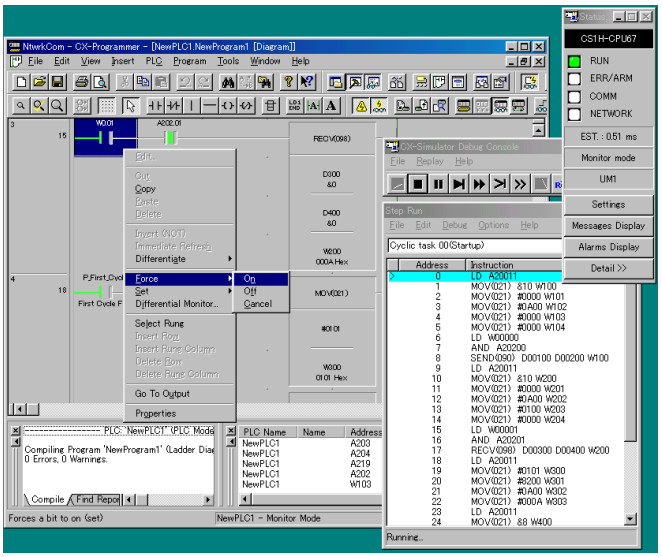
■ CX-Simulator Features

Run Online with the CX-Programmer

The many CX-Programmer online functions can be used in simulations.

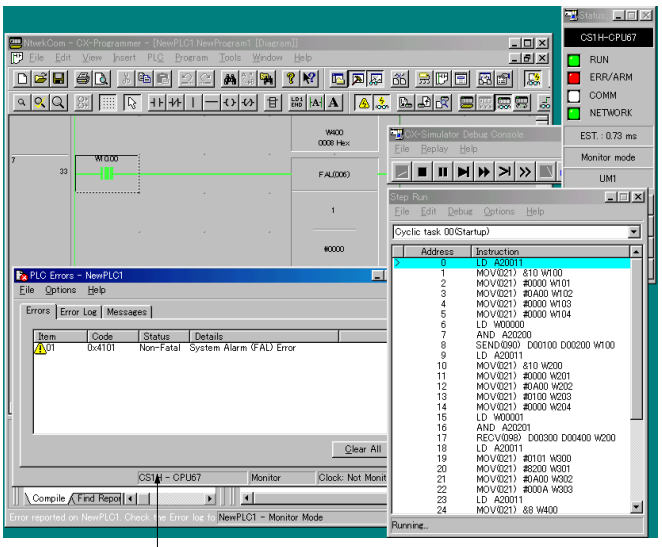
1. Force ON/OFF

Bits can be set or reset from the CX-Programmer's ladder program or monitoring windows, just like when working with the physical PLC.



2. Displaying Error Information

Error messages for FAL and MSG instruction run in the ladder program simulator can be monitored and cleared on the CX-Programmer PLC error window.



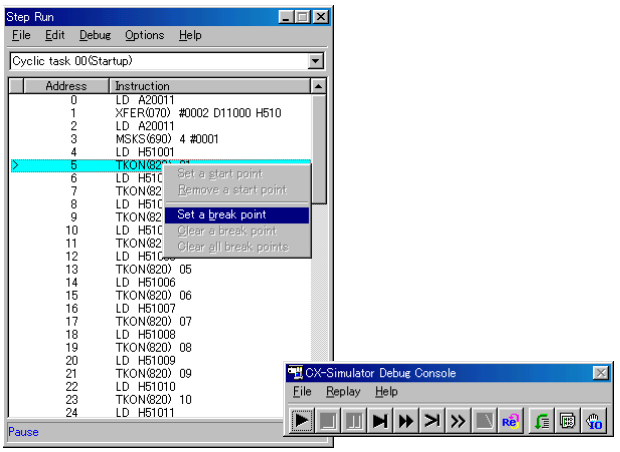
PLC errors can be monitored and cleared.

Debugging

Instruction breaks to stop program execution at a specified program address, IOM breaks to stop program execution based on specified conditions in I/O memory, start point specifications to start execution in the middle of the program, rescanning function to repeat a scan from the beginning, and many other debugging functions simplify the job of correcting programs.

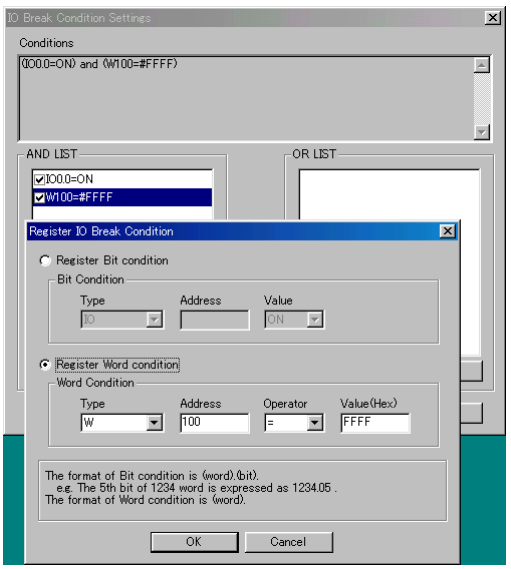
1. Instruction Breaks

A break point can be set for any instruction on the step execution window to enable checking memory contents at any desired point in program execution.



2. IOM Breaks

Program execution can be stopped when the contents of specified memory locations match specified conditions to enable checking memory contents during program execution.

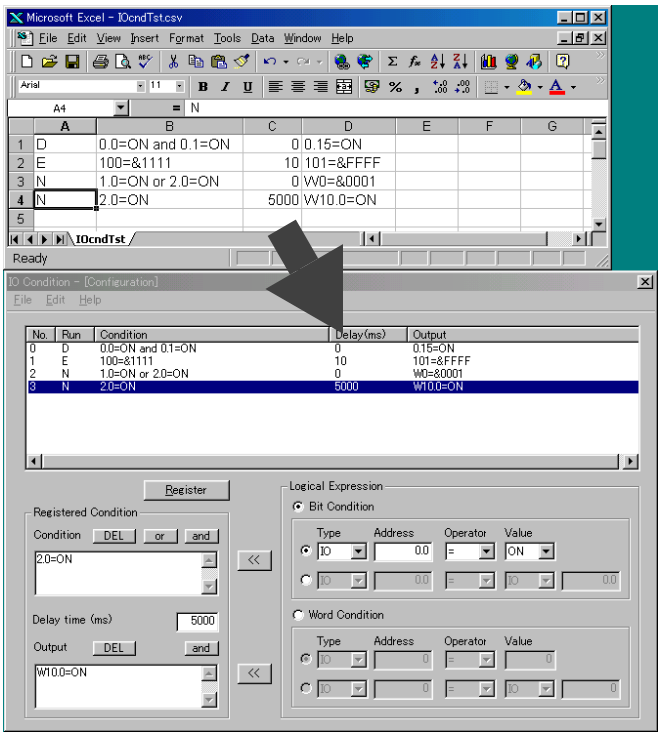


Virtual External Input from Data Files

Excel and other spreadsheets can be used to create virtual external inputs for use with CX-Simulator as data files.

1. I/O Condition Tool

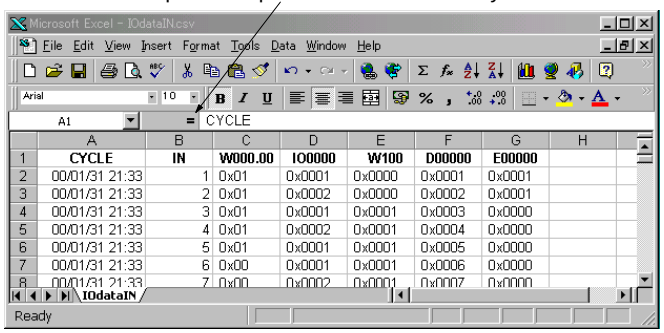
The I/O Condition Tool can be used to create simulator inputs based on CSV files created with spreadsheets containing I/O conditions, output data for specified conditions, and output delay times.



2. Data Reproduction Tool

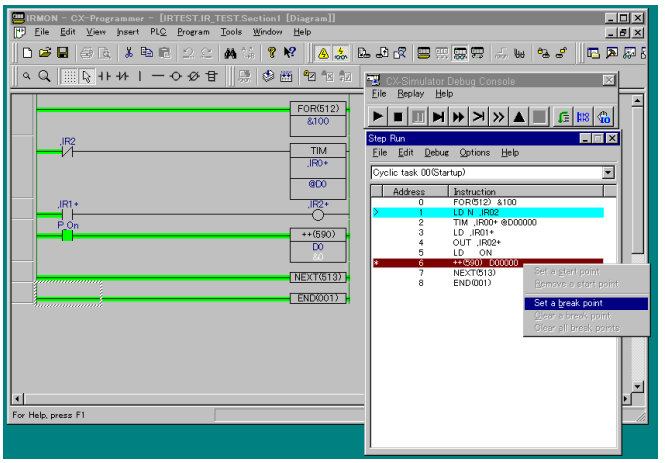
CSV files created with spreadsheets containing bit and word data for each cycle can be reproduced with the Data Reproduction Tool and then used as inputs for the simulator. The resulting output data can also be saved as CSV files.

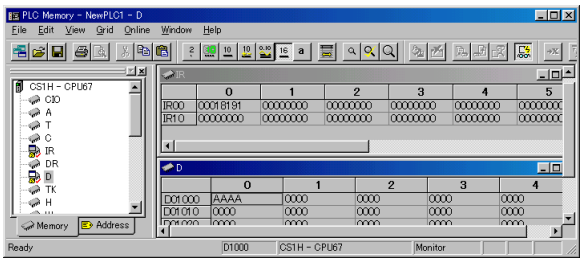
Input data specified for the desired cycles



Monitor Data Changes for Registers and FOR/NEXT for each Task

When program execution is stopped during step execution, the simulator enables monitoring changes in IR and DR registers, as well as data in FOR/NEXT loops, for each task. This type of monitoring is possible only with the simulator and is not possible with the physical PLC.





Communications Middleware

■ Compolet™– ActiveX Control for PLC Communications

Development Work for PLC Communications Simpler and Faster with ActiveX Control

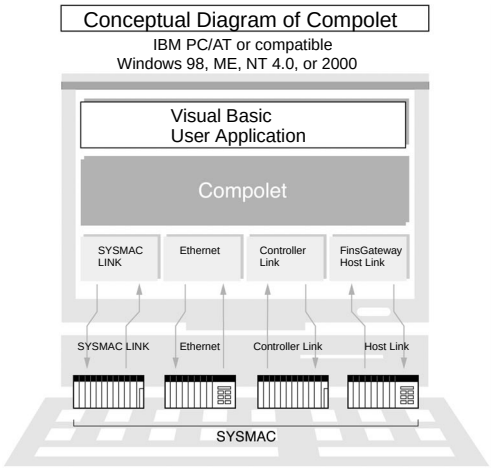
Main Features

Significant Reduction in Development Time

Compolet significantly reduces the time and effort required for difficult, time-consuming communications programming. Using ActiveX control for direct operation of Programmable Controllers (e.g., SYSMAC), eliminates the need for knowledge of PLC communications commands (FINS commands). The application uses an easy-to-read format, allowing simple reading of 100 words of DM Area data. This enables users to concentrate on creating application logics and to configure efficient applications.

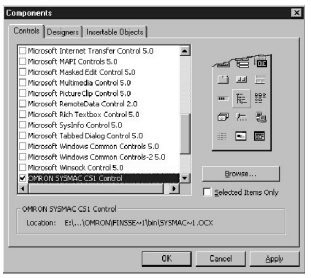
FinsGateway

More than two field networks can be unified into one platform. Users can create various applications without being concerned about types of networks. With the FinsGateway, new networks can be easily added.



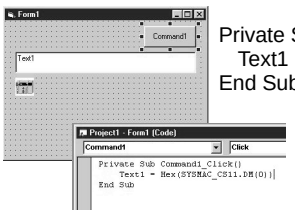
Application

Start Visual Basic and select **Components**.
Select **OMRON SYSMAC CS1 Control.**



On the Form Window, double-click **Command1**, and a window describing codes will be displayed.

Enter the following text in the **Click** column next to the **Command1** column.




```
Private Sub Command1_Click
   Text1 = Hex (SYSMAC_CS11.DM(0))
End Sub
```

Complete

Main Functions

Interface	Function	Description
Property	Communications with SYSMAC PLCs	Specifying the SYSMAC to communicate with, and reading network information
	Reading/writing variables and I/O Area memory data	Reading and writing to memory areas such as DM and CIO words E.g. DM word 100: DM (100)
	Operating state	Reading or changing the operation mode
	Area information	Reading the size of the program area or the number of DM words
	Error information	Reading the value of an error as a message.
	Other SYSMAC information	Reading the format, changing or reading the time
Method	Reading/writing variables and I/O Area memory data	Reading and writing of memory area data such as consecutive DM or I/O words
	I/O table creation	Creating an I/O table for the current configuration
	Forced set/reset/cancel of input bits (contacts)	Forced set/reset/cancel of individual input bits (contacts)
	Execution of FINS services	Sending FINS commands, and acquisition of FINS responses received

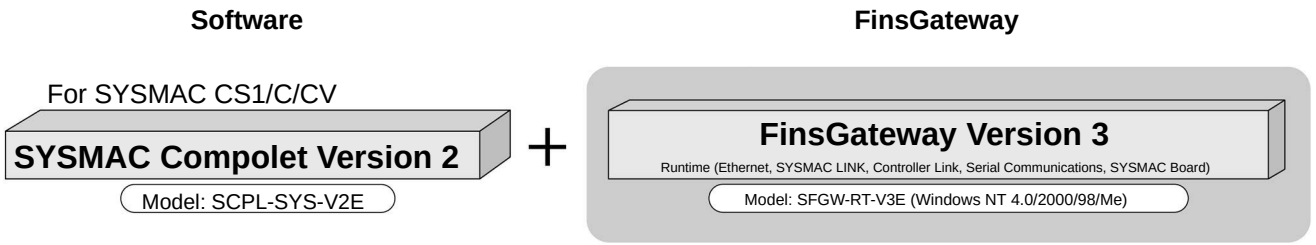
Operating Environment/Specifications

Computer	IBM PC/AT or compatible An environment where the OS can run properly 10MB of free disk space for installation
CPU (memory)	Intel Celeron 400 MHz min. or better recommended (Memory: 32 MB min.)
OS	Windows 98, ME, NT 4.0 SP3 or later, or 2000
Required development software	Microsoft Visual Basic 5.0/6.0
Compatible networks	SYSMAC LINK Controller Link Ethernet Serial communications (RS-232C) SYSMAC Board

Note: A suitable board for each network is required.

Models

Choose one from the following products according to specification requirements.



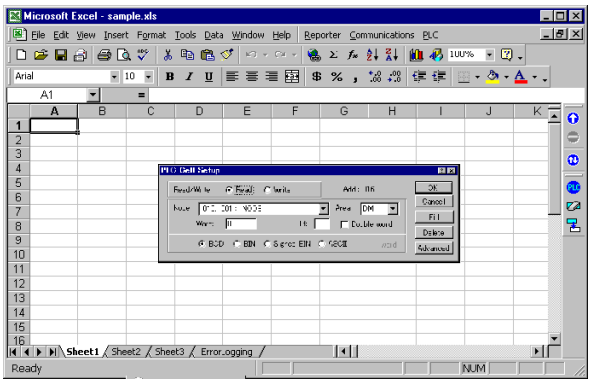
■ PLC Reporter 32 – Simple Data Collection Software

Write PLC data to Excel without programming.

Main Features

Easy Operation

Time-consuming computer programming is completely unnecessary. After installation, PLC data can soon be collected at the computer simply using screen settings. No specialist knowledge is required.

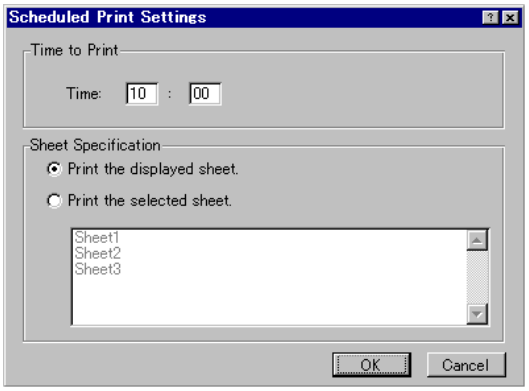


Large Reductions in Construction Costs

Basically, the system can be constructed with just a computer, PLC Reporter, Excel and a Host Link cable. This means that construction time and cost can be greatly reduced.

Automatic Saving/Printing Function

By setting the times at which data is to be saved or printed, or communications started, PLC Reporter will automatically perform all the required tasks. Also, simultaneous time and condition specification is now possible. The maximum number of items that can be set for either specification has been increased to 32. With automatic printing, it is possible to specify different printout sheets for each setting.



Modem Module

A modem module that has the functionality required for modem connections is available as a standard product. By using PLC Reporter in combination with the modem module, data can be obtained from a remote PLC.

Log Function

An easy-to-use log function that helps in the creation of daily reports is available. There are 3 log modes: Fixed time-intervals; when a specified bit turns ON; and one-shot logging to log data only once a day. The logging function can be selected to suit the application, and specified contents of PLC memory can be written to the Excel cells automatically.

Consecutive Reading and Writing for Cells

Data in consecutive areas in PLC memory can be read/written to consecutive cells in the spreadsheet. It is also possible to set cells in the same column simultaneously, and using the batch-setting function that has been added, communications cells can be specified out of a selected range.

Multi-network Version Available

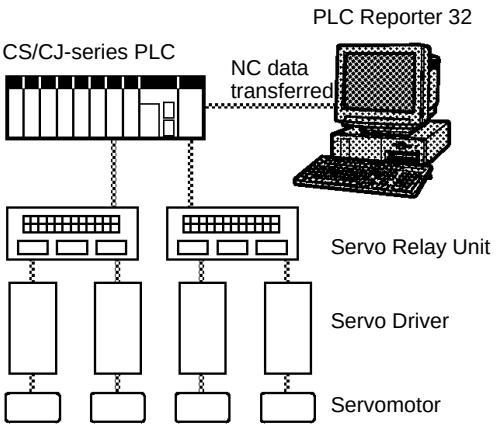
All types of FA network can be handled with this software package. In addition to Host Link communications, a multi-network version that is compatible with SYSMAC LINK, Controller Link, and Ethernet Networks is available.

System Configuration Examples

Changing Production Data in One Operation

Changing Position Data for an NC Unit

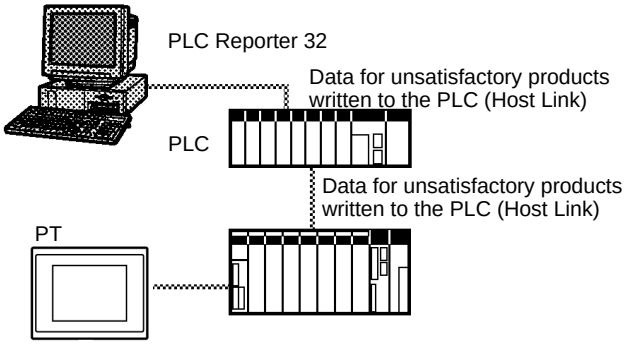
First create the files containing NC Unit data for the different applications. Then, when changing applications, use the PLC Reporter to read the file for the next application from computer memory, and then send it in one operation to the PLC's memory. This functionality means that applications can be switched quickly.



Collection of Data for Quality Checks

Data for Unacceptable Products Displayed in Words

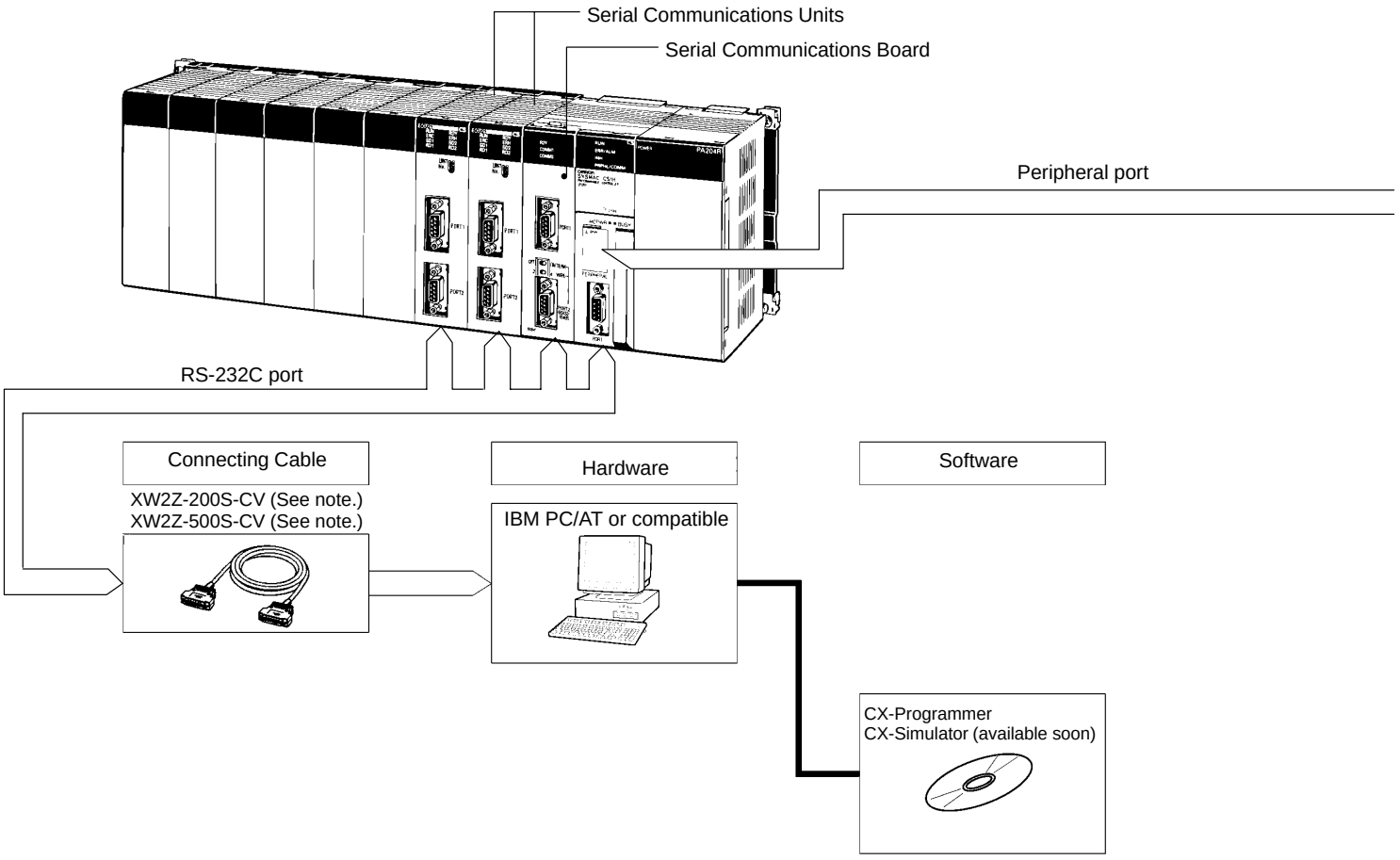
Data for unsatisfactory products sent to the PLC can be collected with the PLC Reporter. Excel's user definitions can be used to define the meanings of codes and thus display messages instead of actual data.



Models/Specifications

Product name	PLC Reporter 32 Host Link Version	PLC Reporter 32 Multi-network Version
Model	SDKY-95HLK-E97	SDKY-95MLT-E97
Compatible networks	Host Link	Host Link, Controller Link, SYSMAC LINK, Ethernet
Connectable PLCs	CS1 Series, C Series, CV Series, SYSMAC Board	
OS	Microsoft Windows98/ME/2000	
Compatible Excel version	Microsoft Excel97/2000	
Computer	IBM PC/AT or compatible	
Recommended specifications	CPU: Pentium 200 MHz min. Memory: 64 MB min. Free disk space: 20 MB min. CD-ROM drive required for installation	

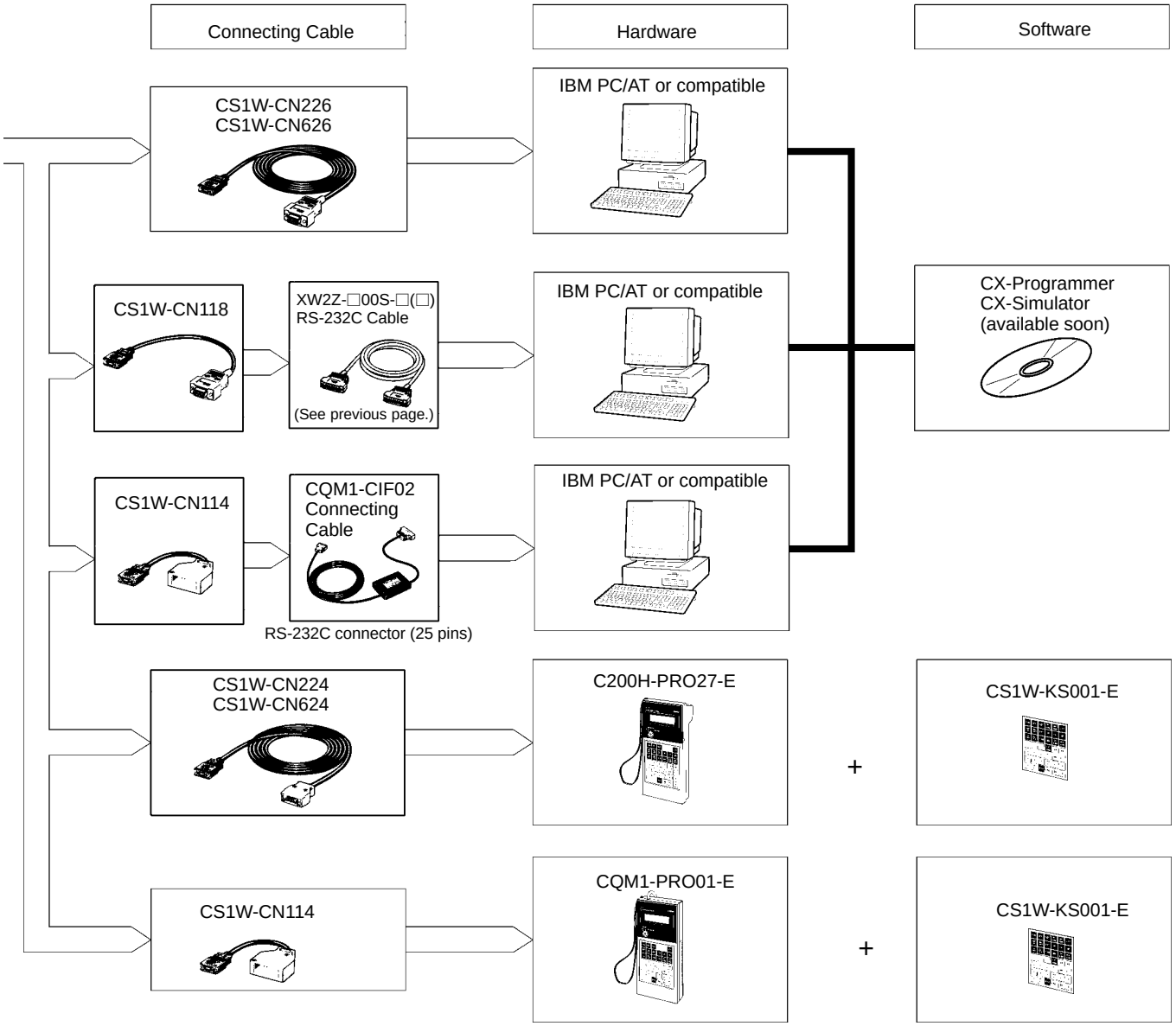
Programming Devices



Note: 1. Refer to the next page for details of cables for connecting to computers. Choose the appropriate cable for the communications mode.

2. The following cables can be used for a Host Link connection (but not a peripheral bus connection):
XW2Z-200S-V
XW2Z-500S-V

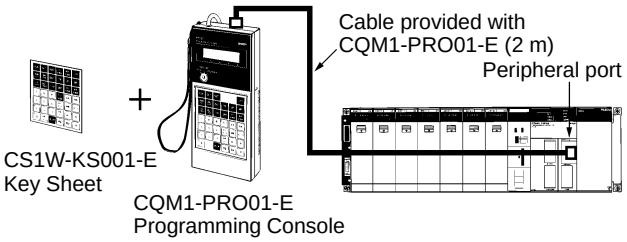
Programming Devices



Programming Devices

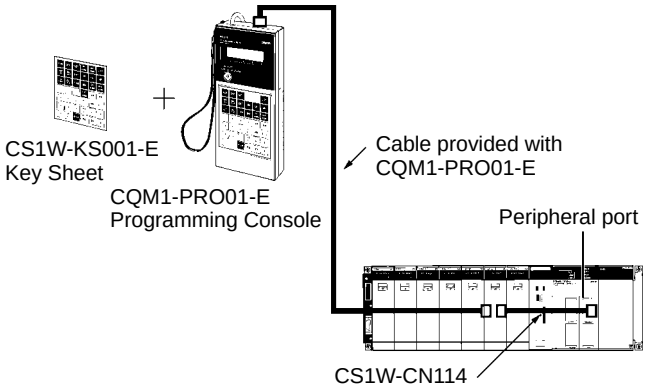
Programming Consoles

CQM1H-PRO01-E



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

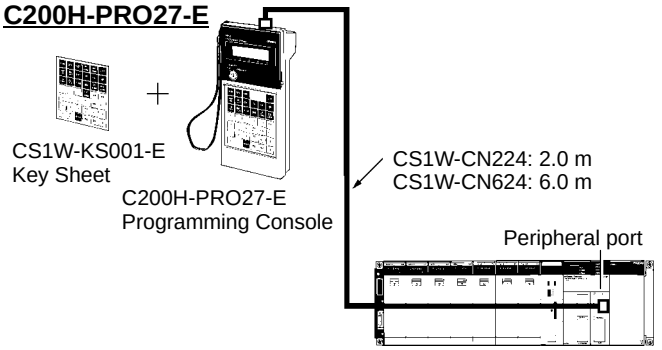
CQM1-PRO01-E (See note.)



Note: The above configuration is also possible for the C200H-PRO27-E with a Programming Console Cable, such as the C200H-CN222.

Model	Cable	Cable length
CQM1-PRO01-E	CS1W-CN114	0.05 m

C200H-PRO27-E

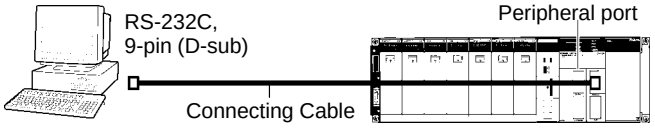


Model	Cable	Cable length
C200H-PR027-E	CS1W-CN224	2.0 m
	CS1W-CN624	6.0 m

Windows-based Programming Software: CX-Programmer

Name	Model		Specifications
CX-Programmer	WS02-CXPC1-EV2.1	For 1 license	OS: Windows 95/98 or Windows NT/Me/2000
	WS02-CXPC1-EL03-V2.1	For 3 licenses	
	WS02-CXPC1-EL10-V2.1	For 10 licenses	

Connecting to the Peripheral Port



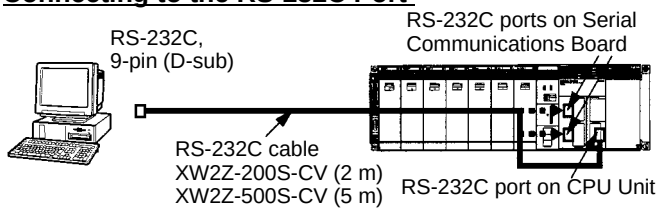
Peripheral Port Connecting Cables

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

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

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

Connecting to the RS-232C Port



RS-232C Port Connecting Cables

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

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

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

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

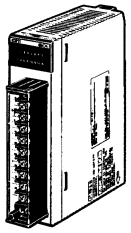
The following serial communications modes can be used to connect a computer with the CX-Programmer to a CS1 PLC.

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

Unit Index

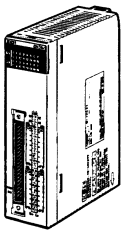
Unit Descriptions

I/O Units



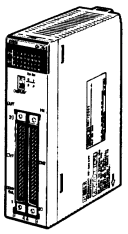
Input Unit
CS1W-ID211
16 points

Output Units
CS1W-OD21□
16 points



Input Unit
CS1W-ID231
32 points

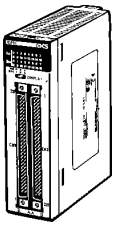
Output Units
CS1W-OD23□
32 points



Input Unit
CS1W-ID261
64 points

Output Units
CS1W-OD26□
64 points

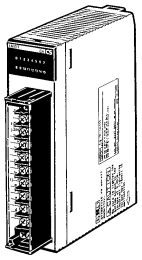
I/O Units
CS1W-MD26□
32/32 points



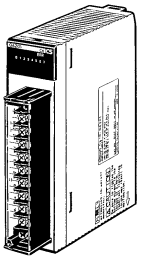
Input Unit
CS1W-ID291
96 points

Output Units
CS1W-OD29□
96 points

I/O Units
CS1W-MD29□
48/48 points

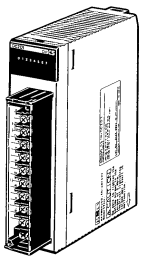


AC Input Units
CS1W-IA□11
16 points



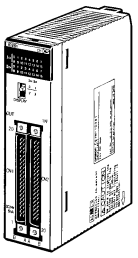
Triac Output Unit
CS1W-OA201
8 points

Triac Output Unit
CS1W-OA211
16 points



Relay Output Unit
CS1W-OC201
8 independent points

Relay Output Unit
CS1W-OC211
16 points



TTL I/O Unit
CS1W-MD561
32/32 points
(Available soon)

■ DC Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
C200H Basic I/O Unit	12 to 24 VDC	8 pts	Removable terminal block	C200H-ID211	---
C200H Group-2 I/O Units	12 VDC	64 pts	Connector	C200H-ID111	---
CS1 Basic I/O Unit	24 VDC	16 pts	Removable terminal block	CS1W-ID211	Input current: 7 mA
	24 VDC	32 pts	Connector	CS1W-ID231	Input current: 6 mA
	24 VDC	64 pts		CS1W-ID261	Input current: 6 mA
	24 VDC	96 pts		CS1W-ID291	Input current: approx. 5 mA

Note: The previous Units always work with the CS1: C200H/ID212/215/216/217/218/219.

■ TTL Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
C200H Special I/O Unit	5 VDC	32 pts	Connector	C200H-ID501	High-speed inputs

Unit Descriptions

■ AC Input Units (and 100 VDC)

Classification	Input voltage	Inputs	Connections	Model
C200H Basic I/O Units	100 to 120 VAC	8 pts	Removable terminal block	C200H-IA121
	200 to 240 VAC	8 pts		C200H-IA221
CS1 Basic I/O Units	100 to 120 VAC, or 100 to 120 VDC	16 pts		CS1W-IA111
	200 to 240 VAC	16 pts		CS1W-IA211

Note: C200H-IA122/122V/222/222V Units can also be used with CS1 PLCs.

■ AC/DC Input Units

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

■ Relay Output Units

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

Note: C200H-OC224/224N/225/226N Units can also be used with CS1 PLCs.

■ Transistor Output Units

Classification	Outputs	Max. switching capacity	Connections	Model	Remarks
CS1 Basic I/O Units	16 pts	12 to 24 VDC, 0.5 A/pt, 8 A/Unit sinking	Removable terminal block	CS1W-OD211	---
		24 VDC, 0.5 A/pt, 5 A/Unit, sourcing, load short protection, alarm		CS1W-OD212	---
	32 pts	12 to 24 VDC, 0.5 A/pt, 5 A/Unit, sinking	Connector	CS1W-OD231	---
		24 VDC, 0.5 A/pt, 5 A/Unit, sourcing, load short protection, alarm		CS1W-OD232	---
	64 pts	12 to 24 VDC, 0.3 A/pt, 6.4 A/Unit, sinking		CS1W-OD261	---
		24 VDC, 0.3 A/pt, 6.4 A/Unit, sourcing, load short protection, alarm		CS1W-OD262	---
	96 pts	12 to 24 VDC, 0.1 A sinking, 7.2 A/Unit		CS1W-OD291	---
		12 to 24 VDC, 0.1 A sourcing, 7.2 A/Unit		CS1W-OD292	---
C200H Basic I/O Units	8 pts	12 to 48 VDC, 1 A sinking	Removable terminal block	C200H-OD411	---
	8 pts	24 VDC, 2.1 A, sinking		C200H-OD213	---
	8 pts	24 VDC, 0.8 A, sourcing, load short protection		C200H-OD214	---
	8 pts	5 to 24 VDC, 0.3 A, sourcing		C200H-OD216	---
	12 pts	24 VDC, 0.3 A, sinking		C200H-OD211	---
	12 pts	5 to 24 VDC, 0.3 A, sourcing		C200H-OD217	---
	16 pts	24 VDC, 1.0 A, sourcing, load short protection		C200H-OD21A	---
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	---
	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		C200H-OD215	128-pt dynamic outputs possible

Note: C200H-OD212/21B Units can also be used with CS1 PLCs.

■ TTL Output Unit

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

■ Triac Output Units

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

Note: The C200H-OA223 Unit can also be used with CS1 PLCs.

■ I/O Units

Name	Classification	Inputs/ Outputs	Input voltage	Max. switching capacity	Connections	Model	Remarks
DC Input/ Transistor Output Units	CS1 Basic I/O Units	32 inputs/ 32 outputs	24 VDC	12 to 24 VDC, 0.3 A, sinking	Connector	CS1W-MD261	---
		32 inputs/ 32 outputs		24 VDC, 0.3 A, sourcing, load short protection, alarm		CS1W-MD262	---
		48 inputs/ 48 outputs	24 VDC	12 to 24 VDC, 0.1 A, sinking		CS1W-MD291	---
		48 inputs/ 48 outputs		12 to 24 VDC, 0.1 A, sourcing		CS1W-MD292	---
	C200H Special I/O Units	16 inputs/ 16 outputs	24 VDC	16 mA at 4.5 V to 100 mA at 26.4 VDC, sinking		C200H-MD215	High-speed inputs, 128-pt dynamic outputs possible
		16 inputs/ 16 outputs	12 VDC	24 VDC, 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.
- High-speed Inputs (except OD501/OD215): Eight of the inputs can be set as high-speed inputs to accurately input short pulses from devices like photomicroswitches.

■ TTL I/O Unit

Name	Classification	Inputs/ Outputs	Input voltage	Max. switching capacity	Connections	Model	Remarks
TTL I/O Unit	C200H Special I/O Units	16 inputs/ 16 outputs	5 VDC	5 VDC, 35 mA	Connector	C200H-MD501	High-speed inputs, 128-pt dynamic outputs possible

■ High-speed Input

Name	Classification	Inputs	Max. switching capacity	Model
High-speed Input Unit	CS1 Basic I/O Units	16 pts	24 VDC, 7 mA	CS1W-IDP01

■ Replacing C200H I/O Units with CS1 I/O Units

It is recommended that CS1 I/O Units are used with SYSMAC CS1 PLCs. Using CS1 I/O Units ensures a higher level of performance (e.g., faster cycle time) than with C200 I/O Units.

Benefits

- The CPU Unit cycle time is shorter, contributing to faster overall installation performance.
  0.03 ms (C200H 16-point Unit) → 0.004 ms (CS1 16-point Unit)
- Long-distance (50 m) Expansion Racks can be used, allowing easy control from remote locations.
- The input response time can be adjusted, enabling easier noise removal.
- In addition to the points listed above, overall ease of operation is greater (e.g., more common points).

Compatibility

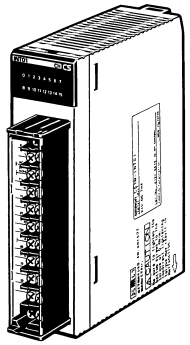
- The pin arrangements for models with connectors are the same.
- I/O current has been improved.

Note: For details, refer to Replacing C200H I/O Units on page 145. Be sure to refer to the operation manuals when designing the system.

Unit Descriptions

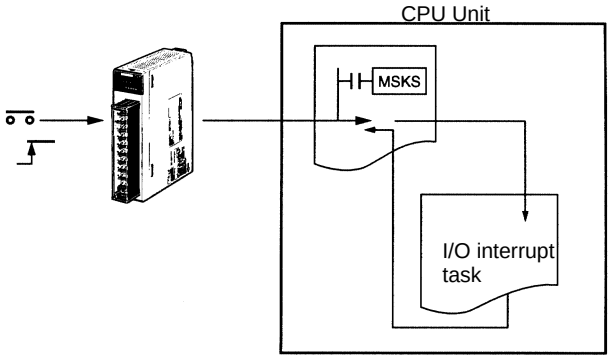
Interrupt Input Unit

High-speed Response (0.42 ms OFF to ON)
Execute an Interrupt Task within 1.0 ms after Input Turns ON



CS1W-INT01

■ System Configuration



When the input on the Interrupt Input Unit turns ON, the CPU Unit is notified immediately, cyclic task execution (normal programming) is interrupted and an I/O interrupt task is executed.

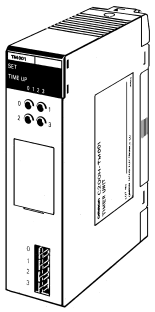
■ Specifications

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

Note: The interrupt function can be used with the CPU Backplane only. (Up to 2 Interrupt Input Units can be mounted to a CPU Rack.)

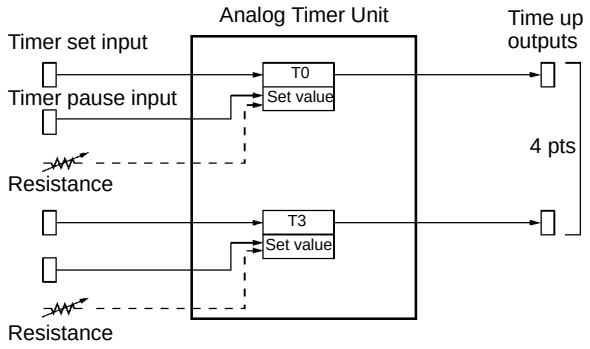
Analog Timer Unit (Interrupt Input Unit)

Easy On-site Time Adjustments



C200H-TM001

■ System Configuration



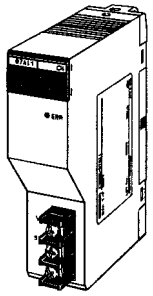
Provides four timers easily adjusted on-site via front-panel adjustments or external variable resistors: No Programming Device required. Using timer pause inputs enables applications as a accumulative timer.

■ Specifications

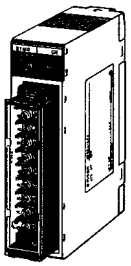
Classification	Timers	Setting range	Time setting method	CPU Unit bits	Allocations (CIO 0319 to CIO 2000)	Model
C200H Basic I/O Unit	4 pts	0.1 to 1.0 s, 1 to 10 s, 2 to 60 s, 1 to 10 min	Internal or external variable resistor	Timer set input, timer pause input, and time up ouput	16 bits	C200H-TM001

B7A Interface Units

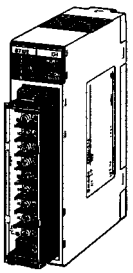
Wire-reduction Units that Transfer 16 Points of I/O Information on Two Signal Wires



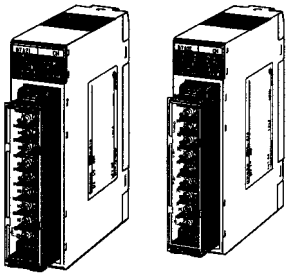
C200H-B7AI1 (16 inputs)
C200H-B7AO1 (16 outputs)



C200H-B7A02
(32 outputs)

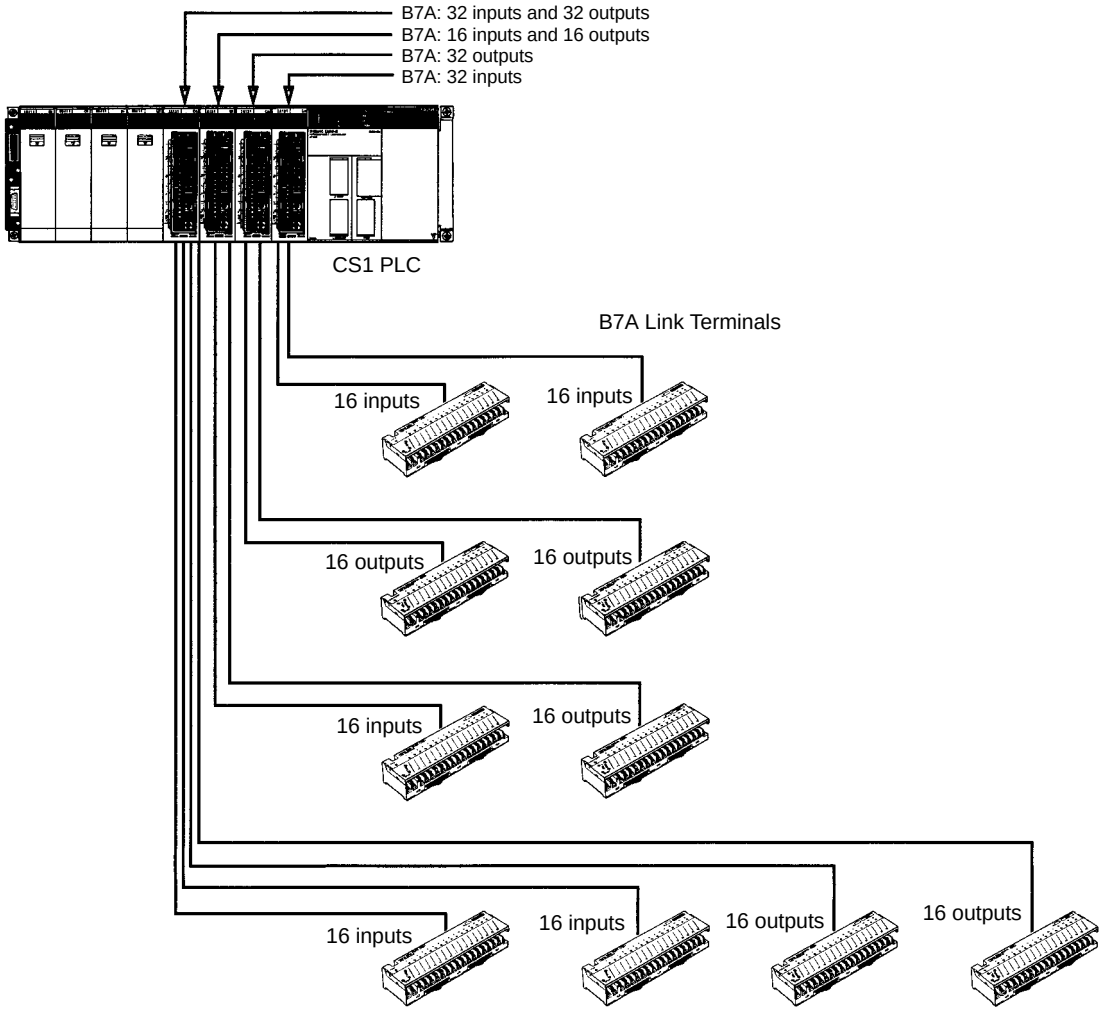


C200H-B7A12
(32 inputs)



C200H-B7A21
(16 inputs/16 outputs)
C200H-B7A22
(32 inputs/32 outputs)

■ Connection Example



Unit Descriptions

■ Specifications

Item		B7A Interface Units		B7A Group-2 Interface Units			
		C200H-B7AI1	C200H-B7AO1	C200H-B7A12	C200H-B7A02	C200H-B7A21	C200H-B7A22
I/O capacity	Inputs	16 inputs or 15 + 1 error input	---	32 inputs (See note 1.)	---	16 inputs (See note 2.)	32 inputs (See note 1.)
	Outputs	---	16 outputs	---	32 outputs	16 outputs	32 outputs
Transmission distance		500 m max. if separate power supplies are used for Unit and Link Terminals. 100 m max. if same power supply is used for Unit and Link Terminals.		Normal operation: 500 m max. if separate power supplies are used for Unit Link Terminals. 100 m max. if same power supply is used for Unit Link Terminals. High-speed operation: 100 m max. with shield connected and 10 m max. without shield connected if separate power supplies are used for Unit Link Terminals. 50 m max. with shield connected and 10 m max. without shield connected if same power supply is used for Unit and Link Terminals.			
Transmission delay		19.2 ms typical, 31 ms max.		Normal operation: 19.2 ms typical, 31 ms max. HIgh-speed operation: 3 ms typical, 5 ms max. (See note 3.)			
Internal current consumption		100 mA max. at 5 VDC					
External power supply (See note 4.)		10 mA max. at 12 to 24 VDC ±10%	30 mA max. at 12 to 24 VDC ±10%	50 mA max. at 12 to 24 VDC ±10%	60 mA max. at 12 to 24 VDC ±10%	50 mA max. at 12 to 24 VDC ±10%	80 mA max. at 12 to 24 VDC ±10%
Weight		200 g max.		300 g max.			
I/O word allocations		The unit number set with the I/O number setting switch on the front panel is invalid. I/O words are allocated consecutively according to the mounting position, in the same way as with basic I/O Units.					

Note: 1. Can also be used for 32 inputs or 30 inputs + 2 error inputs by changing input mode.
2. Can also be used for 16 inputs or 15 inputs + 1 error input by changing input mode.
3. Normal and high-speed operation set via switch.
4. Not including power supply to B7A Link Terminals

■ Applicable B7A Link Terminals

Input Terminals

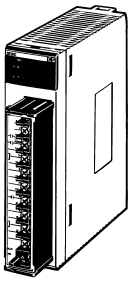
Type	Model	Transmission delay
Screw terminals	B7A-T6□1	Normal (19.2 ms)
	B7AS-T6□1	
	B7A-T6□6	High-speed (3 ms)
	B7AS-T6□6	
Modules	B7A-T6D2	Normal (19.2 ms)
	B7A-T6D7	High-speed (3 ms)
PC connectors	B7A-T□E3	Normal (19.2 ms)
	B7A-T□E8	High-speed (3 ms)

Output Terminals

Type	Model	Transmission delay
Screw terminal	B7A-R6□□1	Normal (19.2 ms)
	B7AS-R6□□1	
	B7A-R6□□6	High-speed (3 ms)
	B7AS-R6□□6	
Modules	B7A-R6A52	Normal (19.2 ms)
	B7A-RA57	High-speed (3 ms)
OC connectors	B7A-R□A□3	Normal (19.2 ms)
	B7A-R□A□8	High-speed (3 ms)

Safety Relay Unit

Reduced Wiring and Space for Safety Circuits



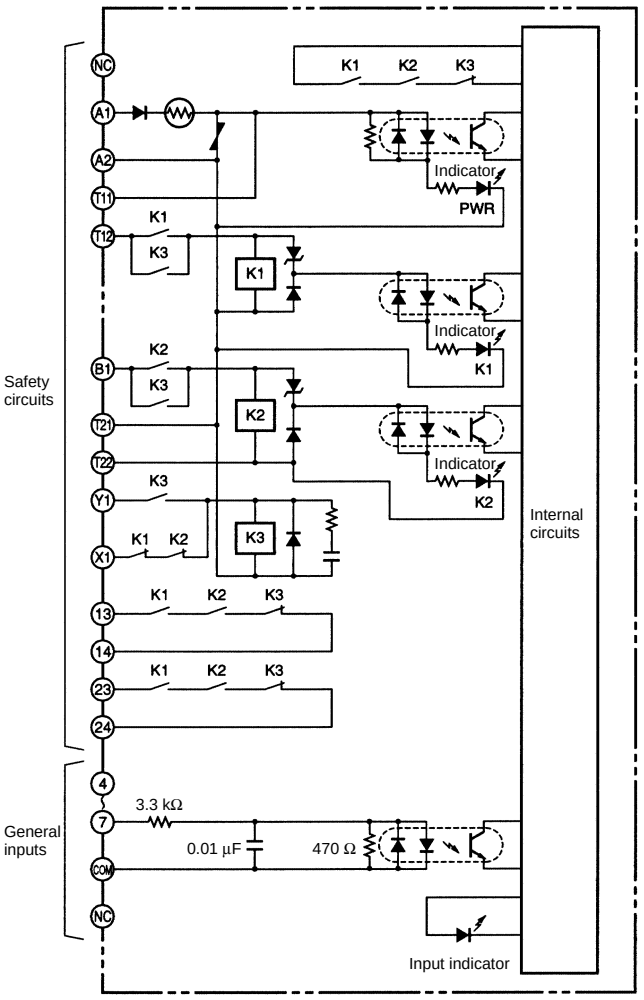
CS1W-SF200

This Safety Relay Unit mounts as an I/O Unit and provides both safety relays and inputs for monitoring.

■ Features

- 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

Item	Specifications
Contact resistance	100 mΩ (5 VDC, 1 A, voltage drop method)
Operating time	300 ms max. (not including bounce)
Response time	10 ms max. (time from input OFF to main contact OFF, not including bounce)
Insulation resistance (See note.)	20 MΩ min. (at 500 VDC) 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 VAC, 50/60 Hz for 1 min for following: Safety circuits-safety outputs, General inputs-safety outputs, Different poles of safety outputs 500 VAC, 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

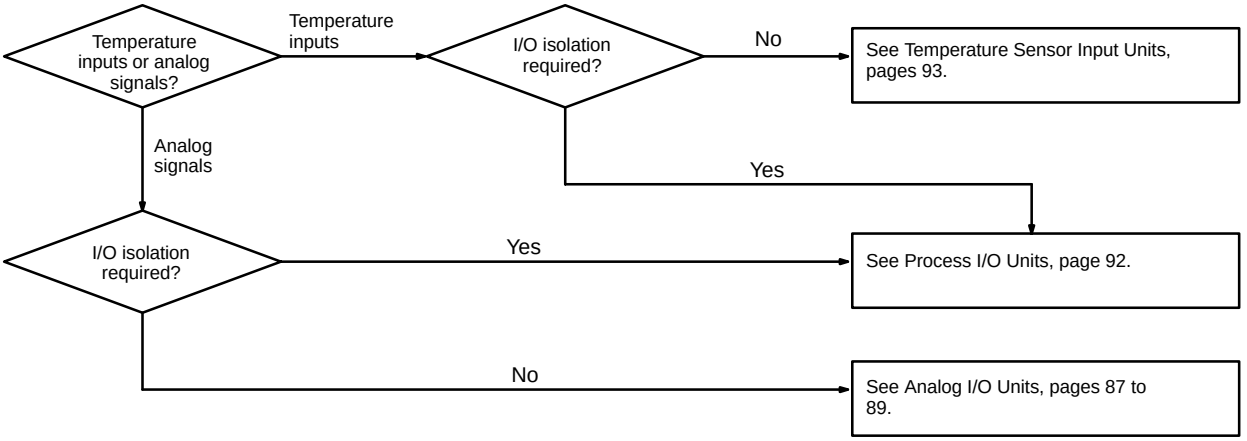
Item		Specification
Power	Supply voltage	24 VDC
	Fluctuation	$^{-15\%}/_{+10\%}$ of supply voltage
	Consumption	24 VDC: 1.7 W max.
Inputs	Current	75 mA max.
Switching	Rated load	250 VAC, 5 A
	Rated ON current	5 A

■ Ratings of General Inputs

Item	Specifications
Power voltage	24 VDC
Fluctuation	$^{-15\%}/_{+10\%}$ of supply voltage
Input impedance	3.3 kΩ
Input current	7 mA typ. (24 VDC)
ON voltage/current	14.4 VDC min./3 mA min.
OFF voltage/current	5 VDC 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

Unit Descriptions

Analog Product Selection Guide

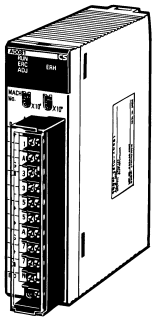


Classification	Model	I/O capacity	I/O isolation*	I/O ranges/types	Conversion time	Remarks	Page
Analog Input Units	CS1W-AD041	8 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA	1 ms/pt	---	87
	CS1W-AD081	8 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA	1 ms/pt	---	
	CS1W-PTW01	4 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	92
	CS1W-PDC01	4 inputs	Yes	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA, 0 to 20 mA	100 ms/4 pts	Measured value alarms (HH, H, L, LL), other features	
	CS1W-PTR01	8 inputs	No	–1 mA to 1 mA, 0 to 1 mA	200 ms/8 pts	Motor overdrive prevention, measured value alarms (H, L), other features	
	CS1W-PTR02	8 inputs	No	–100 mA to 100 mA, 0 to 100 mV	200 ms/8 pts	Measured value alarms (H, L), other features	
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	---	88
	CS1W-DA08V	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V	1 ms/pt	---	
	CS1W-DA08C	4 outputs	No	4 to 20 mA	1 ms/pt	---	
	CS1W-PMV01	4 outputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	Output disconnection alarm, control output answerback input, other features	92
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	---	89
Temperature Sensor Input Units	CS1W-PTS01	4 inputs	Yes	B, E, J, K, N, R, S, T, ±80 mVDC auto range	150 ms/4 pts	Automatic range setting, measured value alarms (HH, H, L, LL), other features.	93
	CS1W-PTS02	4 inputs	Yes	Pt100 (JIS, DIN, ISO) JPt100	100 ms/4 pts		
	CS1W-PTS03	4 inputs	Yes	Ni508Ω	100 ms/4 pts		
	C200H-TS001	4 inputs	No	K, J	4.8 s max.	---	93
	C200H-TS002	4 inputs	No	K, L	4.8 s max.	---	
	C200H-TS101	4 inputs	No	JPt100	4.8 s max.	---	
	C200H-TS102	5 inputs	No	Pt100	4.8 s max.	---	

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

Analog Input Units

Convert Analog Signals to Binary Data



CS1W-AD041-V1/AD081-V1

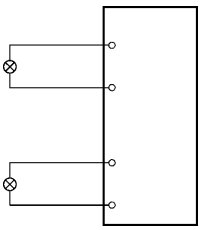
Convert input signals such as 1 to 5 V or 4 to 20 mA to binary values between 0000 and 0FA0 Hex and store the results in the allocated words each cycle. The ladder diagram can be used to transfer the data to the DM Area or the SCALING instructions (e.g., SCL(194)) can be sued to scale the data to the desired ranged.

■ Features

- Wire burnout detection
- Peak-hold function
- Mean function
- Offset gain setting

Note: Analog Input Terminals are also available as DeviceNet Slaves and for MULTIPLE I/O TERMINALs.

■ Circuit Configuration



■ Specifications

Model			CS1W-AD041-V1	CS1W-AD081-V1	DRT1-AD04	DRT1-AD04H	GT1-AD08MX
Classification			CS1 Special I/O Units		DeviceNet Slaves		MULTIPLE I/O TERMINAL or DeviceNet Slaves
Unit number			0 to 95	0 to 95	---	---	---
Inputs			4 pts	8 pts	2 or 4 pts	4 pts	4 or 8 pts
Signal range	**Voltages**	**1 to 5 V**	Yes	Yes	Yes	Yes	Yes
		0 to 10 V	Yes	Yes	Yes	Yes	Yes
		0 to 5 V	Yes	Yes	Yes	Yes	Yes
		–10 to 10 V	Yes	Yes	Yes	---	Yes
	Currents	**4 to 20 mA**	Yes	Yes	Yes	Yes	Yes
		0 to 20 mA	---	---	Yes	Yes	Yes
Signal range settings			4 settings (one for each point)	8 settings (one for each point)	2 pts at a time	2 pts at a time	2 pts at a time
Resolution			1/4000 (1/8000)	1/4000 (1/8000)	1/6000	1/30000	1/6000
Conversion speed			1 ms/pt max. (0.25 ms/pt max.)	1 ms/pt max. (0.25 ms/pt max.)	8 ms/4 pts	250 ms/4 pts	8 ms/8 pts
Overall accuracy (at 25 °C)			Voltage: ±0.2% Current: ±0.4%	Voltage: ±0.2% Current: ±0.4%	Voltage: ±0.3% Current: ±0.4%	Voltage: ±0.3% Current: ±0.4%	Voltage: ±0.3% Current: ±0.4%
Connections			Terminal block	Terminal block	Terminal block	Terminal block	Connector
Features	**Wire burnout detection**		Yes	Yes	Yes	Yes	Yes
	Peak-hold function		Yes	Yes	---	---	---
	Mean function		Yes	Yes	Yes	---	Yes

Note: 1. The C200H-AD001/AD002/AD003 can also be used with the CS1.

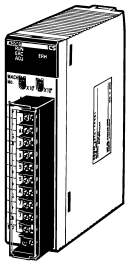
2. Process I/O Units are also available for analog I/O. Refer to page 92.

3. The CS1W-AD041-V1/AD081-V1 will be available soon.
The difference between them and the CS1W-AD041/AD081 currently available is that they are switchable to a higher resolution (1/8000) and faster conversion (0.25 ms/pt).

Unit Descriptions

Analog Output Units

Convert Binary Data to Analog Signals



CS1W-DA041/DA08V/DA08C

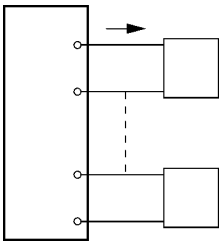
Binary data between 0000 to 0FA0 Hex in the allocated words can be convert to analog signals such as 1 to 5 V or 4 to 20 mA for output. All that is required in the ladder diagram is to place the data in the allocated words.

■ Features

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

The functions provided depend in the model used.

■ Circuit Configuration



Note: Analog Output Terminals are also available as DeviceNet Slaves and for MULTIPLE I/O TERMINALs.

■ Specifications

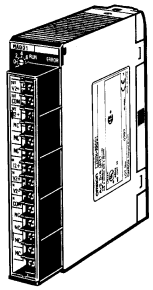
Model			CS1W-DA041	CS1W-DA08V	CS1W-DA08C	GT1-DA02	GT1-DA04MX
Classification			CS1 Special I/O Units			DeviceNet Slaves	MULTIPLE I/O TERMINAL or DeviceNet Slaves
Unit numbers			0 to 95	0 to 95	0 to 95	---	---
Outputs			4 pts	8 pts	8 pts	2 pts	4 pts
Signal range	**Voltages**	**1 to 5 V**	Yes	Yes	---	Yes	Yes
		0 to 10 V	Yes	Yes	---	Yes	Yes
		0 to 5 V	Yes	Yes	---	---	Yes
		–10 to 10 V	Yes	Yes	---	Yes	Yes
	Currents	**4 to 20 mA**	Yes	---	Yes	Yes	---
		0 to 20 mA	---	---	---	Yes	---
Signal range settings			4 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	2 settings (one for each point)	2 pts at a time
Resolution			1/4000	1/4000	1/4000	1/6000	1/6000
Conversion speed			1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.	4 ms/pt	4 ms/4 pts
Overall accuracy (at 25 °C)			Voltage: ±0.3%FS Current: ±0.5%FS	±0.3% FS	±0.5% FS	±0.4% FS	±0.4% FS
Connections			Terminal block	Terminal block	Terminal block	Terminal block	Connector
Features	**Output hold function**		---	Yes	Yes	Yes	Yes

Note: 1. The C200H-DA001/DA002/DA003/DA004 can also be used with the CS1.

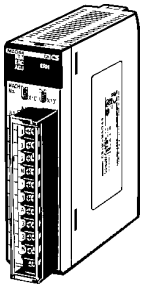
2. Process I/O Units are also available for analog I/O. Refer to page 92.

Analog I/O Units

Analog Inputs and Outputs with One Unit



C200H-MAD01



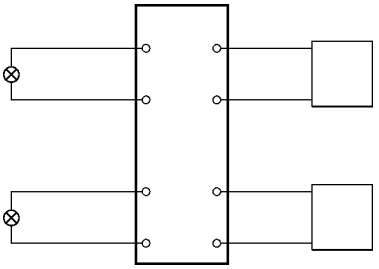
CS1W-MAD44

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.

■ Features

- Mean function
- Peak hold function
- Wire burnout detection
- Output hold function
- Ratio conversions

■ Circuit Configuration



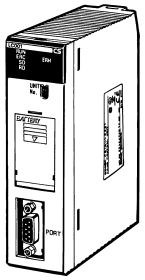
■ Specifications

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

Unit Descriptions

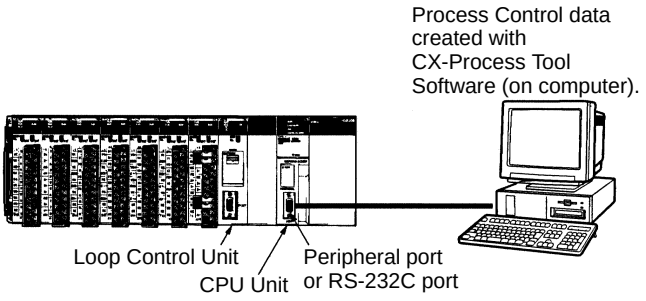
Loop Control Unit

Perform Loop Control for Temperatures, Flow Rates, Pressures, and Other Analog Values
Create Monitoring and Data Logging Systems



CS1W-LC001

■ System Configuration



A Loop Control Unit can support various types of process control by combining more than 120 types of function blocks. It is possible to combine up to 32 loops of PID operation and 250 process operations for programming. Trend graphs, graphic monitoring and alarm monitoring are possible by using CX-Process Tool and Monitor Software.

Note: There may be restrictions due to, for example, the operation cycle.

■ Features

- Combine functional blocks with software connections to specify all I/O functions.
- Enables special types of control, such as cascade control, feed-forward control and variable gain control in addition to PID control. (PID control has an auto-tuning function.)
- PID control and fuzzy logic are possible with 1 Unit.
- Logic sequences can include a total of 4,000 commands and can be used for condition control of the Loop Control Unit and process steps.
- Send FINS commands from the CPU Unit or host computer to read and write function block data.
- Use the CX-Process Monitoring Software to monitor the control status of the Loop Control Unit and change set values on screens that look like on-site instruments.

Note: No external analog or contact I/O functions are available. Analog and contact I/O Units must be purchased separately.

■ Specifications

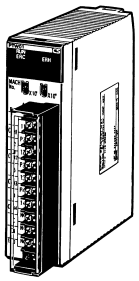
Item		Specifications				
Processing methods		Function blocks				
Function block capacity		Total: 859 blocks max.				
		Analog processes	Control blocks		Control functions for PID and other processes	32 max.
			External digital controller blocks		Performs monitoring and setting for an ES100X Controller connected directly to the RS-232C port on the Loop Control Unit	32 max.
			Operation blocks		Alarms, square root calculations, time calculations, pulse train accumulation, other process calculations	250 max.
		Step ladder program blocks			Logic sequences and step sequences function	Total: 4,000 commands 100 commands/block max. Separable 100 steps max.
		I/O blocks	Field terminal blocks		Analog I/O functions for Analog I/O Units Contact I/O functions for Basic I/O Units	80 max.
			CPU terminal blocks		Analog data and contact data I/O with CPU Unit	16 max.
			Node terminal blocks		Connecting between CPU Unit memory and function block data	32 max.
					Sending data to personal computers	32 max.
					Sending data to PLCs on a network	50 max.
					Receiving data from PLCs on a network	100 max.
			SCADA interface	Expanded CPU Unit Terminal	Analog data and contact data I/O with CPU Unit and the blocks	32 max.
				Send/Receive All Blocks	Analog data and contact data I/O for all blocks used	2 max.
		System common blocks			System common operation cycle setting, operation commands, load rate monitoring, etc.	1
Methods to create and transfer function blocks		Created with CX-Process Tool Software (sold separately) and transferred to Loop Control Unit.				
Control methods	**PID**	PID with advanced feed-forward circuitry (2 degrees of freedom), with autotuning				
	Control combination	Any of the following types of control method can be combined for allowable combinations of function blocks: Basic PID control, cascade control, feed-forward control, variable-gain control, sample PID control, Smith dead time compensation control, PID control with differential gap, override control, program control, time-proportional control, etc.				
Alarms	**PID blocks**	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: Up to three Loop Control Units can be mounted to the CPU Rack. Loop Control Units cannot be mounted to expansion racks.

Unit Descriptions

Process I/O Units

Built-in Signal Conversion with Direct Process Signal Input



CS1W-P□□0□

Choose from a total of 16 models, including 8 isolated-type models, to handle essentially all normal processing applications. Meet a wide variety of monitoring needs with variable range setting, output scaling, rate-of-change operation and alarm, and many other features.

■ Features

- External converters and transducers not required: Greatly reduces costs, space requirements, and labor.
- Input temperatures and use measured value alarms and disconnection alarms.
- Input analog currents and voltages and output square root and input error detection.
- Input pulse signals from capacitive flow sensors and output either accumulated or instantaneous values.
- For control outputs, use output disconnected detection, output rate-of-change limits, and high/low output limits.

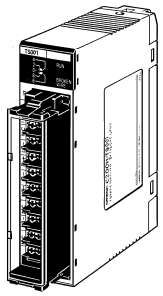
■ Specifications

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-PTS01	4 inputs	All inputs isolated.	B, E, J, K, N, R, S, T, ±80 mVDC variable range	Standard accuracy: ±0.1% Temp coefficient: ±0.015%/°C Resolution: 1/4,096	Variable range setting, output scaling (±32,000), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms
Isolated-type Temperature-resistance Thermometer Input Unit	CS1W-PTS02	4 inputs	All inputs isolated.	Pt100 (JIS, IEC) JPt100	Standard accuracy: Larger of ±0.1% or ±0.1°C Temp coefficient: ±0.015%/°C Resolution: 1/4,096	
Isolated-type Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	4 inputs	All inputs isolated.	Ni508.4Ω	Standard accuracy: Larger of ±0.2% or ±0.2°C Temp coefficient: ±0.015%/°C Resolution: 1/4,096	
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	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 disconnection alarms
Isolated-type Analog Input Unit	CS1W-PDC01	4 inputs	All inputs isolated.	±10 V, 0 to 10 V, ± 5 V, 0 to 5 V, 1 to 5 V, ±10 VDC variable range, 4 to 20 mA, 0 to 20 mA	Standard accuracy: ±0.1% Temp coefficient: ±0.015%/°C Resolution: 1/4,096	Output scaling (±32,000), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, square root, input error alarms
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 input) or 20 pulses/s (contact input)	---	Built-in sensor power supply, contact bounce filter, unit pulse conversion, accumulative and instantaneous value output, 4 instantaneous value alarms.
Isolated-type Control Output Unit	CS1W-PMV01	4 outputs	All outputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: 4 to 20 mA: ±0.1% 1 to 5 V: ±0.2% Temp coefficient: ±0.015%/°C 4,000 (outputs)	Output disconnection alarms, control output answerback input, output rate-of-change limit, output high/low limits
Isolated-type Power Voltage Output Unit	CS1W-PMV02	4 outputs	All outputs isolated	0 to 10 V, ±10 V, 0 to 5 V, ±5, 0 to 1 V, ±1 V	---	---
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	Motor overdrive prevention at startup, output scaling (±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	Output scaling (±32,000), measured value alarms (H, L)

Note: Refer to pages 87 to 89 for descriptions of the Analog I/O Units (CS1W-AD0□□, CS1W-DA0□□, CS1W-MAD44.)

Temperature Sensor Units

Directly Input from Four Temperature Sensors



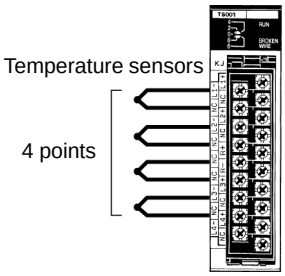
CS1W-PTS01
CS1W-PTS02
CS1W-PTS03
C200H-TS001
C200H-TS002
C200H-TS101
C200H-TS102

Using input from thermocouples or resistance thermometers (up to 4 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 transferred to the DM Area or other memory locations using the ladder program.

■ Features

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

■ Circuit Configuration



■ Specifications

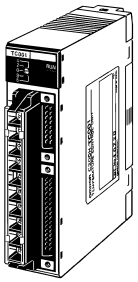
Model			CS1W-PTS01	CS1W-PTS02	CS1W-PTS03	C200H-TS001	C200H-TS002	C200H-TS101	C200H-TS102	DRT1-TS04T	DRT1-TS04P
Classification			CS1 Special I/O Units			C200H Special I/O Units				CompoBus/D Slaves	
Unit numbers			0 to 95	0 to 95	0 to 95	0 to 9	0 to 9	0 to 9	0 to 9	---	---
Inputs			4 pts			4 pts				4 pts	
Input signals	**Thermocouples**	**K**	Yes	---	---	Yes	Yes	---	---	Yes	---
		J	Yes	---	---	Yes	---	---	---	Yes	---
		L	---	---	---	---	Yes	---	---	Yes	---
		R	Yes	---	---	---	---	---	---	Yes	---
		S	Yes	---	---	---	---	---	---	Yes	---
		T	Yes	---	---	---	---	---	---	Yes	---
		E	Yes	---	---	---	---	---	---	Yes	---
		B	Yes	---	---	---	---	---	---	Yes	---
		N	Yes	---	---	---	---	---	---	Yes	---
		W	---	---	---	---	---	---	---	Yes	---
		U	---	---	---	---	---	---	---	Yes	---
		PLII	---	---	---	---	---	---	---	Yes	---
		±80 mV	Yes	---	---	---	---	---	---	---	---
	Resistance thermometers	**JPt100**	---	Yes	---	---	---	Yes	---	---	Yes
		PT100	---	Yes	---	---	---	---	Yes	---	Yes
		Ni508.4Ω	---	---	Yes	---	---	---	---	---	---
Input signal range settings			4 pts set individually			One setting for all 4 pts				One setting for all 4 pts	
A/D conversion output data			4-digit binary			4-digit BCD				4-digit binary	
Conversion speed			150 ms/4 pts	100 ms/4 points		4.8 s max. (when 4 pts are set for Unit)				250 ms/4 points	
Overall accuracy			Standard accuracy: ±0.1% Temp coefficient: ±0.015%/°C (not including cold contact compensation error)	Standard accuracy: Larger of ±0.1% or ±0.1°C Temp coefficient: ±0.015%/°C		±1% + 1°C				Larger of ±0.5% or ±2°C (depending on signal)	Larger of ±0.5% or ±1°C (depending on signal)
Connections			Terminal block			Terminal block				Terminal block	

Note: Refer to page 92 for information on CS1W-PTS□□ Process I/O Units.

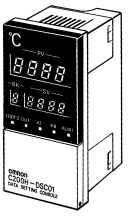
Unit Descriptions

Temperature Control Units

One Unit Functions as Two Temperature Controllers



C200H-TC□□□



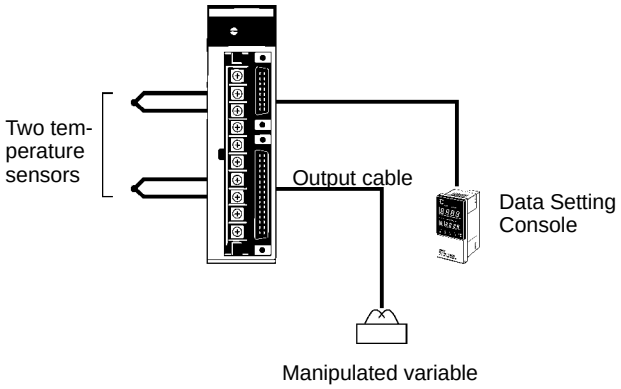
C200H-DSC01
Data Setting Console

Perform 2-loop PID control (two degrees of freedom) 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.

■ Features

- 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.

■ System Configuration



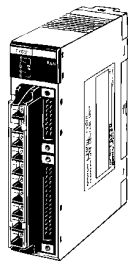
■ Specifications

Classification	Temperature sensor inputs	Control outputs	Unit numbers	Model
C200H Special I/O Unit	Thermocouples (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	0 to 9	C200H-TC001
		Voltage (pulse)		C200H-TC002
		Current (linear)		C200H-TC003
	Platinum resistance thermometers (JPt00, Pt100)	Open-collector (pulse)		C200H-TC101
		Voltage (pulse)		C200H-TC102
		Current (linear)		C200H-TC103

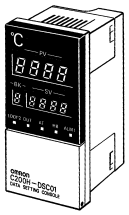
Data Setting Console

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

Heat/Cool Control Unit



C200H-TV□□□



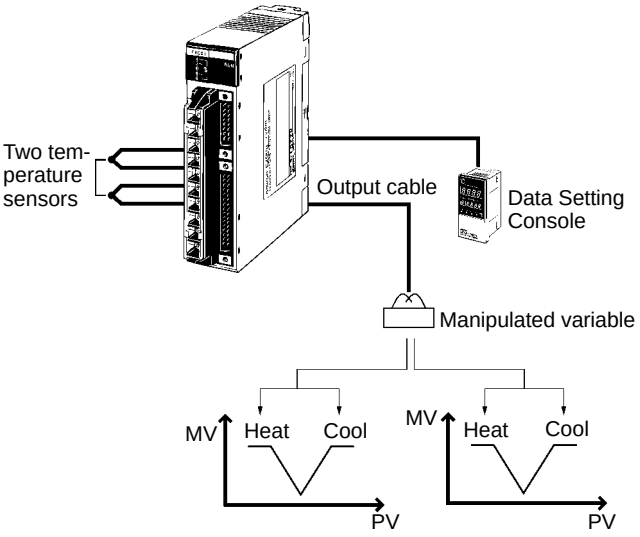
C200H-DSC01
Data Setting Console

Perform 2-loop PID control (two degrees of freedom) based on inputs from thermocouples or platinum resistance thermometers to control heating and cooling through transistor, voltage, or current outputs. Words allocated to the Unit in memory can be manipulated from the ladder diagram to start/stop operation, set the set point, read the process value, or perform other operations.

■ Features

- 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 set points, alarm values, and PID parameters.
- Connects to Data Setting Console.

■ System Configuration



■ Specifications

Classification	Temperature sensor inputs	Heating control output	Cooling control output	Unit numbers	Model
C200H Special I/O Unit	Thermocouples (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	Open-collector (pulse)	0 to 9	C200H-TV001
		Voltage (pulse)			C200H-TV002
		Current (linear)			C200H-TV003
	Platinum resistance thermometers (JPt00, Pt100)	Open-collector (pulse)			C200H-TV101
		Voltage (pulse)			C200H-TV102
		Current (linear)			C200H-TV103

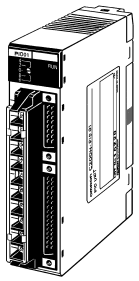
Data Setting Console

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

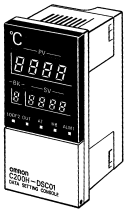
Unit Descriptions

PID Control Units

Ideal for Analog Control of Pressures, Flows, and other Variables



C200H-PID01/PID02/PID03



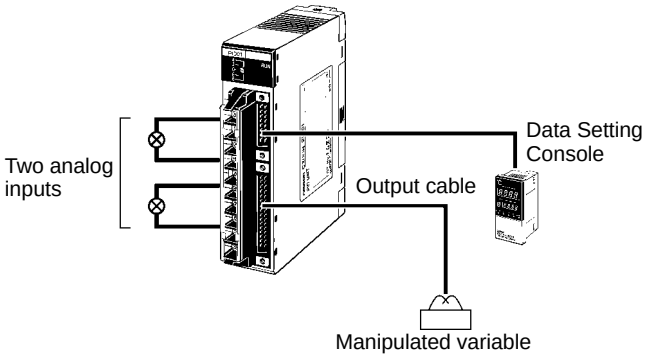
C200H-DSC01
Data Setting Console

Perform 2-loop PID control (two degrees of freedom) based on input ranges such as 4 to 20 mA or 1 to 5 V to control transistor, voltage, or current outputs. Words allocated to the Unit in memory can be manipulated from the ladder diagram to start/stop operation, set the set point, read the process value, or perform other operations.

■ Features

- Supports 2-loop PID control (two degrees of freedom) or ON/OFF control.
- Directly input analog signal.
- Open-collector, voltage, or current outputs
- Sampling period: 100 ms
- Run/start control.
- Manual outputs supported.
- Set two internal alarms for each loop.
- Record up to eight sets of set points, alarm values, and PID parameters.
- Digital filters can be set to dampen rapid changes in inputs.
- Connects to Data Setting Console.

■ System Configuration



■ Specification

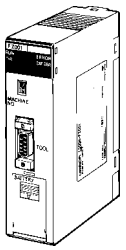
Classifications	Temperature sensor input	Control output	Unit numbers	Model
C200H Special I/O Unit	4 to 20 mA, 1 to 5 V, 0 to 5 V or 0 to 10 V	Open-collector (pulse)	0 to 9	C200H-PID01
		Voltage (pulse)		C200H-PID02
		Current (linear)		C200H-PID03

Data Setting Console

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

Fuzzy Logic Unit

Take Advantage of High-speed Fuzzy Logic



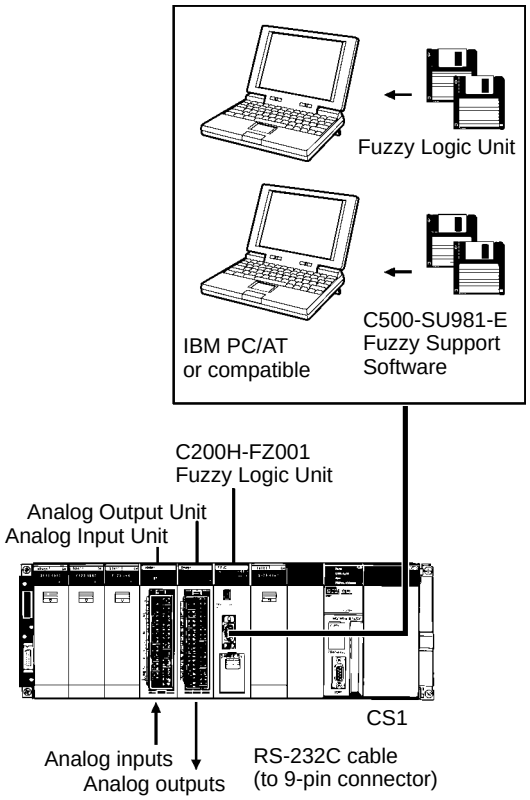
C200H-FZ001

Use the Fuzzy Support Software to create rule, membership functions, and other fuzzy data and transfer then to the Unit after checking the knowledge. The ladder program in the CPU Unit can be used to set fuzzy inputs for processing by the Fuzzy Logic Unit and then the results can then be read using the ladder program.

■ Features

- Contains a high-performance fuzzy logic processor for high-speed fuzzy processing.
- Handles jobs that used to be performed by using the experience of skilled operators.
- Eight inputs and 4 outputs
- 8 conditions and 2 conclusions per rule, 128 rules total.

■ System Configuration



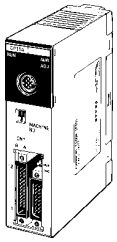
■ Specifications

Classification	Model	Fuzzy logic		Inputs		Outputs		Unit numbers	Processing time
		Rule form	Rules	Data	FS range	Data	FS range		
C200H Special I/O Unit	C200H-FZ001	8 conditions and 2 conclusions	128	8 words max.	0 to 4095	4 words max.	0 to 4095	0 to 9	6 ms max. for Unit, 3 to 4 times the cycle time for system

Unit Descriptions

Cam Positioner Unit

One Unit Functions as 48 Mechanical Cams



C200H-CP114

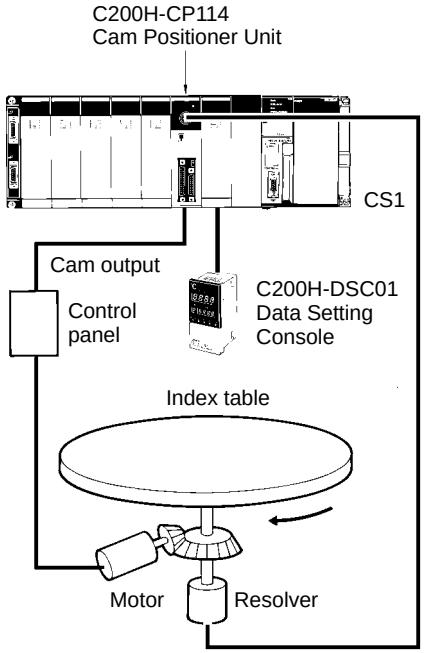
C200H-DSC01
Data Setting Console

Angles are detected though an externally connected resolver (3F88L-RS□□ angle detector) and cam outputs are produced for preset ON/OFF angle data.

■ Features

- Supports16 external outputs and 32 internal outputs for a total of 48 cam outputs.
- Set up to seven ON/OFF data for each cam.
- The Data Setting Console allows easy monitoring of cam data settings, present cam angles, or etc.
- An Adjustment Operation function enables setting cam outputs while actually operating the controlled machine.

■ System Configuration

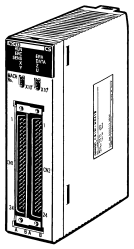


■ Specifications

Classification	Model	No. of cam outputs	Control unit	Resolver response speed	Unit numbers	Resolver response time
Cam Positioner Unit	C200H-CP114	48 (external outputs: 16, internal outputs: 32)	1°	800 r/min max.	0 to 9	200 μs (sampling frequency: 5 KHz)

Position Control Units

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



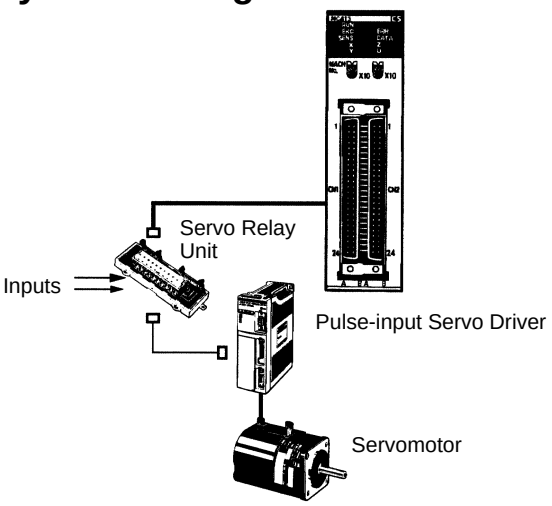
CS1W-NC113/213/413/133/233/433
C200HW-NC113/213/413

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.

■ Features

- 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.

■ System Configuration



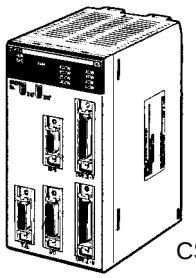
■ Specifications

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

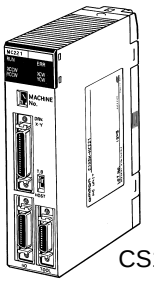
Unit Descriptions

Motion Control Unit

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



CS1W-MC421

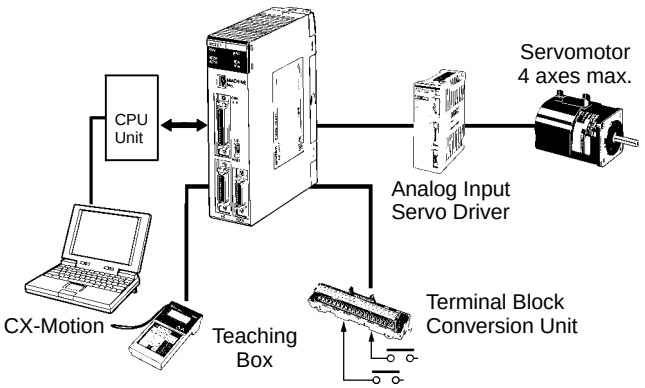


CS1W-MC221

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

The Motion Controller provides semiclosed-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



■ Features

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

■ Specifications

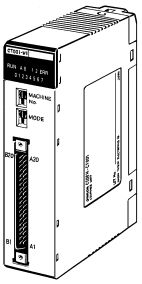
Model		CS1W-MC421	CS1W-MC221
Classification		CS1 Special I/O Unit	
Control method		Semiclosed loop with automatic trapezoid or S-curve acceleration/deceleration	
Control output signals		Analog	
Internal programming language		G language (Program started by command sent from CPU Unit's ladder program.)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

CX-Motion: Windows-based Support Software

Model	WS02-MCTC1-EV2
Supported MC Units	CS1W-MC221/421, C200H-MC221, and CV500-MC221/421
Applicable computer	DOS, OS: Windows 95/98 or Windows NT Version 4.0
Functions	Functions required for MC Unit control: Creating/editing/saving/printing system parameters, positioning data, and MC programs; monitoring MC Unit operation

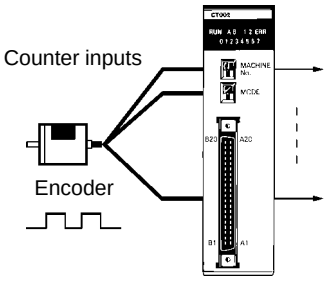
High-speed Counter Units

Two External Inputs and Eight External Outputs with Many Operating Modes



CS1W-CT041
CS1W-CT021
C200H-CT021
C200H-CT001-V1
C200H-CT002

■ System Configuration



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.

■ Features (CS1W-CT0□1)

- Max. input frequency = 500 kHz. (See note 1.) Output turns ON less than 0.5 ms after set value is reached. (See note 2.)

Note: 1. This figure is for when line driver input is used.
2. The time may exceed 0.5ms in some cases, such as 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.

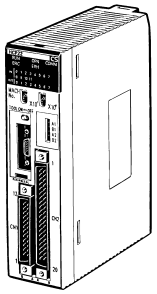
■ Specifications

Classification	Number of counters	Encoder A and B input, pulse input, Z signal	Maximum counting speed	Unit numbers	Model
C200H Special I/O Unit	1	Open-collector Input voltage: 5 VDC, 12 VDC, or 24 VDC	50 kcps	0 to 9	C200H-CT001-V1
		RS-422 line driver	75 kcps		C200H-CT002
	2	Open-collector Input voltage: 12 VDC or 24 VDC	50 kcps	0 to F	C200H-CT021
		RS-422 line driver	75 kcps		
CS1 Special I/O Unit	2	Open-collector Input voltage: 5 VDC, 12 VDC, or 24 VDC (5- and 12-VDC 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 VDC, 12 VDC, or 24 VDC (5- and 12-VDC input only possible up to 2 axes.)	50 kcps		CS1W-CT041
		RS-422 line driver	500 kcps		

Unit Descriptions

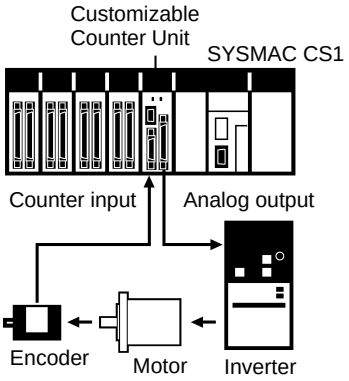
Customizable Counter Units

Customizable Counter Units with PLC Functionality. Features Such as Synchronous Control Allow Greater Range of Mechanical Control. Also Perform "Sub-PLC" Role.



CS1W-HCP22
CS1W-HCA22
CS1W-HIO01

■ System Configuration



In addition to counter input, pulse input, and analog output, which are indispensable for mechanical control (inputs and outputs vary with the model), PLC functionality and 20 points of basic I/O are available with just 1 Unit. There are also models that just have PLC functionality. High-speed PLC functionality, with an overhead of 0.1 ms, allows the Units to be used as "sub-PLCs" that contribute to greater responsiveness and system performance, as well as function distribution and modularization.

■ Specifications

Model number		CS1W-HCP22	CS1W-HCA22	CS1W-HIO01
Type		Counter inputs, pulse outputs	Counter inputs, pulse outputs	Basic type
Inputs	12 DC inputs	Yes	Yes	Yes
	2 counter inputs	Yes	Yes	No
Outputs	8 transistor outputs	Yes	Yes	Yes
	2 pulse outputs	Yes	No	No
	2 analog outputs	No	Yes	No

■ Programming Functions

Programming language	Ladder programming
Basic instruction execution speed	200 ns (1 Kword) or 400 ns (4 Kwords), switchable
Program capacity	1 Kword or 4 Kwords, switchable
Data memory capacity	6 Kwords + 2 Kwords of expanded data memory
Backup functions	10-day capacitor backup and flash memory storage
CS1 CPU Unit data exchange	132-channel data link (maximum)
Programming Device	CX-Programmer (versions 1.2. or later) or Programming Console
Programming Device Connecting Cable	CS1 Connecting Cable or Programming Console Cable

■ Counter Inputs (CS1W-HCP22/HCA22)

Number of counter inputs	2
Operating modes	Linear and ring
Signal level	5, 12, or 24 V, or line driver (only one input each for 5 and 12 V)
Input method	Phase difference (×1, ×2, or ×4), up/down, or pulse with direction
Counting speed	Voltage: 50 kcps Line driver: 50/200 kcps

■ Pulse Outputs (CS1W-HCP22)

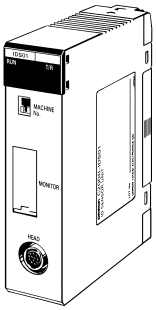
Number of outputs	2
Output signal	Clockwise/counterclockwise
Signal level	5 to 24 V
Output speed	200 kpps

■ Analog Outputs (CS1W-HCA22)

Number of outputs	2
Output signal	–10 to 10 V, 0 to 10 V, 1 to 5 V, 0 to 5 V
Resolution	1/4,000, 1/10,000 (for –10 to 10 V only)
Accuracy	±0.3% of FS (23±2°C), ±0.5% of FS (0 to 55°C)
Conversion speed	0.5 ms max.

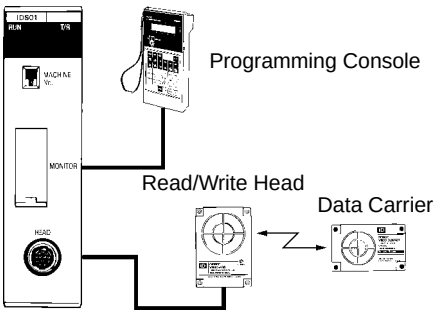
ID Sensor Units

Connect an ID System to the PLC. Easily Started with a Programming Console.



C200H-IDS01-V1
(electromagnetic,
for short distances)

■ System Configuration



Read/write data in Data Carrier memory by sending read/write commands from the CPU Unit to the Read/Write Head. The C200H-IDS01-V1 is used with the V600 Series for short-distance communications with electromagnetic coupling.

The Programming Console can be connected directly to the ID Sensor Unit to send commands to read/write Data Carriers and monitor the results. The Programming Console is particularly useful when initially starting up the system.

■ Features

- Connects and ID System to the Programmable Controller.
- Read data from Data Carriers simply by sending a read command.
- Read/write up to 1,024 bytes.
- Record error logs with up to 30 records.
- Use a Programming Console to monitor and control operation.

■ Specifications

Classification	Connectable ID System	Unit numbers	Model
C200H Special I/O Unit	V600 Series(electro-magnetic, for short distances)	0 to 9	C200H-IDS01-V1

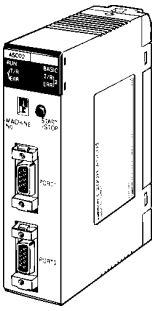
Unit Descriptions

Serial Communications Features

Unit	Model	Ports	Serial communications mode						BASIC programming	Message communications
			Protocol macros	Host Link	NT Links	No-protocol	Peripheral bus	Programming Console bus		
			General-purpose external devices	Host computers	OMRON PTs	General-purpose external devices	Programming Devices	Programming Console	General-purpose external device	
CPU Units	All models	Port 1: Peripheral	No	Yes	Yes	No	Yes	Yes	No	No
		Port 2: RS-232C	No	Yes	Yes	Yes	Yes	No	No	No
ASCII Units	C200H-ASC02	Port 1: RS-232C	No	No	No	No	No	No	Yes	No
		Port 2: RS-232C	No	No	No	No	No	No	Yes	No
	C200H-ASC11	Port 1: RS-232C	No	No	No	No	No	No	Yes	No
		Port 2: RS-232C	No	No	No	No	No	No	Yes	No
	C200H-ASC21	Port 1: RS-232C	No	No	No	No	No	No	Yes	No
		Port 2: RS-422A/485	No	No	No	No	No	No	Yes	No
	C200H-ASC31	Port 1: RS-232C	No	No	No	No	No	No	Yes	No
		Port 2: RS-232C	No	No	No	No	No	No	Yes	No
Serial Communications Boards/ Units	CS1W-SCB21	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No
		Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No
	CS1W-SCB41	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No
		Port 2: RS-422A/485	Yes	Yes	Yes	No	No	No	No	No
	CS1W-SCU21	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No
		Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No
DeviceNet RS-232C Unit	DRT1-232C2	Port 1: RS-232C Port 2: RS-232C	No	No	No	No	No	No	No	Yes

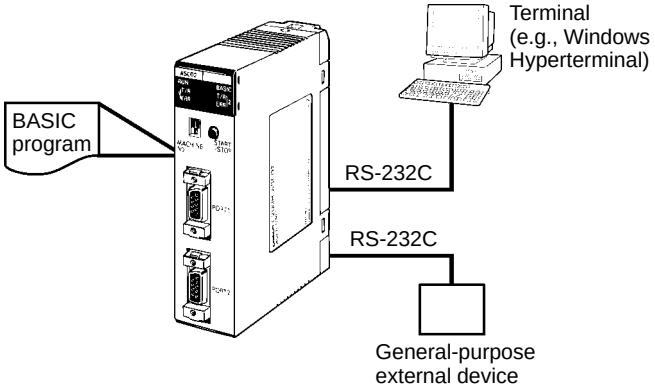
ASCII Units

Easily Perform ASCII Data Communications



C200H-ASC11
C200H-ASC21
C200H-ASC31

■ 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-ASC21/ASC21/ASC31 provided 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.

■ Features

- 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 fro 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.

■ Specifications

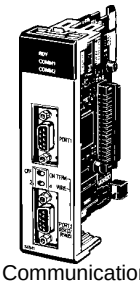
Classification	User memory	Shared memory	Serial communications ports	Unit numbers	Model
C200H Special I/O Unit	200 Kbytes	Provided (90 words in I/O memory)	RS-232C x 2	0 to F	C200H-ASC11
			RS-232C x 1, RS-422A/485 x 1		C200H-ASC21
			RS-232C x 2, RS-232C x 1 for terminal		C200H-ASC31

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

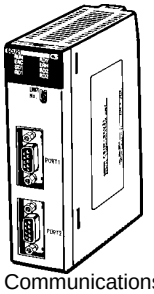
Unit Descriptions

Serial Communications Boards
Serial Communications Units

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



Serial Communications Boards
CS1W-SCB21
CS1W-SCB41



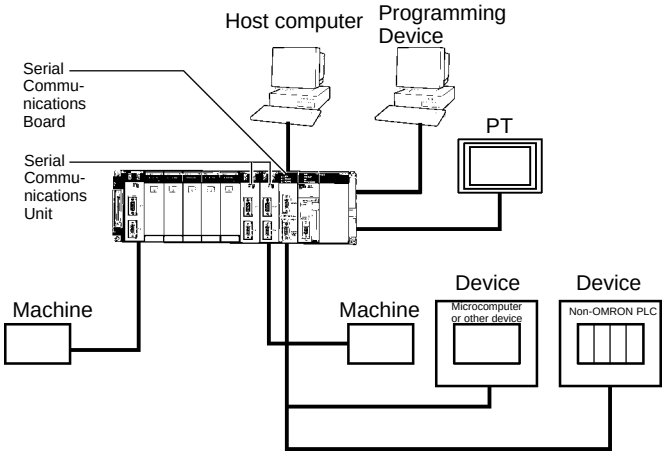
Serial Communications Unit
CS1W-SCU21

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. Specify Protocol Macros, Host Link Communications, or 1:N NT Links separately for each port. With the CS1 Series, you can easily provide the right number of serial ports for your system.

■ Features

- 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 in CPU Unit when data is received.
- Serial Communications Board
  - Mount up to 16 Unit (including all other CPU Bus Units) on CPU or Expansion Racks. Ideal for systems that required many serial ports.

■ System Configuration



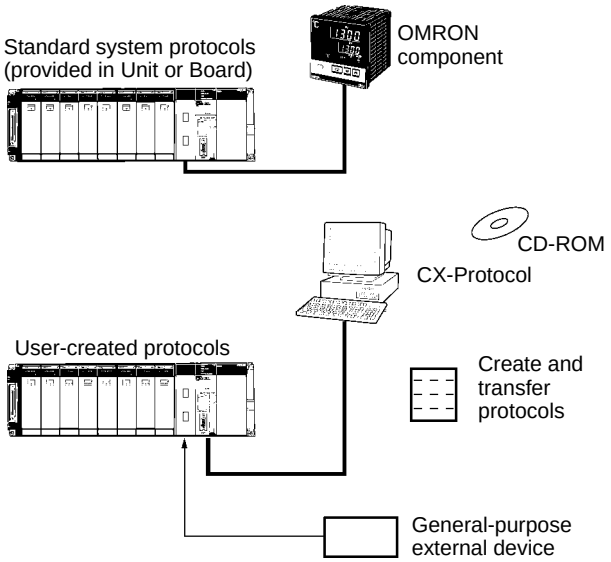
■ Specifications

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

Protocol Macros

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

■ System Configuration



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

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

■ Types of Protocol

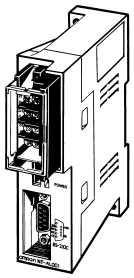
Protocols	External devices	Required products
Standard system protocols	OMRON components	Serial Communications Board or Unit
User-created protocols	General-purpose external device	Serial Communications Board or Unit + CX-Protocol (Windows-based protocol support software)

■ Standard System Protocols

Component		Model	Send/receive sequences
CompoWay/F-compatible components		OMRON CompoWay/F slave components	CompoWay/F command send/response receive
Digital Controllers and Temperature Controllers	Small Digital Controller with Communications (53 x 53 mm)	E5CK	Present value read, set point read, manipulated variable read, etc. Set point write, alarm write, PID parameter write, etc.
	Temperature Controllers with Digital Indications (Thermac J with communications) (96 x 96 mm or 48 x 96 mm)	E5□J-A2H0	
	Digital Controllers with Communications (96 x 96 mm)	ES100□	
	High-density Temperature Controller with communications (8 control points)	E5ZE	
Intelligent Signal Processors (special specifications)		K3T□	Display value read, comparison value read, write, etc.
Bar Code Readers	Laser Scanner type	V500	Read start, data read, read stop, etc.
	CCD type	V520	
Laser Micrometer		3Z4L	Measurement condition set, continuous measurement start, etc.
Visual Inspection Systems	High speed, high precision, low cost	F200	Measurement, continuous measurement, etc.
	High-precision inspection/positioning	F300	
	Character inspection software/positioning software	F350	Measurement, positioning, inspection, character inspection, etc.
ID 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.

Unit Descriptions

RS-232C/RS-422A Adapter Unit



NT-AL001

The NT-AL001 is used to connect a PT or other device with an RS-232C terminal to a device with an RS-422A terminal.

■ Features

- 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.
- Duct wiring can be used. The removable terminal block enables wiring not possible with D-sub connectors. (The RS-232C interface is 9-pin D-sub.)

■ Communications Specifications

RS-232C Interface

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

RS-422A Interface

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

Communications Networks

■ Overview

Level	Network	Functions	Communications	Unit/Board
Information networks	Ethernet	Host computer to PLC	FINS messages	Ethernet Unit
		PLC to PLC		
		Host computer to CPU Unit memory card	FTP server	
		UNIX computer or other socket service to PLC	Socket services	
	Controller Link and SYSMAC LINK	Computers connected directly to network and PLC	FINS messages	Controller Link Support Board and Unit SYSMAC LINK Support Board and Unit
			Data links (offsets and automatic setting)	
Control networks	Controller Link and SYSMAC LINK	PLC to PLC	FINS messages	Controller Link Unit SYSMAC LINK Unit
			Data links (offsets and automatic setting)	
	PC Link		Simple data links	PC Link Unit
	DeviceNet		FINS messages on open network	DeviceNet Master Unit and Configurator
	DeviceNet	PLC to components (slaves)	HIgh-capacity remote I/O on open network (fixed or user allocations)	DeviceNet Master Unit and Configurator
	CompoBus/S		High-speed remote I/O with OMRON network (fixed allocations)	CompoBus/S Master Unit

■ Communications Specifications

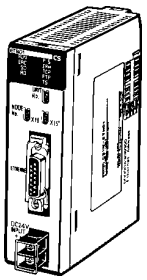
Network	Ethernet	Controller Link	SYSMAC LINK	PC Link	DeviceNet	CompoBus/S
Messages	Yes	Yes	Yes	---	Yes	---
Data links	---	Yes	Yes	Yes	---	---
Remote I/O	---	---	---	---	Yes	Yes
Maximum speed	10 Mbps	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	128 Kbps	500 Kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	750 Kbps (See note 1.) Comm cycle: Approx. 1 ms (128 inputs and 128 outputs)
Total distance	2.5 km	Twisted-pairs:1 km (at 500 bps) Optical: 20 km	Coaxial: 1 km Optical: 10 km	500 m	500 m (at 125 bps)	Trunk line: 500 m (See note 2.) Communications cycle: 6 ms max.
Maximum nodes	100	32/62	62	32	63	32
Communications media	Coaxial cable	Special twisted-pair cable or optical cable	Coaxial cable or optical cable	Twisted-pair cable or optical cable	DeviceNet cable	2-core or 4-core VCTF cable, special flat cable (See note 3.)
Network data link capacity	---	32,000/62,000 words	2,966 words	64 words	---	---
Remote I/O capacity	---	---	---	---	32,000 pts (with Configurator) 2,048 pts (without Configurator)	256 pts
Supporting PLCs	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE	CS1, CVM1, CV Series, C200HX/HG/HE, C200HS, C1000H, C2000H	CS1, C200HX/HG/HE, C200HS, C1000H, C2000H	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE, C200HS, CQM1/CQM1H (with I/O Link), CPM2C (with I/O Link)	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.

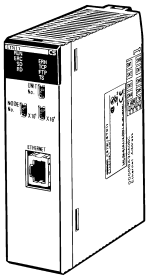
Unit Descriptions

Ethernet Unit

Forms a Connections Between OA Information and FA Control



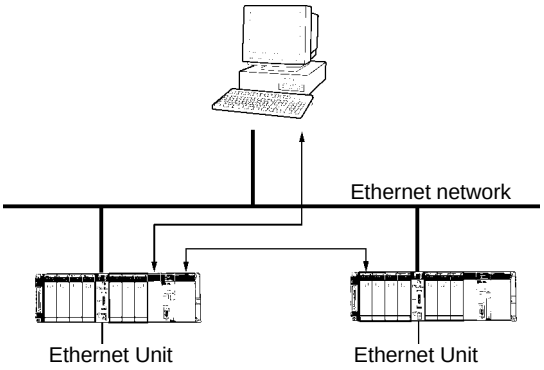
CS1W-ETN01
(10Base-5)



CS1W-ETN11
(10Base-T)

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

■ System Configuration



■ Features

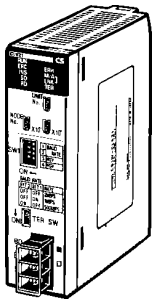
- Access socket services simply by manipulating specific bits in memory.
- Take advantage of electronic mail.
- Interconnect to Controller Link and other networks.
- Use the Ethernet standard protocols, TCP/IP and UDP/IP.
- Use OMRON's standard FINS message communications.
- Transfer file with host computers using FTP.
- Set communications parameters with the CX-Programmer.

■ Specifications

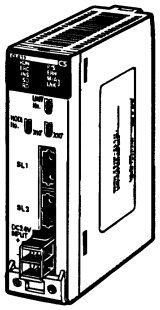
Classification	Communications services	Unit numbers	Model
CS1 CPU Bus Unit	FINS communications, FTP server, socket services, and mail services	0 to F (4 Units max.)	CS1W-ETN01 CS1W-ETN11

Controller Link Units and Controller Link Support Board

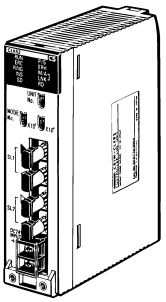
OMRON's Main FA Network



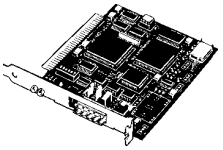
CS1W-CLK21
Wired Controller Link Unit



CS1W-CLK12
Optical Controller Link Unit (H-PCF Cable)



CS1W-CLK52
Optical Controller Link Unit (GI Cable)



Personal Computer Boards (for PCI bus)
3G8F7-CLK22-E (for wired systems)
3G8F7-CLK12-E (for optical, H-PCF-cable systems)
3G8F7-CLK52-E (for optical, GI-cable systems)

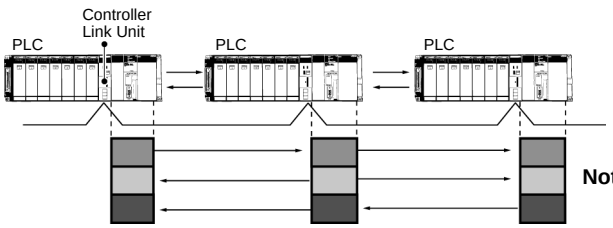
The Controller Link is OMRON's main FA-level network. It supports automatic data links between PLCs and between PLCs and host computer, as well as programmed data transfers using a message service. You get high-capacity, flexible data links and high-capacity data transfers with messages. For a low-cost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

■ Features

- 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, C200HX/HG/HE, CVM1, and CV PLCs.
- Complete error correction and troubleshooting functions.
- Set communications parameters with the CX-Programmer.
- Increase network reliability with duplex connections for optical networks.
- Use either ring mode or bus mode for optical networks.

■ System Configuration

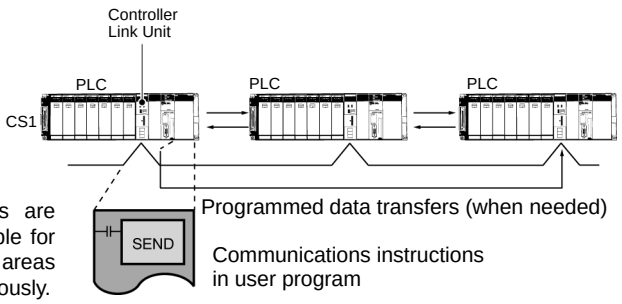
Data Links



Cyclic transfer with shared memory data areas
I/O bits, LR Area bits, DM Area words, etc.

Note: Data links are not possible for different areas simultaneously.

Message Communications



Programmed data transfers (when needed)

Communications instructions in user program

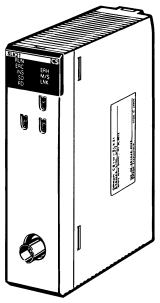
■ Specifications

Unit/Board	Classification	Communications	Media	Specifications	Unit numbers	Model
Controller Link Units	CS1 Bus Unit	Data links and message communications	Wired	Up to 4 Units can be mounted to CPU Rack or CS1 Expansion Racks.	0 to F (4 Unit max.)	CS1W-CLK21
			Optical (token ring or token bus)			CS1W-CLK12/52
Controller Link Support Boards	Personal computer board		Wired	Applicable computer: Windows-compatible computer with PCI bus	---	3G8F7-CLK21
			Optical (token bus mode)			3G8F7-CLK12/52

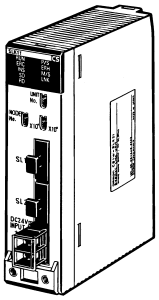
Unit Descriptions

SYSMAC LINK Units and Support Boards

OMRON's Main FA Networks



CS1W-SLK21
Coaxial SYSMAC LINK Unit

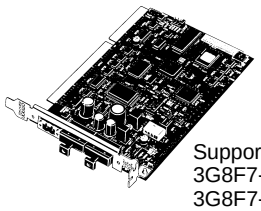


CS1W-SLK11
Optical SYSMAC LINK Unit

Both automatic data links and as-needed message services can be set up between PLCs or between PLCs and factory computers. You can exchange large volumes of data between up to 62 nodes for large-scale networks, or create a smaller network to suit the application.

■ Features

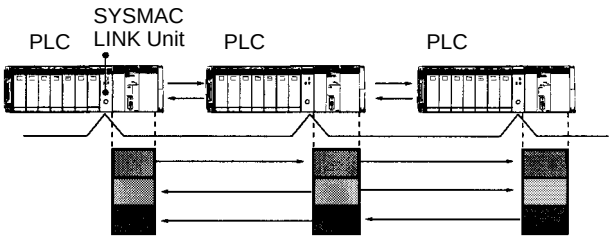
- Large-capacity, flexible data links.
- Large-capacity data transfers with message service.
- Use coaxial cable or optical fiber to meet system requirements.
- Connect different series of PLCs: CS1, C200HX/HG/HE, CVM1, CV, C200HS and C1000H.
- Complete troubleshooting measures.
- Communications settings with CX-Programmer.



Support Boards (for PCI bus)
3G8F7-SLK21-E (for coaxial systems)
3G8F7-SLK11-E (for optical systems)

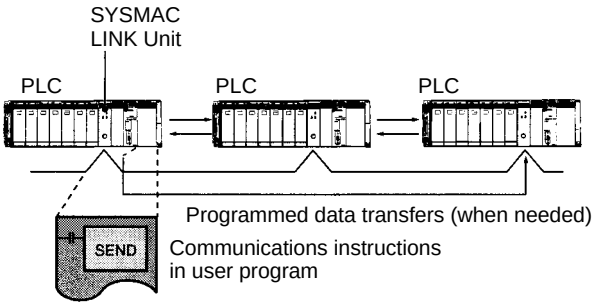
■ System Configuration

Data Links



Cyclic transfer with shared memory data areas
I/O bits, LR Area bits, DM Area words, etc.

Message Service

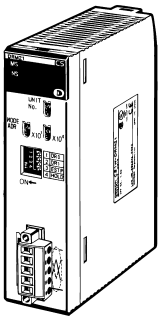


■ Specifications

Unit	Unit classification	Communications	Transmission media	Specifications	Unit numbers	Model
SYSMAC LINK Unit	CS1 CPU Bus Unit	Data links and message service	Coaxial cable	Up to 4 Units can be mounted to CPU Rack or CS1 Expansion Racks.	0 to F (4 Unit max.)	CS1W-SLK21
			Optical cable			CS1W-SLK11
SYSMAC LINK Support Board	Computer board		Coaxial cable	Computer: DOS (See note.)	---	3G8F7-SLK21
			Optical cable			3G8F7-SLK11

DeviceNet Units

Multivendor, Multibit Network

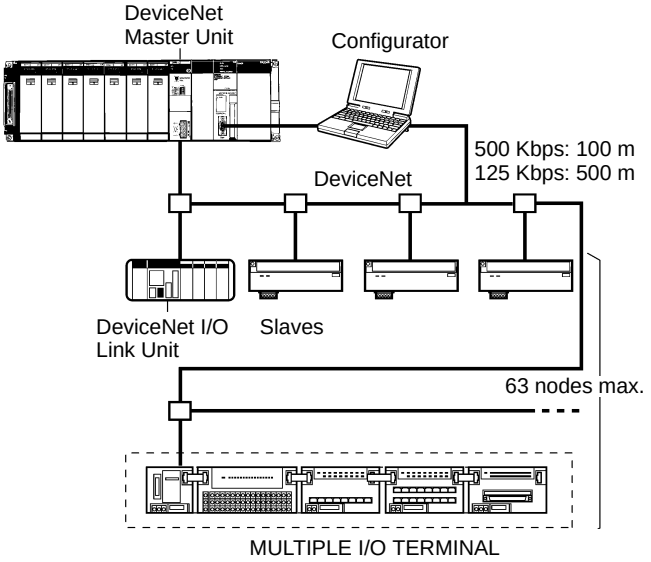


CS1W-DRM21
DeviceNet Unit

This is OMRON's implementation of the DeviceNet open field network, a multibit, multivender network for machine/line control and information. The following types of communications are possible.

1. Remote I/O communications for automatic data transfers between the CPU Unit and Slaves (with no programming in the CPU Unit).
2. Message communications that, using specific instructions (IOWR and CMND), can be programmed in a CPU Unit equipped with a DeviceNet Unit to send read/write message to slaves or other CPU Units equipped with DeviceNet Units and control operation.

■ System Configuration



■ Features

- The following functionality is available without a Configurator:
  - Remote I/O communications can be allocated in any area using the DM Area settings.
  - More than one DeviceNet Unit can be mounted for each CPU Unit (3 max. for fixed allocations).
  - More than one DeviceNet Unit can be connected in a single network. When using the Configurator (see note), remote I/O can be allocated in an order independent of node address.

  Note: The Configurator is allocated 1 node if connected using a special board or card. It is not allocated a node if connected using serial communications.
- DeviceNet Units can be used as both masters and slaves, and master and slave functionality can be used simultaneously.
- DeviceNet Units allow DeviceNet networks to be handled with the same seamless transparency as Controller Link, Ethernet, or other networks by using message communications or CX-Programmer remote programming and monitoring.

■ Specifications

DeviceNet Unit

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

Unit Descriptions

DeviceNet Configurator

Model number	Specifications
WS02-CFDC1-E	Software only (Windows 95, 98, NT 4.0, or 2000)
3G8F5-DRM21-E	ISA board with software (Windows 95, 98, or NT)
3G8E2-DRM21-E	PC card with software (Windows 95 or 98)

Setting/Monitoring Software

Name	Model number	Specifications
DeviceNet Analyzer	WS02-ALDF-E	---
NX-Server	WS02-NXD1-E	DDE edition
	WS02-NXDS1	SDK edition
	WS02-NXDR1	RT edition

DeviceNet Slaves

Slave		Specifications		Model
Programmable Slaves		Controller with SYSMAC CPM2C CPU No. of remote I/O link points: 1,024 max. Provides CompoBus/S Master.	4 transistor outputs (sinking)	CPM2C-S100C-DRT
			4 transistor outputs (sourcing)	CPM2C-S110C-DRT
I/O Link Units		512 internal inputs/512 internal outputs (between CS1 or C200HX/HG/HE PLC and Master)		C200HW-DRT21
		16 internal inputs/16 internal outputs (between CQM1/CQM1H PLC and Master)		CQM1-DRT21
		32 internal inputs/32 internal outputs (between CPM1A/CPM2A PLC and Master)		CPM1A-DRT21
Remote Transistor I/O Terminals		8 inputs (NPN, + common)		DRT1-ID08
		8 inputs (PNP, – common)		DRT1-ID08-1
		8 outputs (NPN, – common)		DRT1-OD08
		8 outputs (PNP, + common)		DRT1-OD08-1
		16 inputs (NPN, + common)		DRT1-ID16
		16 inputs (PNP, – common)		DRT1-ID16-1
		16 outputs (NPN, – common)		DRT1-OD16
		16 outputs (PNP, + common)		DRT1-OD16-1
		16 input points (NPN with + common) 16 output points (NPN with – common)		DRT1-MD16
Remote Transistor I/O Terminals with 3-tier Terminal Block	Common power supply for communications and internal circuits	16 input points (NPN with + common)		DRT1-ID16TA
		16 input points (PNP with – common)		DRT1-ID16TA-1
		8 input points (NPN with + common) 8 output points (NPN with – common)		DRT1-MD16TA
		8 input points (PNP with – common) 8 output points (PNP with + common)		DRT1-MD16TA-1
		16 output points (NPN with – common)		DRT1-OD16TA
		16 output points (PNP with + common)		DRT1-OD16TA-1
	Separate power supplies for communications and internal circuits	16 inputs (NPN, + common)		DRT1-ID16T
		16 inputs (PNP, – common)		DRT1-ID16T-1
		16 input points (NPN, + common) 16 output points (NPN, – common)		DRT1-MD16T
		16 input points (PNP, – common) 16 input points (PNP, + common)		DRT1-MD16T-1
		16 outputs (NPN, – common)		DRT1-OD16T
		16 outputs (PNP, + common)		DRT1-OD16T-1

Slave		Specifications	Model
Remote Transistor I/O Terminals with Connectors		32 inputs (NPN, + common)	DRT1-ID32ML
		32 inputs (PNP, – common)	DRT1-ID32ML-1
		32 outputs (NPN, – common)	DRT1-OD32ML
		32 outputs (PNP, + common)	DRT1-OD32ML-1
		32 I/O (NPN, – common)	DRT1-MD32ML
		32 I/O (PNP, + common)	DRT1-MD32ML-1
	Mounting Bracket B	---	SRT2-ATT02
Remote Adapters		16 inputs (NPN, + common)	DRT1-ID16X
		16 inputs (PNP, – common)	DRT1-ID16X-1
		16 outputs (NPN, – common)	DRT1-OD16X
		16 outputs (PNP, + common)	DRT1-OD16X-1
	Flat Cable Connectors with MIL Plugs	Straight DIP pins	XG4A-2031
		L-shaped DIP pins	XG4A-2034
DeviceNet Fiber Amplifier Sensor Communications Unit		Connects to up to 16 Fiber Amplifier Units for the E3X-DA-N	E3X-DRT21
		Fiber Amplifier Unit	E3X-DA6-P
		Reduced-wiring Connector	E3X-CN02
		Terminal Unit	E39-TM1
Sensor Terminals (for 2-wire Sensors)		8 sensor I/O points (NPN), 2 inputs per Sensor	DRT1-HD16S
		8 sensor I/O points (PNP)	DRT1-ND16S
	Cable Connectors	0.3 to 0.5 mm^2	XS8A-0441
		0.14 to 0.2 mm^2	XS8A-0442
Water-resistant Terminals (transistor I/O)		4 inputs (NPN, + common)	DRT1-ID04CL
		4 inputs (PNP, – common)	DRT1-ID04CL-1
		4 outputs (NPN, – common)	DRT1-OD04CL
		4 outputs (PNP, + common)	DRT1-OD04CL-1
		8 inputs (NPN, + common)	DRT1-ID08CL
		8 inputs (PNP, – common)	DRT1-ID08CL-1
		8 outputs (NPN, – common)	DRT1-OD08CL
		8 outputs (PNP, + common)	DRT1-OD08CL-1
Environmentally Resistant Transistor I/O Terminals		8 inputs (NPN, + common)	DRT1-ID08C
		16 inputs (NPN, + common)	DRT1-HD16C
		16 inputs (PNP, – common)	DRT1-HD16C-1
		8 outputs (NPN, – common)	DRT1-OD08C
		16 outputs (NPN, – common)	DRT1-WD16C
		16 outputs (PNP, + common)	DRT1-WD16C-1
		8 inputs/8 outputs (NPN, + common/– common)	DRT1-MD16C
		8 inputs/8 outputs (PNP, – common/+ common)	DRT1-MD16C-1
B7AC Interface Terminal		3 sets of 10 inputs (branching to 3 B7AC Link Terminals)	DRT1-B7AC
Analog Input Terminals		2 or 4 inputs (2 or 4 words) (voltage or current)	DRT1-AD04
		4 inputs (4 words) (voltage or current)	DRT1-AD04H

Unit Descriptions

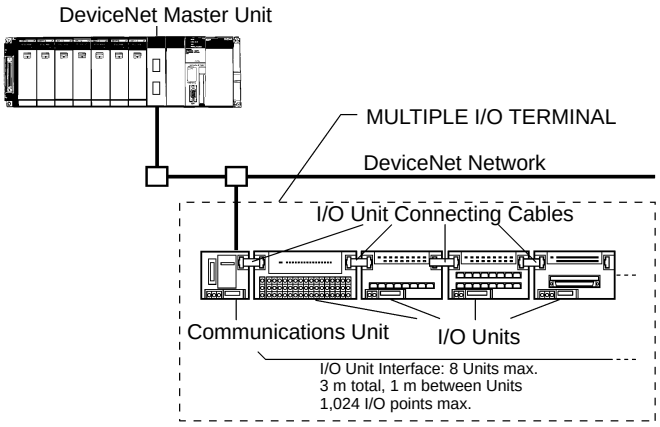
Slave	Specifications		Model
Analog Output Terminals	2 outputs (2 words)	Current: 0 to 20 mA, 4 to 20 mA	DRT1-DA02
		Voltage: 1 to 5 V, 0 to 10 V, – 10 to 10 V	
Temperature Input Terminals	4 inputs (4 words)	Inputs: R, S, K1, K2, J1, J2, T, E, B, N, L1, L2, U, W, PLII	DRT1-TS04T
		Inputs: Pt100, JPt100	DRT1-TS04P
RS-232C Unit	Two RS-232C ports, 16 inputs (signal status)		DRT1-232C2
Digital Controller	DeviceNet-compatible Digital Controller		E5EK-AA2-DRT
High-density Temperature Controllers	DeviceNet-compatible High-density Temperature Controllers		E5ZE-8□D1-□B-V2
Multi-function Compact Inverter DeviceNet Communications Unit	DeviceNet Communications Unit for the 3G3MV		3G3MV-PDRT1-SINV
High-function General-purpose Inverter DeviceNet Communications Unit	DeviceNet Communications Unit for the 3G3RV and 3G3FV		3G3FV-PDRT1-SIN
Intelligent Flags III	DeviceNet-compatible ID system		V600-HAM42-DRT
Vision Sensor Controller	DeviceNet-compatible vision system		F150-C10EV3-DRT
One-axis Positioner	DeviceNet-compatible One-axis Positioner		3F88M-DRT141
Connection Cable	2 m		3F88M-PRO01
Programmable Terminal DeviceNet Interface Unit	DeviceNet Interface Unit for the NT31/NT631 Series		NT-DRT21
DeviceNet Wireless Units	DeviceNet Wireless Master Unit		WD30-M
	DeviceNet Wireless Slave Unit		WD30-S

Note: For details on C200HX/HG/HE Units, refer to the C200HX/HG/HE Catalog (Cat. No. P036).

MULTIPLE I/O TERMINAL

Multibit Building-block DeviceNet Slave

■ System Configuration



A Communications Unit can be connected to the DeviceNet Master Unit to interface various types of I/O Units. Allocations and address settings are not required for the I/O Units, enabling flexible, simple distributed I/O.

■ Features

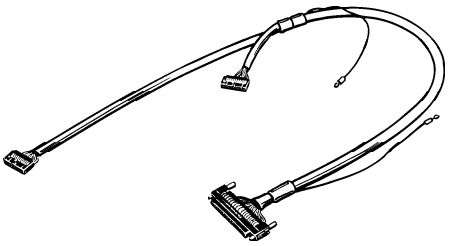
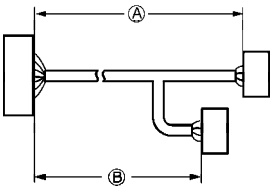
- To expand I/O, merely add I/O Units to the I/O interface.
- Create a low-cost multibit system.
- Connect up to 8 MULTIPLE I/O TERMINALs to one Communications Unit.
- Mix Digital and Analog Unit.
- Select from a wide range of I/O Units.

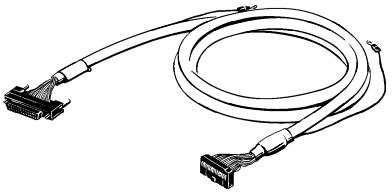
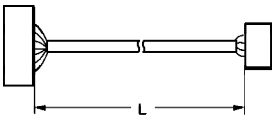
■ MULTIPLE I/O TERMINAL Units

Name		Model number	I/O points	Specifications
Communications Unit		DRT1-COM	---	Total Slave I/O points: 1,024 max.
Digital I/O Units	Units with Terminal Blocks	GT1-ID16	16 inputs	NPN (+ common)
		GT1-ID16-1	16 inputs	PNP (– common)
		GT1-OD16	16 outputs	NPN (– common)
		GT1-OD16-1	16 outputs	PNP (+ common)
	Units with MOLEX Connectors	GT1-ID16MX	16 inputs	NPN (+ common)
		GT1-ID16MX-1	16 inputs	PNP (– common)
		GT1-OD16MX	16 outputs	NPN (– common)
		GT1-OD16MX-1	16 outputs	PNP (+ common)
	Units with Fujitsu Connectors	GT1-ID16ML	16 inputs	NPN (+ common)
		GT1-ID16ML-1	16 inputs	PNP (– common)
		GT1-OD16ML	16 outputs	NPN (– common)
		GT1-OD16ML-1	16 outputs	PNP (+ common)
	Units with D-Sub 25-pin Connectors	GT1-ID16DS	16 inputs	NPN (+ common)
		GT1-ID16DS-1	16 inputs	PNP (– common)
		GT1-OD16DS	16 outputs	NPN (– common)
		GT1-OD16DS-1	16 outputs	PNP (+ common)
	Units with High-density Fujitsu Connectors	GT1-ID32ML	32 inputs	NPN (+ common)
		GT1-ID32ML-1	32 inputs	PNP (– common)
		GT1-OD32ML	32 outputs	NPN (– common)
		GT1-OD32ML-1	32 outputs	PNP (+ common)
Analog Input Units		GT1-AD08MX	8 inputs	MOLEX connector
		GT1-AD04	4 inputs	Terminal block
Analog Output Units		GT1-DA04MX	4 outputs	MOLEX connector
		GT1-DA04	4 outputs	Terminal block
Temperature Input Units		GT1-TS04T	4 inputs	Thermocouple
		GT1-TS04P	4 inputs	Platinum resistance thermometer
Counter Unit		GT1-CT01	1 input, 2 outputs	1 input, 2 outputs Counter Unit with encoder input
Relay Output Units		GT1-ROP08	8 outputs	8 relay outputs, 2A, SPST-NO
		GT1-ROS16	16 outputs	16 relay outputs, 5A, SPST-NO
I/O Unit Connecting Cable		GCN1-100	---	1 m

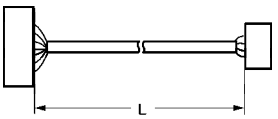
Unit Descriptions

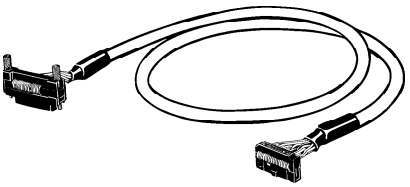
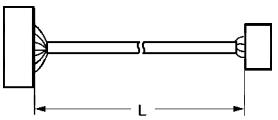
■ G79-□C Cables with Connectors

Length (mm)		Model		Dimensions
A	B	For input	For output	
1,000	750	G79-I100C-75	G79-O100C-75	  Straight length
1,500	1,250	G79-I150C-125	G79-O150C-125	
2,000	1,750	G79-I200C-175	G79-O200C-175	
3,000	2,750	G79-I300C-275	G79-O300C-275	
5,000	4,750	G79-I500C-475	G79-O500C-475	

Length L (mm)	Model	Dimensions
1,000	G79-100C	 L: Cable length 
1,500	G79-150C	
2,000	G79-200C	
3,000	G79-300C	
5,000	G79-500C	

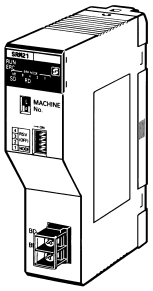
■ XW2Z Cables with Connectors

Length L (mm)	Model	Dimensions
500	XW2Z-050B	L: Cable length  For 32 points
1,000	XW2Z-100B	
1,500	XW2Z-150B	
2,000	XW2Z-200B	
3,000	XW2Z-300B	
5,000	XW2Z-500B	

Length L (mm)	Model	Dimensions
500	XW2Z-050A	 L: Cable length  For 16 points
1,000	XW2Z-100A	
1,500	XW2Z-150A	
2,000	XW2Z-200A	
3,000	XW2Z-300A	
5,000	XW2Z-500A	

CompoBus/S Master Unit

High-speed ON/OFF Bus for Distributed Machine Control and Reduced Wiring



C200HW-SRM21-V1

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

■ Features

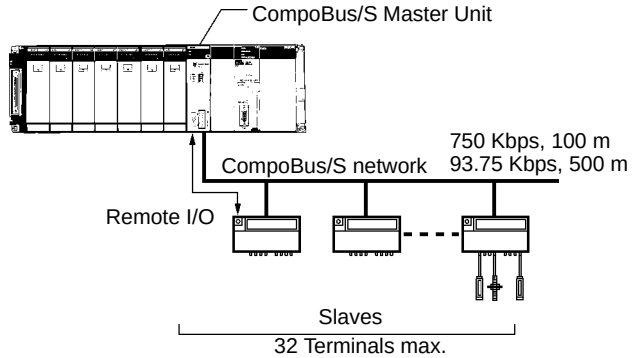
- Select either long-distance or high-speed communications.

  High-speed: 750 Kbps, communications distance: 100 m (30 m for 4-core VCTF or special flat cable)

  Long-distance: 93.75 Kbps, communications distance: 500 m

  (Total distance is 200 m max. for 4-core VCTF or special flat cable)
- Easy expansions at any location with T-branches.
- Reduce wiring with either VCTF cable or a special flat cable.
- Sensor connectors for easy wiring.

■ System Configuration



■ Communications Specifications

Communications method		Special CompoBus/S protocol
Coding method		Manchester coding method
Connection method		Multidrop, T-branch (requires termination)
Communications Baud rate		High-speed mode: 750 kbps Long-distance mode: 93.75 kbps. Set with DIP switch.
Communications cycle time	High-speed mode	0.5 ms (with 8 input and 8 output Slaves)
		0.8 ms (with 16 input and 16 output Slaves)
	Long-distance mode	4.0 ms (with 8 input and 8 output Slaves)
		6.0 ms (with 16 input and 16 output Slaves)
Communications cable		2-conductor cable (VCTF 0.75 x 2), 4-conductor cable (VCTF 0.75 x 4), or Special Flat Cable
Maximum communications distance		2-conductor VCTF Cable

Mode	Main	Branch	Total branch
High-speed	100 m max.	3 m max.	50 m max.
Long-distance	500 m max.	6 m max.	120 m max.

4-conductor VCTF or Special Flat Cable

Mode	Main	Branch	Total branch
High-speed (See note 1.)	30 m max.	3 m max.	30 m max.
Long-distance (See note 2.)	Variable branch wiring (total cable length 200 m max.)		

Max. No. of nodes	32
Error control checks	Manchester code, frame length, and parity checks

Note: 1. For 16 Slaves or fewer: Main: 100 m max., Total branch: 50 m max.

2. No restrictions on branching method or individual line lengths. Connect terminating resistance to Slave farthest from Master.

■ Master Specifications

I/O points	256 (128 inputs and 128 outputs) or 128 (64 inputs and 64 outputs) (Switch-selectable)
Allocated words	For 256 I/O: 20 words (8 for inputs, 8 for outputs, 4 for status) For 128 I/O: 10 words (4 for inputs, 4 for outputs, 2 for status)
No. of mountable Master Units	For 256 I/O: 8 For 128 I/O: 16
No. of points per node number	8 points
No. of connectable Slaves	32
Status information	Communications Error Flags, Participation Flags

Note: Uses Special I/O Unit Area (in CIO Area).

Unit Descriptions

■ Specifications

CompoBus/S Master Unit

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

CompoBus/S Slaves

Name	Model number	Specifications
I/O Link Units	CPM2C-SRT21	For CPM2C; 8 input points, 8 output points
	CPM1A-SRT21	For CPM1A/CPM2A; 8 input points, 8 output points
Remote I/O Terminals with Transistors	SRT2-ID04	4 input points, NPN (+ common)
	SRT2-ID04-1	4 input points, PNP (– common)
	SRT2-OD04	4 output points, NPN (– common)
	SRT2-OD04-1	4 output points, PNP (+ common)
	SRT2-ID08	8 input points, NPN (+ common)
	SRT2-ID08-1	8 input points, PNP (– common)
	SRT2-OD08	8 output points, NPN (– common)
	SRT2-OD08-1	8 output points, PNP (+ common)
	SRT2-ID16	16 input points, NPN (+ common)
	SRT2-ID16-1	16 input points, PNP (– common)
	SRT2-OD16	16 output points, NPN (– common)
	SRT2-OD16-1	16 output points, PNP (+ common)
Remote I/O Terminals with Transistors and 3-tier Terminal Block	SRT2-ID16T	16 input points, NPN (+ common)
	SRT2-ID16T-1	16 input points, PNP (– common)
	SRT2-MD16T	16 I/O points, NPN (inputs: + common, outputs: – common)
	SRT2-MD16T-1	16 I/O points, PNP (inputs: – common, outputs: + common)
	SRT2-OD16T	16 output points, NPN (– common)
	SRT2-OD16T-1	16 output points, PNP (+ common)
Remote Input Terminals with Transistors and Connectors (4/8 points)	SRT2-ID04MX	4 input points, NPN (+ common)
	SRT2-ID08MX	8 input points, PNP (+ common)
Remote Output Terminals with Relays	SRT2-ROC08	8 relay output points
	SRT2-ROC16	16 relay output points
	SRT2-ROF08	8 power MOSFET relay output points
	SRT2-ROF16	16 power MOSFET relay output points

Name	Model number	Specifications
Remote I/O Terminals with Transistors and Connectors	SRT2-ID32ML	32 input points, NPN (+ common)
	SRT2-ID32ML-1	32 input points, PNP (– common)
	SRT2-OD32ML	32 output points, NPN (– common)
	SRT2-OD32ML-1	32 output points, PNP (+ common)
	SRT2-MD32ML	32 I/O points, NPN (inputs: + common, outputs: – common)
	SRT2-MD32ML-1	32 I/O points, PNP (inputs: – common, outputs: + common)
	SRT2-VID08S	8 input points, NPN (+ common)
	SRT2-VID08S-1	8 input points, PNP (– common)
	SRT2-VOD08S	8 output points, NPN (– common)
	SRT2-VOD08S-1	8 output points, PNP (+ common)
	SRT2-VID16ML	16 input points, NPN (+ common)
	SRT2-VID16ML-1	16 input points, PNP (– common)
	SRT2-VOD16ML	16 output points, NPN (– common)
	SRT2-VOD16ML-1	16 output points, PNP (+ common)
	SRT2-ATT01	Mounting Bracket A
	SRT2-ATT02	Mounting Bracket B
Waterproof Terminals (with Transistors)	SRT2-ID04CL	4 input points, NPN (+ common)
	SRT2-ID04CL-1	4 input points, PNP (– common)
	SRT2-OD04CL	4 output points, NPN (– common)
	SRT2-OD04CL-1	4 output points, PNP (+ common)
	SRT2-ID08CL	8 input points, NPN (+ common)
	SRT2-ID08CL-1	8 input points, PNP (– common)
	SRT2-OD08CL	8 output points, NPN (– common)
	SRT2-OD08CL-1	8 output points, PNP (+ common)
CompoBus/S Fiber Amplifier Sensor Communication Unit	E3X-SRT21	Connects to up to 14 Fiber Amplifier Units
Sensor Terminals	SRT2-ID08S	8 sensor inputs (NPN)
	SRT2-ND08S	4 remote-teaching Sensor inputs, 4 outputs (NPN)
	SRT2-OD08S	8 outputs (NPN)
Analog Input Terminal	SRT2-AD04	1 to 4 inputs (set with DIP switch)
Analog Output Terminal	SRT2-DA02	1 or 2 outputs (set with DIP switch)
Remote I/O Modules	SRT2-ID16P	16 input points, NPN (+ common)
	SRT2-OD16P	16 output points, NPN (– common)
Positioner Drivers (Cannot be used in Long-distance Communications Mode.)	FND-X06H-SRT	200-VAC input, 6 A
	FND-X12H-SRT	200-VAC input, 12 A
	FND-X25H-SRT	200-VAC input, 25 A
	FND-X50H-SRT	200-VAC input, 50 A
	FND-X06L-SRT	100-VAC input, 6 A
	FND-X12L-SRT	100-VAC input, 12 A

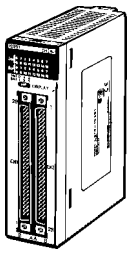
I/O Allocations

■ I/O Allocations

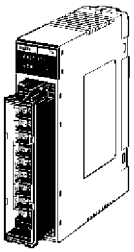
In CS1 PLCs, part of the I/O memory is allocated to each Unit. Units are divided into the following 3 groups for allocations.

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

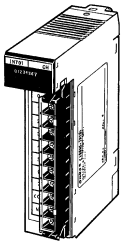
Basic I/O Units



CS1 Basic I/O Units



C200H Basic I/O Units



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

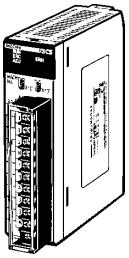
Allocations

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

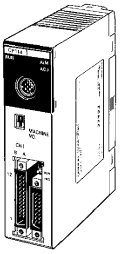
Note 1. The Rack's first word setting can be changed from the default setting (CIO 0000) to any word from CIO 0000 to CIO 9999. The first word setting can be changed only with a Programming Device other than a Programming Console.

2. The unit number setting on the front of C200H Group-2 High-density I/O Units is ignored. Words are allocated to these Units based on their location in the Rack.

Special I/O Units



CS1 Special I/O Units



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

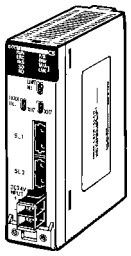
Allocations

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

Note 1. Although there are 80 unit number settings, a maximum of 80 Units can actually be mounted to a PLC because that is the maximum number of slots possible.

2. Some Units classified as I/O Units (namely C200H High-density I/O Units) are actually treated as Special I/O Units.

CS1 CPU Bus Units



CS1 CPU Bus Units

Allocations

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

■ Allocations to Basic I/O Unit Groups

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

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

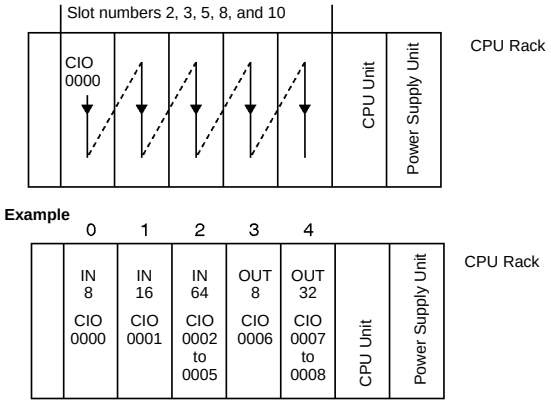
Basic I/O Units can be mounted to the CPU Rack, CS1 Expansion Racks, and C200HX/HG/HE Expansion I/O Racks.

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

Allocation Methods

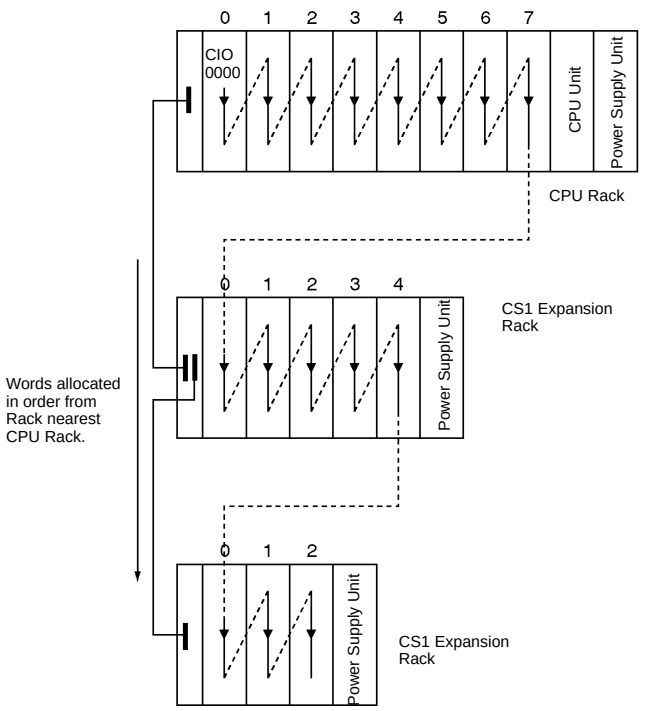
1. CPU Rack

Basic I/O Units on the CPU Rack are allocated words left to right; Units are allocated as many words as required in word units.



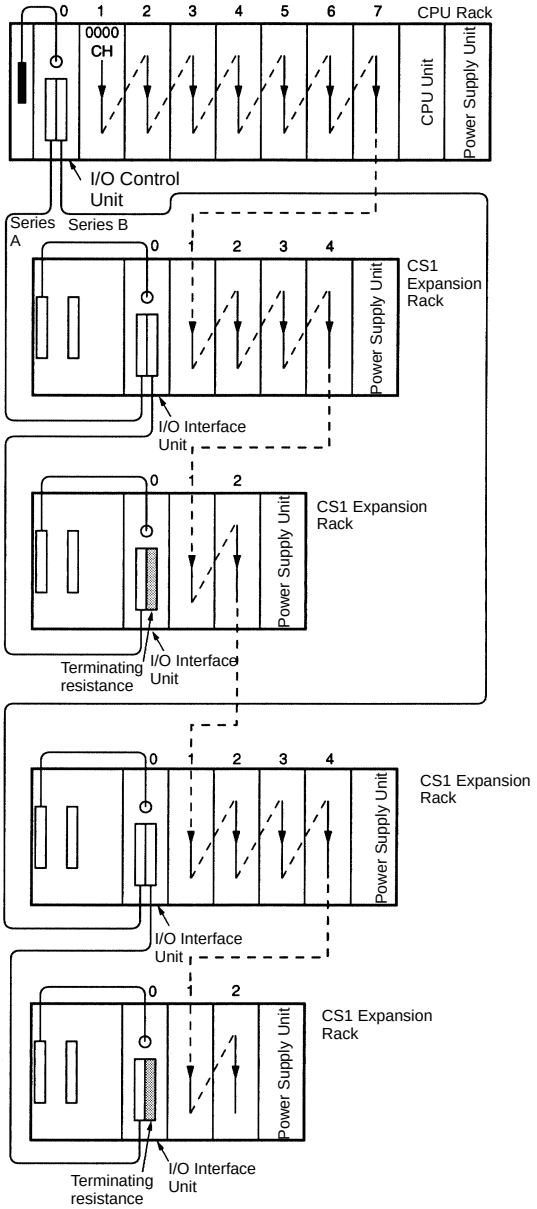
2. Allocations to CS1 Expansion and C200H Expansion I/O Racks

I/O allocations to Basic I/O Units continues 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.



I/O Allocations

■ 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*.

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

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

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

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

■ Allocations to CS1 CPU Bus Units

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

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

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

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

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

Current Consumption

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

■ CPU Racks and Expansion Racks

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

Note: 1. When calculating current/power consumption in a CPU Rack, be sure to include the power required by the CPU Backplane and CPU Unit themselves.

2. Likewise, be sure to include the power required by the Expansion Backplane itself when calculating current/power consumption in an Expansion Rack.

Power Supply Unit	Max. Current Consumption			Max. Total Power Consumption
	5-V group	26-V group	24-V group	
C200HW-PA204	4.6 A	0.6 A	None	30 W
C200HW-PA204S	4.6 A	0.6 A	0.8 A	30 W
C200HW-PA204R	4.6 A	0.6 A	None	30 W
C200HW-PD204	4.6 A	0.6 A	None	30 W
C200HW-PA209R	9 A	1.3 A	None	45 W

Be sure both Condition 1 and Condition 2 are met.

Condition 1: Maximum Current Supply

1. Current required at 5 VDC by all Units (A) ≤ Max. Current shown in table
2. Current required at 26 VDC by all Units (B) ≤ Max. Current shown in table
3. Current required at 24 VDC by all Units (C) ≤ Max. Current shown in table

Condition 2: Maximum Total Current Supply

1. A × 5 VDC + B × 26 VDC + C × 24 VDC ≤ Max. Power shown in table

■ Example Calculations

Example 1

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

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

Current Consumption

■ Current Consumption Tables

5-VDC Voltage Group

Name	Model	Consumption (A)
CPU Units (These values include current consumption by a Programming Console.)	CS1H-CPU67H	0.82 (See note.)
	CS1H-CPU66H	0.82 (See note.)
	CS1H-CPU65H	0.82 (See note.)
	CS1H-CPU64H	0.82 (See note.)
	CS1H-CPU63H	0.82 (See note.)
	CS1G-CPU45H	0.78 (See note.)
	CS1G-CPU44H	0.78 (See note.)
	CS1G-CPU43H	0.78 (See note.)
	CS1G-CPU42H	0.78 (See note.)
Serial Communication Boards	CS1W-SCB21	0.28 (See note.)
	CS1W-SCB41	0.36 (See note.)
CPU Backplanes (for CS1 Units only)	CS1W-BC022	Available soon
	CS1W-BC032	Available soon
	CS1W-BC052	Available soon
	CS1W-BC082	Available soon
	CS1W-BC102	Available soon
CPU Backplanes	CS1W-BC023	0.11
	CS1W-BC033	0.11
	CS1W-BC053	0.11
	CS1W-BC083	0.11
	CS1W-BC103	0.11
I/O Control Unit	CS1W-IC102	0.92
CS1 Expansion Backplanes (for CS1 Units only)	CS1W-BI032	Available soon
	CS1W-BI052	Available soon
	CS1W-BI082	Available soon
	CS1W-BI102	Available soon
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

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

Basic I/O Units

Category	Name	Model	Consumption (A)
C200H Input Units	DC Input Units	C200H-ID211	0.01
		C200H-ID212	0.01
	AC Input Units	C200H-IA121	0.01
		C200H-IA122	0.01
		C200H-IA122V	0.01
		C200H-IA221	0.01
		C200H-IA222	0.01
		C200H-IA222V	0.01
	AC/DC Input Units	C200H-IM211	0.01
		C200H-IM212	0.01
	B7A Interface Units	C200H-B7AI1	0.10
		C200H-B7A12	0.10
	Interrupt Input Unit	C200HS-INT01	0.02
C200H Group-2 High-density Input Units	DC Input Units	C200H-ID216	0.10
		C200H-ID217	0.12
		C200H-ID218	0.10
		C200H-ID219	0.12
		C200H-ID111	0.12
CS1 Input Units	DC Input Units	CS1W-ID211	0.10
		CS1W-ID231	0.15
		CS1W-ID261	0.15
		CS1W-ID291	0.20
	AC Input Units	CS1W-IA111	0.11
		CS1W-IA211	0.11
	Interrupt Input Unit	CS1W-INT01	0.10
	High-speed Input Unit	CS1W-IDP01	0.10
	Safety Relay Unit	CS1W-SF200	0.10
C200H Output Units	Relay Output Units	C200H-OC221	0.01
		C200H-OC222	0.01
		C200H-OC222N	0.008
		C200H-OC225	0.05
		C200H-OC226N	0.03
		C200H-OC223	0.01
		C200H-OC224	0.01
		C200H-OC224N	0.01
	Transistor Output Units	C200H-OD411	0.14
		C200H-OD213	0.14
		C200H-OD214	0.14
		C200H-OD216	0.01
		C200H-OD211	0.16
		C200H-OD217	0.01
		C200H-OD212	0.18
		C200H-OD21A	0.16
	B7A Interface Units	C200H-B7A01	0.10
		C200H-B7A02	0.10
	Triac Output Units	C200H-OA223	0.18
		C200H-OA222V	0.20
		C200H-OA224	0.27
CS1 Output Units	Relay Output Units	CS1W-OC201	0.10
		CS1W-OC211	0.13
	Transistor Output Units	CS1W-OD211	0.17
		CS1W-OD212	0.17
		CS1W-OD231	0.27
		CS1W-OD232	0.27
		CS1W-OD261	0.39
		CS1W-OD262	0.39
		CS1W-OD291	0.18
		CS1W-OD292	0.18
	Triac Output Units	CS1W-OA201	0.23 max. (0.07+0.02× No. of points ON)
		CS1W-OA211	0.406 max. (0.07+0.021×No. of points ON)
C200H Group-2 High-density Output Units	Transistor Output Units	C200H-OD218	0.27
		C200H-OD21B	0.48
		C200H-OD219	0.48

Category	Name	Model	Consumption (A)
CS1 I/O Units	DC Input/Transistor Output Units	CS1W-MD261	0.27
		CS1W-MD262	0.27
		CS1W-MD291	0.35
		CS1W-MD292	0.35
C200H I/O Units	B7A Interface Units	C200H-B7A21	0.10
		C200H-B7A22	0.10
	Analog Timer Unit	C200H-TM001	0.06

Special I/O Units

Category	Name	Model	Consumption(A)
C200H High-density I/O Units (Special I/O Units)	DC Input Unit	C200H-ID215	0.13
	TTL Input Unit	C200H-ID501	0.13
	Transistor Output Unit	C200H-OD215	0.22
	TTL Output Unit	C200H-OD501	0.22
	TTL I/O Unit	C200H-MD501	0.18
	DC Input Transistor Output Unit	C200H-MD215	0.18
		C200H-MD115	0.18
C200H Special I/O Units	Temperature Control Units	C200H-TC001	0.33
		C200H-TC002	0.33
		C200H-TC003	0.33
		C200H-TC101	0.33
		C200H-TC102	0.33
		C200H-TC103	0.33
	Heat/Cool Temperature Control Units	C200H-TV001	0.33
		C200H-TV002	0.33
		C200H-TV003	0.33
		C200H-TV101	0.33
		C200H-TV102	0.33
		C200H-TV103	0.33
	Temperature Sensor Units	C200H-TS001	0.45
		C200H-TS002	0.45
		C200H-TS101	0.45
		C200H-TS102	0.45
	PID Control Units	C200H-PID01	0.33
		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 Units	C200H-CT001-V1	0.30
		C200H-CT002	0.30
		C200H-CT021	0.45
	Motion Control Unit	C200H-MC221	0.65 (w/ Teaching Box: 0.85)
	Position Control Units	C200HW- NC113	0.30
		C200HW-NC213	0.30
		C200HW-NC413	0.50
C200H Special I/O Units	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
	PC Card Unit	C200HW-PCV01	(See note.)
	DeviceNet Master Unit	C200HW-DRM21-V1	0.25
	DeviceNet I/O Link Unit	C200HW-DRT21	0.25
	CompoBus/S Master Unit	C200HW-SRM21-V1	0.15
	PC Link Unit	C200H-LK401	0.35

Note: The consumption depends on the commercial memory card used. Calculate the consumption using the following.

+5 VDC, 0.7 A max. (for each Unit) + PC card output current (Icard)
I_{5V} (1 slot) ≤ 0.5 A, I_{12V} (1 slot) ≤ 0.1 A
However, Icard = I_{5V} (2 slots) + 3.4 × I_{12V} (2 slots) ≤ 1.0 A

Current Consumption

Category	Name	Model	Consumption(A)
CS1 Special I/O Unit	Analog Input Unit	CS1W-AD□□□	0.13
	Analog Output Unit	CS1W-DA□□□	0.13
	Analog I/O Unit	CS1W-MAD44	0.20
	Isolated Thermocouple Input Unit	CS1W-PTS01	0.15
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.16
	Isolated DC Input Unit	CS1W-PDC01	
	Isolated Pulse Input Unit	CS1W-PPS01	
	Isolated Control Output Unit	CS1W-PMV01	
	Power Transducer Input Unit	CS1W-PTR01	0.08
	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 Units	CS1W-CT021	
		CS1W-CT041	0.45
	Customizable Counter Units	CS1W-HCP22	0.80
		CS1W-HCA22	0.75
		CS1W-HIO01	0.60

CS1 CPU Bus Units

Category	Name	Model	Consumption (A)
CS1 CPU Bus Units	Loop Control Unit	CS1W-LC001	0.36
	Controller Link Units	CS1W-CLK52	0.65
		CS1W-CLK21	0.33
		CS1W-CLK12	0.52
	SYSMAC LINK Unit	CS1W-SLK21	0.48
		CS1W-SLK11	0.47
	Serial Communications Unit	CS1W-SCU21	0.29 (See Note.)
	Ethernet Unit	CS1W-ETN01/11	0.40
	DeviceNet Unit	CS1W-DRM21	0.29

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

26-V Current Consumption

Category	Name	Model	Consumption (A)
C200H Output Units	Relay Output Units	C200H-OC221	0.075 for 8 points ON at the same time
		C200H-OC222	
		C200H-OC223	
		C200H-OC224	
		C200H-OC225	
		C200H-OC222N	0.09 for 8 points ON at the same time
		C200H-OC226N	
		C200H-OC224N	
	Transistor Output Units	C200H-OD216	0.075 for 8 points ON at the same time
		C200H-OD217	
CS1 Output Units	Relay Output Units	CS1W-OC201	0.006 for each point ON at the same time
		CS1W-OC211	
C200H Special I/O Units	Analog Intput Unit	C200H-AD003	0.10
	Analog Output Units	C200H-DA003	0.20
		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 I/O Units	Analog Input Unit	CS1W-AD□□□	0.10
	Analog Output Units	CS1W-DA041	0.18
		CS1W-DA08V	0.18
		CS1W-DA08C	0.25
	Analog I/O Unit	CS1W-MAD44	0.20
	Isolated Thermocouple Input Unit	CS1W-PTS01	0.15
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.16
	Isolated DC Input Unit	CS1W-PDC01	
	Isolated Pulse Input Unit	CS1W-PPS01	
	Isolated Control Output Unit	CS1W-PMV01	
	Power Transducer Input Unit	CS1W-PTR01	0.08
	100-mV DC Input Unit	CS1W-PTR02	
	Customizable Counter Unit	CS1W-HCA22	0.15

Instructions

■ Sequence Input Instructions

Name	Mnemonic	Function code	Function
LOAD	LD	---	Indicates a logical start and creates an ON/OFF execution condition based on the ON/OFF status of the specified operand bit.
LOAD NOT	LD NOT	---	Indicates a logical start and creates an ON/OFF execution condition based on the reverse of the ON/OFF status of the specified operand bit.
AND	AND	---	Takes a logical AND of the status of the specified operand bit and the current execution condition.
AND NOT	AND NOT	---	Reverses the status of the specified operand bit and takes a logical AND with the current execution condition.
OR	OR	---	Takes a logical OR of the ON/OFF status of the specified operand bit and the current execution condition.
OR NOT	OR NOT	---	Reverses the status of the specified bit and takes a logical OR with the current execution condition.
AND LOAD	AND LD	---	Takes a logical AND between logic blocks.
OR LOAD	OR LD	---	Takes a logical OR between logic blocks.
NOT	NOT	520	Reverses the execution condition.
CONDITION ON	UP	521	UP(521) turns ON the execution condition for one cycle when the execution condition goes from OFF to ON.
CONDITION OFF	DOWN	522	DOWN(522) turns ON the execution condition for one cycle when the execution condition goes from ON to OFF.
BIT TEST	LD TST	350	LD TST(350), AND TST(350), and OR TST(350) are used in the program like LD, AND, and OR; the execution condition is ON when the specified bit in the specified word is ON and OFF when the bit is OFF.
BIT TEST NOT	LD TSTN	351	LD TSTN(351), AND TSTN(351), and OR TSTN(351) are used in the program like LD NOT, AND NOT, and OR NOT; the execution condition is OFF when the specified bit in the specified word is ON and ON when the bit is OFF.
BIT TEST	AND TST	350	LD TST(350), AND TST(350), and OR TST(350) are used in the program like LD, AND, and OR; the execution condition is ON when the specified bit in the specified word is ON and OFF when the bit is OFF.
BIT TEST NOT	AND TSTN	351	LD TSTN(351), AND TSTN(351), and OR TSTN(351) are used in the program like LD NOT, AND NOT, and OR NOT; the execution condition is OFF when the specified bit in the specified word is ON and ON when the bit is OFF.
BIT TEST	OR TST	350	LD TST(350), AND TST(350), and OR TST(350) are used in the program like LD, AND, and OR; the execution condition is ON when the specified bit in the specified word is ON and OFF when the bit is OFF.
BIT TEST NOT	OR TSTN	351	LD TSTN(351), AND TSTN(351), and OR TSTN(351) are used in the program like LD NOT, AND NOT, and OR NOT; the execution condition is OFF when the specified bit in the specified word is ON and ON when the bit is OFF.

■ Sequence Output Instructions

Name	Mnemonic	Function code	Function
OUTPUT	OUT	---	Outputs the result (execution condition) of the logical processing to the specified bit.
OUTPUT NOT	OUT NOT	---	Reverses the result (execution condition) of the logical processing, and outputs it to the specified bit.
KEEP	KEEP	011	Operates as a latching relay.
DIFFERENTIATE UP	DIFU	013	DIFU(013) turns the designated bit ON for one cycle when the execution condition goes from OFF to ON (rising edge).
DIFFERENTIATE DOWN	DIFD	014	DIFD(014) turns the designated bit ON for one cycle when the execution condition goes from ON to OFF (falling edge).
SET	SET	---	SET turns the operand bit ON when the execution condition is ON.
RESET	RSET	---	RSET turns the operand bit OFF when the execution condition is ON.
MULTIPLE BIT SET	SETA	530	SETA(530) turns ON the specified number of consecutive bits.
MULTIPLE BIT RESET	RSTA	531	RSTA(531) turns OFF the specified number of consecutive bits.

Name	Mnemonic	Function code	Function
SINGLE BIT SET	SETB	532	Turns ON the specified bit in the specified word when the execution condition is ON.
SINGLE BIT RESET	RSTB	533	Turns OFF the specified bit in the specified word when the execution condition is ON.
SINGLE BIT OUTPUT	OUTB	534	Outputs the result (execution condition) of the logical processing to the specified bit.

■ Sequence Control Instructions

Name	Mnemonic	Function code	Function
END	END	001	Indicates the end of a program. END(001) completes the execution of a program for that cycle. No instructions written after END(001) will be executed. Execution proceeds to the program with the next task number. When the program being executed has the highest task number in the program, END(001) marks the end of the overall main program.
NO OPERATION	NOP	000	This instruction has no function. (No processing is performed for NOP(000).)
INTERLOCK	IL	002	Interlocks all outputs between IL(002) and ILC(003) when the execution condition for IL(002) is OFF. IL(002) and ILC(003) are normally used in pairs.
INTERLOCK CLEAR	ILC	003	Interlocks all outputs between IL(002) and ILC(003) when the execution condition for IL(002) is OFF. IL(002) and ILC(003) are normally used in pairs.
JUMP	JMP	004	When the execution condition for JMP(004) is OFF, program execution jumps directly to the first JME(005) in the program with the same jump number. When the execution condition is ON, all instructions are executed normally.
JUMP END	JME	005	JME(005) indicates the destination of jumps made for JMP(004), CJP(510), and CJPN(511).
CONDITIONAL JUMP	CJP	510	The operation of CJP(510) is the basically the opposite of JMP(004). When the execution condition for CJP(510) is ON, program execution jumps directly to the first JME(005) in the program with the same jump number. When the execution condition is OFF, all instructions are executed normally.
CONDITIONAL JUMP	CJPN	511	The operation of CJPN(511) is almost identical to JMP(004). When the execution condition for CJP(004) is OFF, program execution jumps directly to the first JME(005) in the program with the same jump number. When the execution condition is ON, all instructions are executed normally.
MULTIPLE JUMP	JMP0	515	When the execution condition for JMP0(515) is OFF, all instructions from JMP0(515) to the next JME0(516) in the program are processed as NOP(000). When the execution condition is ON, all instructions are executed normally. Use JMP0(515) and JME0(516) in pairs. There is no limit on the number of pairs that can be used in the program.
MULTIPLE JUMP END	JME0	516	JME0(516) indicates the destination of jumps made for JMP0(515).
FOR-NEXT LOOPS	FOR	512	The instructions between FOR(512) and NEXT(513) are repeated a specified number of times. FOR(512) and NEXT(513) are used in pairs.
BREAK LOOP	BREAK	514	Programmed in a FOR-NEXT loop to cancel the execution of the loop for a given execution condition. The remaining instructions in the loop are processed as NOP(000) instructions.
FOR-NEXT LOOPS	NEXT	513	The instructions between FOR(512) and NEXT(513) are repeated a specified number of times. FOR(512) and NEXT(513) are used in pairs.

■ Timer and Counter Instructions

Name	Mnemonic	Function code	Function
TIMER	TIM	---	TIM operates a decrementing timer with units of 0.1-s. The setting range for the set value (SV) is 0 to 999.9 s.
COUNTER	CNT	---	CNT operates a decrementing counter. The setting range for the set value (SV) is 0 to 9,999.
HIGH-SPEED TIMER	TIMH	015	TIMH(015) operates a decrementing timer with units of 10-ms. The setting range for the set value (SV) is 0 to 99.99 s.
ONE-MS TIMER	TMHH	540	TMHH(540) operates a decrementing timer with units of 1-ms. The setting range for the set value (SV) is 0 to 9.999 s. The timing charts for TMHH(540) are the same as those given above for TIMH(015).
ACCUMULATIVE TIMER	TTIM	087	TTIM(087) operates an incrementing timer with units of 0.1-s. The setting range for the set value (SV) is 0 to 999.9 s.

Name	Mnemonic	Function code	Function
LONG TIMER	TIML	542	TIML(542) operates a decrementing timer with units of 0.1-s that can time up to 9999999.9 S (approx. 115 days).
MULTI-OUTPUT TIMER	MTIM	543	MTIM(543) operates a 0.1-s incrementing timer with eight independent SVs and Completion Flags. The setting range for the set value (SV) is 0 to 999.9 s.
REVERSIBLE COUNTER	CNTR	012	CNTR(012) operates a reversible counter.
RESET TIMER/COUNTER	CNR	545	Resets the timers or counters within the specified range of timer or counter numbers. Sets the set value (SV) to the maximum of 9999.

■ Symbol Comparison Instructions

Name	Mnemonic	Function code	Function
Symbol Comparison (Unsigned)	LD, AND, OR + =, <>, <, <=, >, >=	300 (=) 305 (<>) 310 (<) 315 (<=) 320 (>) 325(>=)	Symbol comparison instructions (unsigned) compare two values (constants and/or the contents of specified words) in 16-bit binary data and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
Symbol Comparison (Double-word, unsigned)	LD, AND, OR + =, <>, <, <=, >, >= + L	301 (=) 306 (<>) 311 (<) 316 (<=) 321 (>) 326 (>=)	Symbol comparison instructions (double-word, unsigned) compare two values (constants and/or the contents of specified double-word data) in unsigned 32-bit binary data and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
Symbol Comparison (Signed)	LD, AND, OR + =, <>, <, <=, >, >= +S	302 (=) 307 (<>) 312 (<) 317 (<=) 322 (>) 327 (>=)	Symbol comparison instructions (signed) compare two values (constants and/or the contents of specified words) in signed 16-bit binary (4-digit hexadecimal) and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
Symbol Comparison (Double-word, signed)	LD, AND, OR + =, <>, <, <=, >, >= +SL	303 (=) 308 (<>) 313 (<) 318 (<=) 323 (>) 328 (>=)	Symbol comparison instructions (double-word, signed) compare two values (constants and/or the contents of specified double-word data) in signed 32-bit binary (8-digit hexadecimal) and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
COMPARE	CMP	020	Compares two unsigned binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
DOUBLE COMPARE	CMPL	060	Compares two double unsigned binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
SIGNED BINARY COMPARE	CPS	114	Compares two signed binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
DOUBLE SIGNED BINARY COMPARE	CPSL	115	Compares two double signed binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
TABLE COMPARE	TCMP	085	Compares the source data to the contents of 16 consecutive words and turns ON the corresponding bit in the result word when the contents of the words **are** equal.
MULTIPLE COMPARE	MCMP	019	Compares 16 consecutive words with another 16 consecutive words and turns ON the corresponding bit in the result word where the contents of the words **are not** equal.
BLOCK COMPARE	BCMP	068	Compares the source data to 16 ranges (defined by 16 lower limits and 16 upper limits) and turns ON the corresponding bit in the result word when the source data is within the range.

■ Data Comparison Instructions

Name	Mnemonic	Function code	Function
AREA RANGE COMPARE	ZCP	088	Compares a specified 16-bit unsigned binary value (word contents or constant) to the range defined by specified upper and lower limits and outputs the results to the Arithmetic Flags in the Auxiliary Area.
DOUBLE AREA RANGE COMPARE	ZCPL	116	Compares a specified 32-bit unsigned binary value (word contents or constant) to the range defined by specified upper and lower limits and outputs the results to the Arithmetic Flags in the Auxiliary Area.

Instructions

■ Data Movement Instructions

Name	Mnemonic	Function code	Function
MOVE	MOV	021	Transfers a word of data to the specified word.
DOUBLE MOVE	MOVL	498	Transfers two words of data to the specified words.
MOVE NOT	MVN	022	Transfers the complement of a word of data to the specified word.
DOUBLE MOVE NOT	MVNL	499	Transfers the complement of two words of data to the specified words.
MOVE BIT	MOVB	082	Transfers the specified bit.
MOVE DIGIT	MOVD	083	Transfers the specified digit or digits. (Each digit is made up of 4 bits.)
MULTIPLE BIT TRANSFER	XFRB	062	Transfers the specified number of consecutive bits.
BLOCK TRANSFER	XFER	070	Transfers the specified number of consecutive words.
BLOCK SET	BSET	071	Copies the same word to a range of consecutive words.
DATA EXCHANGE	XCHG	073	Exchanges the contents of the two specified words.
DOUBLE DATA EXCHANGE	XCGL	562	Exchanges the contents of a pair of consecutive words with another pair of consecutive words.
SINGLE WORD DISTRIBUTE	DIST	080	Transfers the source word to a destination word calculated by adding an offset value to the base address.
DATA COLLECT	COLL	081	Transfers the source word (calculated by adding an offset value to the base address) to the destination word.
MOVE TO REGISTER	MOVR	560	Sets the PLC memory address of the specified word, bit, or timer/counter Completion Flag in the specified Index Register. (Use MOVRW(561) to set the PLC memory address of a timer/counter PV in an Index Register.)
MOVE TIMER/COUNTER PV TO REGISTER	MOVRW	561	Sets the PLC memory address of the specified timer or counter's PV in the specified Index Register. (Use MOVR(560) to set the PLC memory address of a word, bit, or timer/counter Completion Flag in an Index Register.)

■ Data Shift Instructions

Name	Mnemonic	Function code	Function
SHIFT REGISTER	SFT	010	Operates a shift register.
REVERSIBLE SHIFT REGISTER	SFTR	084	Creates a shift register that shifts data to either the right or the left.
ASYNCHRONOUS SHIFT REGISTER	ASFT	017	Shifts all non-zero word data within the specified word range either towards St or toward E, replacing 0000Hex word data.
WORD SHIFT	WSFT	016	Shifts data between St and E in word units.
ARITHMETIC SHIFT LEFT	ASL	025	Shifts the contents of Wd one bit to the left.
DOUBLE SHIFT LEFT	ASLL	570	Shifts the contents of Wd and Wd +1 one bit to the left.
ARITHMETIC SHIFT RIGHT	ASR	026	Shifts the contents of Wd one bit to the right.
DOUBLE SHIFT RIGHT	ASRL	571	Shifts the contents of Wd and Wd +1 one bit to the right.
ROTATE LEFT	ROL	027	Shifts all Wd bits one bit to the left including the Carry Flag (CY).
DOUBLE ROTATE LEFT	ROLL	572	Shifts all Wd and Wd +1 bits one bit to the left including the Carry Flag (CY).
ROTATE LEFT WITHOUT CARRY	RLNC	574	Shifts all Wd bits one bit to the left not including the Carry Flag (CY).
DOUBLE ROTATE LEFT WITHOUT CARRY	RLNL	576	Shifts all Wd and Wd +1 bits one bit to the left not including the Carry Flag (CY).
ROTATE RIGHT	ROR	028	Shifts all Wd bits one bit to the right including the Carry Flag (CY).
DOUBLE ROTATE RIGHT	RORL	573	Shifts all Wd and Wd +1 bits one bit to the right including the Carry Flag (CY).
ROTATE RIGHT WITHOUT CARRY	RRNC	575	Shifts all Wd bits one bit to the right not including the Carry Flag (CY). The contents of the rightmost bit of Wd shifts to the leftmost bit and to the Carry Flag (CY).
DOUBLE ROTATE RIGHT WITHOUT CARRY	RRNL	577	Shifts all Wd and Wd +1 bits one bit to the right not including the Carry Flag (CY). The contents of the rightmost bit of Wd +1 is shifted to the leftmost bit of Wd, and to the Carry Flag (CY).
ONE DIGIT SHIFT LEFT	SLD	074	Shifts data by one digit (4 bits) to the left.
ONE DIGIT SHIFT RIGHT	SRD	075	Shifts data by one digit (4 bits) to the right.

Name	Mnemonic	Function code	Function
SHIFT N-BIT DATA LEFT	NSFL	578	Shifts the specified number of bits to the left.
SHIFT N-BIT DATA RIGHT	NSFR	579	Shifts the specified number of bits to the right.
SHIFT N-BITS LEFT	NASL	580	Shifts the specified 16 bits of word data to the left by the specified number of bits.
DOUBLE SHIFT N-BITS LEFT	NSLL	582	Shifts the specified 32 bits of word data to the left by the specified number of bits.
SHIFT N-BITS RIGHT	NASR	581	Shifts the specified 16 bits of word data to the right by the specified number of bits.
DOUBLE SHIFT N-BITS RIGHT	NSRL	583	Shifts the specified 32 bits of word data to the right by the specified number of bits.

■ Increment/Decrement Instructions

Name	Mnemonic	Function code	Function
INCREMENT BINARY	++	590	Increments the 4-digit hexadecimal content of the specified word by 1.
DOUBLE INCREMENT BINARY	++L	591	Increments the 8-digit hexadecimal content of the specified words by 1.
DECREMENT BINARY	––	592	Decrements the 4-digit hexadecimal content of the specified word by 1.
DOUBLE DECREMENT BINARY	––L	593	Decrements the 8-digit hexadecimal content of the specified words by 1.
INCREMENT BCD	++B	594	Increments the 4-digit BCD content of the specified word by 1.
DOUBLE INCREMENT BCD	++BL	595	Increments the 8-digit BCD content of the specified words by 1.
DECREMENT BCD	––B	596	Decrements the 4-digit BCD content of the specified word by 1.
DOUBLE DECREMENT BCD	––BL	597	Decrements the 8-digit BCD content of the specified words by 1.

■ Symbol Math Instructions

Name	Mnemonic	Function code	Function
SIGNED BINARY ADD WITHOUT CARRY	+	400	Adds 4-digit (single-word) hexadecimal data and/or constants.
DOUBLE SIGNED BINARY ADD WITHOUT CARRY	+L	401	Adds 8-digit (double-word) hexadecimal data and/or constants.
SIGNED BINARY ADD WITH CARRY	+C	402	Adds 4-digit (single-word) hexadecimal data and/or constants with the Carry Flag (CY).
DOUBLE SIGNED BINARY ADD WITH CARRY	+CL	403	Adds 8-digit (double-word) hexadecimal data and/or constants with the Carry Flag (CY).
BCD ADD WITHOUT CARRY	+B	404	Adds 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD ADD WITHOUT CARRY	+BL	405	Adds 8-digit (double-word) BCD data and/or constants.
BCD ADD WITH CARRY	+BC	406	Adds 4-digit (single-word) BCD data and/or constants with the Carry Flag (CY).
DOUBLE BCD ADD WITH CARRY	+BCL	407	Adds 8-digit (double-word) BCD data and/or constants with the Carry Flag (CY).
SIGNED BINARY SUBTRACT WITHOUT CARRY	–	410	Subtracts 4-digit (single-word) hexadecimal data and/or constants.
DOUBLE SIGNED BINARY SUBTRACT WITHOUT CARRY	–L	411	Subtracts 8-digit (double-word) hexadecimal data and/or constants.
SIGNED BINARY SUBTRACT WITH CARRY	–C	412	Subtracts 4-digit (single-word) hexadecimal data and/or constants with the Carry Flag (CY).
DOUBLE SIGNED BINARY WITH CARRY	–CL	413	Subtracts 8-digit (double-word) hexadecimal data and/or constants with the Carry Flag (CY).
BCD SUBTRACT WITHOUT CARRY	–B	414	Subtracts 4-digit (single-word) BCD data and/or constants.

Name	Mnemonic	Function code	Function
DOUBLE BCD SUBTRACT WITHOUT CARRY	–BL	415	Subtracts 8-digit (double-word) BCD data and/or constants.
BCD SUBTRACT WITH CARRY	–BC	416	Subtracts 4-digit (single-word) BCD data and/or constants with the Carry Flag (CY).
DOUBLE BCD SUBTRACT WITH CARRY	–BCL	417	Subtracts 8-digit (double-word) BCD data and/or constants with the Carry Flag (CY).
SIGNED BINARY MULTIPLY	*	420	Multiplies 4-digit signed hexadecimal data and/or constants.
SIGNED BINARY MULTIPLY	*L	421	Multiplies 8-digit signed hexadecimal data and/or constants.
UNSIGNED BINARY MULTIPLY	*U	422	Multiplies 4-digit unsigned hexadecimal data and/or constants.
DOUBLE UNSIGNED BINARY MULTIPLY	*UL	423	Multiplies 8-digit unsigned hexadecimal data and/or constants.
BCD MULTIPLY	*B	424	Multiplies 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD MULTIPLY	*BL	425	Multiplies 8-digit (double-word) BCD data and/or constants.
SIGNED BINARY DIVIDE	/	430	Divides 4-digit (single-word) signed hexadecimal data and/or constants.
DOUBLE SIGNED BINARY DIVIDE	/L	431	Divides 8-digit (double-word) signed hexadecimal data and/or constants.
UNSIGNED BINARY DIVIDE	/U	432	Divides 4-digit (single-word) unsigned hexadecimal data and/or constants.
DOUBLE UNSIGNED BINARY DIVIDE	/UL	433	Divides 8-digit (double-word) unsigned hexadecimal data and/or constants.
BCD DIVIDE	/B	434	Divides 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD DIVIDE	/BL	435	Divides 8-digit (double-word) BCD data and/or constants.

■ Conversion Instructions

Name	Mnemonic	Function code	Function
BCD-TO BINARY	BIN	023	Converts BCD data to binary data.
DOUBLE BCD-TO-DOUBLE BINARY	BINL	058	Converts 8-digit BCD data to 8-digit hexadecimal (32-bit binary) data.
BINARY-TO-BCD	BCD	024	Converts a word of binary data to a word of BCD data.
DOUBLE BINARY-TO-DOUBLE BCD	BCDL	059	Converts 8-digit hexadecimal (32-bit binary) data to 8-digit BCD data.
2'S COMPLEMENT	NEG	160	Calculates the 2's complement of a word of hexadecimal data.
DOUBLE 2'S COMPLEMENT	NEGL	161	Calculates the 2's complement of two words of hexadecimal data.
16-BIT TO 32-BIT SIGNED BINARY	SIGN	600	Expands a 16-bit signed binary value to its 32-bit equivalent.
DATA DECODER	MLPX	076	Reads the numerical value in the specified digit (or byte) in the source word, turns ON the corresponding bit in the result word (or 16-word range), and turns OFF all other bits in the result word (or 16-word range). 4-to-16 bit conversion
DATA ENCODER	DMPX	077	Finds the location of the first or last ON bit within the source word (or 16-word range), and writes that value to the specified digit (or byte) in the result word. 16-to-4 bit conversion
ASCII CONVERT	ASC	086	Converts 4-bit hexadecimal digits in the source word into their 8-bit ASCII equivalents.
ASCII TO HEX	HEX	162	Converts up to 4 bytes of ASCII data in the source word to their hexadecimal equivalents and writes these digits in the specified destination word.
COLUMN TO LINE	LINE	063	Converts a column of bits from a 16-word range (the same bit number in 16 consecutive words) to the 16 bits of the destination word.
LINE TO COLUMN	COLM	064	Converts the 16 bits of the source word to a column of bits in a 16-word range of destination words (the same bit number in 16 consecutive words).
SIGNED BCD-TO-BINARY	BINS	470	Converts one word of signed BCD data to one word of signed binary data.

Name	Mnemonic	Function code	Function
DOUBLE SIGNED BCD-TO-BINARY	BISL	472	Converts double signed BCD data to double signed binary data.
SIGNED BINARY-TO-BCD	BCDS	471	Converts one word of signed binary data to one word of signed BCD data.
DOUBLE SIGNED BINARY-TO-BCD	BDSL	473	Converts double signed binary data to double signed BCD data.

■ Logic Instructions

Name	Mnemonic	Function code	Function
LOGICAL AND	ANDW	034	Takes the logical AND of corresponding bits in single words of word data and/or constants.
DOUBLE LOGICAL AND	ANDL	610	Takes the logical AND of corresponding bits in double words of word data and/or constants.
LOGICAL OR	ORW	035	Takes the logical OR of corresponding bits in single words of word data and/or constants.
DOUBLE LOGICAL OR	ORWL	611	Takes the logical OR of corresponding bits in double words of word data and/or constants.
EXCLUSIVE OR	XORW	036	Takes the logical exclusive OR of corresponding bits in single words of word data and/or constants.
DOUBLE EXCLUSIVE OR	XORL	612	Takes the logical exclusive OR of corresponding bits in double words of word data and/or constants.
EXCLUSIVE NOR	XNRW	037	Takes the logical exclusive NOR of corresponding single words of word data and/or constants.
DOUBLE EXCLUSIVE NOR	XNRL	613	Takes the logical exclusive NOR of corresponding bits in double words of word data and/or constants.
COMPLEMENT	COM	029	Turns OFF all ON bits and turns ON all OFF bits in Wd.
DOUBLE COMPLEMENT	COML	614	Turns OFF all ON bits and turns ON all OFF bits in Wd and Wd+1.

■ Special Math Instructions

Name	Mnemonic	Function code	Function
BINARY ROOT	ROTB	620	Computes the square root of the 32-bit binary content of the specified words and outputs the integer portion of the result to the specified result word.
BCD SQUARE ROOT	ROOT	072	Computes the square root of an 8-digit BCD number and outputs the integer portion of the result to the specified result word.
ARITHMETIC PROCESS	APR	069	Calculates the sine or cosine, or performs linear extrapolation. Sine/cosine calculation: Calculates the sine or cosine of the source angle data between 0° and 90° and outputs the result as a 4-digit BCD value to 4 decimal places. Linear extrapolation: The linear extrapolation function allows any relationship between X and Y to be approximated with line segments. The input data can be unsigned 16-bit BCD data, unsigned 16-bit binary data, signed 16-bit binary data (CJ1H-CPU□□H only), signed 32-bit binary data (CJ1H-CPU□□H only), or single-precision floating point data (CJ1H-CPU□□H only).
FLOATING POINT DIVIDE	FDIV	079	Divides one 7-digit floating-point number by another. The floating-point numbers are expressed in scientific notation (7-digit mantissa and 1-digit exponent).
BIT COUNTER	BCNT	067	Counts the total number of ON bits in the specified word(s).

■ Floating-point Math Instructions

Name	Mnemonic	Function code	Function
FLOATING TO 16-BIT	FIX	450	Converts a 32-bit floating-point value to 16-bit signed binary data and places the result in the specified result word.
FLOATING TO 32-BIT	FIXL	451	Converts a 32-bit floating-point value to 32-bit signed binary data and places the result in the specified result words.

Name	Mnemonic	Function code	Function
16-BIT TO FLOATING	FLT	452	Converts a 16-bit signed binary value to 32-bit floating-point data and places the result in the specified result words.
32-BIT TO FLOATING	FLTL	453	Converts a 32-bit signed binary value to 32-bit floating-point data and places the result in the specified result words.
FLOATING POINT ADD	+F	454	Adds two 32-bit floating-point numbers and places the result in the specified result words.
FLOATING POINT SUBTRACT	–F	455	Subtracts one 32-bit floating-point number from another and places the result in the specified result words.
FLOATING-POINT DIVIDE	/F	457	Divides one 32-bit floating-point number by another and places the result in the specified result words.
FLOATING-POINT MULTIPLY	∗F	456	Multiplies two 32-bit floating-point numbers and places the result in the specified result words.
DEGREES TO RADIANS	RAD	458	Converts a 32-bit floating-point number from degrees to radians and places the result in the specified result words.
RADIANS TO DEGREES	DEG	459	Converts a 32-bit floating-point number from radians to degrees and places the result in the specified result words.
SINE	SIN	460	Calculates the sine of a 32-bit floating-point number (in radians) and places the result in the specified result words.
COSINE	COS	461	Calculates the cosine of a 32-bit floating-point number (in radians) and places the result in the specified result words.
TANGENT	TAN	462	Calculates the tangent of a 32-bit floating-point number (in radians) and places the result in the specified result words.
ARC SINE	ASIN	463	Calculates the arc sine of a 32-bit floating-point number and places the result in the specified result words. (The arc sine function is the inverse of the sine function; it returns the angle that produces a given sine value between –1 and 1.)
ARC COSINE	ACOS	464	Calculates the arc cosine of a 32-bit floating-point number and places the result in the specified result words. (The arc cosine function is the inverse of the cosine function; it returns the angle that produces a given cosine value between –1 and 1.)
ARC TANGENT	ATAN	465	Calculates the arc tangent of a 32-bit floating-point number and places the result in the specified result words. (The arc tangent function is the inverse of the tangent function; it returns the angle that produces a given tangent value.)
SQUARE ROOT	SQRT	466	Calculates the square root of a 32-bit floating-point number and places the result in the specified result words.
EXPONENT	EXP	467	Calculates the natural (base e) exponential of a 32-bit floating-point number and places the result in the specified result words.
LOGARITHM	LOG	468	Calculates the natural (base e) logarithm of a 32-bit floating-point number and places the result in the specified result words.
EXPONENTIAL POWER	PWR	840	Raises a 32-bit floating-point number to the power of another 32-bit floating-point number.
FLOATING SYMBOL COMPARISON	LD, AND, OR + =F, <>F, <F, <=F, >F, >=F	329 (=F) 330 (<>F) 331 (<F) 332 (<=F) 333 (>F) 334 (>+F)	Compares the specified single-precision data (32 bits) or constants and creates an ON execution condition if the comparison result is true. Three kinds of symbols can be used with the floating-point symbol comparison instructions: LD (Load), AND, and OR.
FLOATING-POINT TO ASCII	FSTR	448	Converts the specified single-precision floating-point data (32-bit decimal-point or exponential format) to text string data (ASCII) and outputs the result to the destination word.
ASCII TO FLOAT-ING-POINT	FVAL	449	Converts the specified text string (ASCII) representation of single-precision floating-point data (decimal-point or exponential format) to 32-bit single-precision floating-point data and outputs the result to the destination words.

■ Double-precision Floating-point Instructions

Name	Mnemonic	Function code	Function
DOUBLE SYMBOL COMPARISON	LD, AND, OR + =D, <>D, <D, <=D, >D, >=D	335 (=D) 336 (<>D) 337 (<D) 338 (<=D) 339 (>D) 340 (>=D)	Compares the specified double-precision data (64 bits) and creates an ON execution condition if the comparison result is true. Three kinds of symbols can be used with the floating-point symbol comparison instructions: LD (Load), AND, and OR. Comparison with constants is not possible with this instruction.
DOUBLE FLOATING TO 16-BIT BINARY	FIXD	841	Converts the specified double-precision floating-point data (64 bits) to 16-bit signed binary data and outputs the result to the destination word.
DOUBLE FLOATING TO 32-BIT BINARY	FIXLD	842	Converts the specified double-precision floating-point data (64 bits) to 32-bit signed binary data and outputs the result to the destination words.
16-BIT BINARY TO DOUBLE FLOATING	DBL	843	Converts the specified16-bit signed binary data to double-precision floating-point data (64 bits) and outputs the result to the destination words.
32-BIT BINARY TO DOUBLE FLOATING	DBLL	844	Converts the specified 32-bit signed binary data to double-precision floating-point data (64 bits) and outputs the result to the destination words.
DOUBLE FLOATING-POINT ADD	+D	845	Adds the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE FLOATING-POINT SUBTRACT	–D	846	Subtracts the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE FLOATING-POINT MULTIPLY	*D	847	Multiplies the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE FLOATING-POINT DIVIDE	/D	848	Divides the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE DEGREES TO RADIANS	RADD	849	Converts the specified double-precision floating-point data (64 bits) from degrees to radians and outputs the result to the result words.
DOUBLE RADIANS TO DEGREES	DEGD	850	Converts the specified double-precision floating-point data (64 bits) from radians to degrees and outputs the result to the result words.
DOUBLE SINE	SIND	851	Calculates the sine of the angle (radians) in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE COSINE	COSD	852	Calculates the cosine of the angle (radians) in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE TANGENT	TAND	853	Calculates the tangent of the angle (radians) in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE ARC SINE	ASIND	854	Calculates the angle (in radians) from the sine value in the specified double-precision floating-point data (64 bits) and outputs the result to the result words. (The arc sine function is the inverse of the sine function; it returns the angle that produces a given sine value between –1 and 1.)
DOUBLE ARC COSINE	ACOSD	855	Calculates the angle (in radians) from the cosine value in the specified double-precision floating-point data (64 bits) and outputs the result to the result words. (The arc cosine function is the inverse of the cosine function; it returns the angle that produces a given cosine value between –1 and 1.)
DOUBLE ARC TANGENT	ATAND	856	Calculates the angle (in radians) from the tangent value in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE SQUARE ROOT	SQRTD	857	Calculates the square root of the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE EXPONENT	EXPD	858	Calculates the natural (base e) exponential of the specified double-precision floating-point data (64 bits) and outputs the result to the result words.

Name	Mnemonic	Function code	Function
DOUBLE LOGARITHM	LOGD	859	Calculates the natural (base e) logarithm of the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE EXPONENTIAL POWER	PWRD	860	Raises a double-precision floating-point number (64 bits) to the power of another double-precision floating-point number and outputs the result to the result words.

■ Table Data Processing Instructions

Name	Mnemonic	Function code	Function
SET STACK	SSET	630	Defines a stack of the specified length beginning at the specified word and initializes the words in the data region to all zeroes.
PUSH ONTO STACK	PUSH	632	Writes one word of data to the specified stack.
FIRST IN FIRST OUT	FIFO	633	Reads the first word of data written to the specified stack (the oldest data in the stack).
LAST IN FIRST OUT	LIFO	634	Reads the last word of data written to the specified stack (the newest data in the stack).
DIMENSION RECORD TABLE	DIM	631	Defines a record table by declaring the length of each record and the number of records. Up to 16 record tables can be defined.
SET RECORD LOCATION	SETR	635	Writes the location of the specified record (the PLC memory address of the beginning of the record) in the specified Index Register.
GET RECORD NUMBER	GETR	636	Returns the record number of the record at the PLC memory address contained in the specified Index Register.
DATA SEARCH	SRCH	181	Searches for a word of data within a range of words.
SWAP BYTES	SWAP	637	Switches the leftmost and rightmost bytes in all of the words in the range.
FIND MAXIMUM	MAX	182	Finds the maximum value in the range.
FIND MINIMUM	MIN	183	Finds the minimum value in the range.
SUM	SUM	184	Adds the bytes or words in the range and outputs the result to two words.
FRAME CHECKSUM	FCS	180	Calculates the ASCII FCS value for the specified range.
STACK SIZE READ	SNUM	638	Counts the amount of stack data (number of words) in the specified stack.
STACK DATA READ	SREAD	639	Reads the data from the specified data element in the stack. The offset value indicates the location of the desired data element (how many data elements before the current pointer position).
STACK DATA OVERWRITE	SWRIT	640	Writes the source data to the specified data element in the stack (overwriting the existing data). The offset value indicates the location of the desired data element (how many data elements before the current pointer position).
STACK DATA INSERT	SINS	641	Inserts the source data at the specified location in the stack and shifts the rest of the data in the stack downward. The offset value indicates the location of the insertion point (how many data elements before the current pointer position).
STACK DATA DELETE	SDEL	642	Deletes the data element at the specified location in the stack and shifts the rest of the data in the stack upward. The offset value indicates the location of the deletion point (how many data elements before the current pointer position).

■ Data Control Instructions

Name	Mnemonic	Function code	Function
PID CONTROL	PID	190	Executes PID control according to the specified parameters.
PID CONTROL WITH AUTO TUNING	PIDAT	191	Executes PID control according to the specified parameters. The PID constants can be autotuned.
LIMIT CONTROL	LMT	680	Controls output data according to whether or not input data is within upper and lower limits.
DEAD BAND CONTROL	BAND	681	Controls output data according to whether or not input data is within the dead band range.

Name	Mnemonic	Function code	Function
DEAD ZONE CONTROL	ZONE	682	Adds the specified bias to input data and outputs the result.
SCALING	SCL	194	Converts unsigned binary data into unsigned BCD data according to the specified linear function.
SCALING 2	SCL2	486	Converts signed binary data into signed BCD data according to the specified linear function. An offset can be input in defining the linear function.
SCALING 3	SCL3	487	Converts signed BCD data into signed binary data according to the specified linear function. An offset can be input in defining the linear function.
AVERAGE	AVG	195	Calculates the average value of an input word for the specified number of cycles.

■ Subroutines Instructions

Name	Mnemonic	Function code	Function
SUBROUTINE CALL	SBS	091	Calls the subroutine with the specified subroutine number and executes that program.
SUBROUTINE ENTRY	SBN	092	Indicates the beginning of the subroutine program with the specified subroutine number.
SUBROUTINE RETURN	RET	093	Indicates the end of a subroutine program.
MACRO	MCRO	099	Calls the subroutine with the specified subroutine number and executes that program using the input parameters in S to S+3 and the output parameters in D to D+3.
GLOBAL SUBROUTINE ENTRY	GSBN	751	Indicates the beginning of a global subroutine program with the specified subroutine number.
GLOBAL SUBROUTINE RETURN	GRET	752	Indicates the end of a global subroutine program.
GLOBAL SUBROUTINE CALL	GSBS	750	Calls the global subroutine with the specified subroutine number and executes that program.

■ Interrupt Control Instructions

Name	Mnemonic	Function code	Function
SET INTERRUPT MASK	MSKS	690	Sets up interrupt processing for I/O interrupts or scheduled interrupts. Both I/O interrupt tasks and scheduled interrupt tasks are masked (disabled) when the PLC is first turned on. MSKS(690) can be used to unmask or mask I/O interrupts and set the time intervals for scheduled interrupts.
READ INTERRUPT MASK	MSKR	692	Reads the current interrupt processing settings that were set with MSKS(690).
CLEAR INTERRUPT	CLI	691	Clears or retains recorded interrupt inputs for I/O interrupts or sets the time to the first scheduled interrupt for scheduled interrupts.
DISABLE INTERRUPTS	DI	693	Disables execution of all interrupt tasks except the power OFF interrupt.
ENABLE INTERRUPTS	EI	694	Enables execution of all interrupt tasks that were disabled with DI(693).

Instructions

■ Step Instructions

Name	Mnemonic	Function code	Function
STEP DEFINE	STEP	008	STEP(008) functions in the following 2 ways, depending on its position and whether or not a control bit has been specified. (1)Starts a specific step. (2)Ends the step programming area (i.e., step execution). The step programming area is the area from STEP instruction (step number specified) to STEP instruction (no STEP number).
STEP START	SNXT	009	SNXT(009) is used in the following three ways: (1)To start step programming execution. (2)To proceed to the next step control bit. (3)To end step programming execution.

■ Basic I/O Unit Instructions

Name	Mnemonic	Function code	Function
I/O REFRESH	IORF	097	Refreshes the specified I/O words. Refresh is performed for Basic I/O Units mounted on the CPU Rack and Expansion Racks.
7-SEGMENT DECODER	SDEC	078	Converts the hexadecimal contents of the designated digit(s) into 8-bit, 7-segment display code and places it into the upper or lower 8-bits of the specified destination words.
INTELLIGENT I/O READ	IORD	222	Reads the contents of the I/O Unit's memory area.
INTELLIGENT I/O WRITE	IOWR	223	Outputs the contents of the CPU Unit's I/O memory area to the Special I/O Unit.
CPU BUS UNIT I/O REFRESH	DLNK	226	Immediately refreshes the I/O in the CPU Bus Unit with the specified unit number.

■ Serial Communications Instructions

Name	Mnemonic	Function code	Function
PROTOCOL MACRO	PMCR	260	Calls and executes a communications sequence registered in a Serial Communications Board or Serial Communications Unit.
TRANSMIT	TXD	236	Converts the specified number of bytes of data to ASCII code and, according to the No-protocol Mode start code and end code specified in the PC Setup, outputs the data from the RS-232C port built into the CPU Unit.
RECEIVE	RXD	235	Starting from the specified word, reads the specified number of bytes of data received via the RS-232C port (No-protocol Mode) built into the CPU Unit according to the No-protocol Mode start code and end code specified in the PC Setup.
CHANGE SERIAL PORT SETUP	STUP	237	Changes the communications parameters of a serial port on the CPU Unit, Serial Communications Unit (CPU Bus Unit), or Serial Communications Board. STUP(237) thus enables the protocol mode to be changed during PLC operation.

■ Network Instructions

Name	Mnemonic	Function code	Function
NETWORK SEND	SEND	090	Transmits data to a node in the network.
NETWORK RECEIVE	RECV	098	Requests data to be transmitted from a node in the network and receives the data.
DELIVER COMMAND	CMND	490	Sends FINS commands and receives the response.

■ File Memory Instructions

Name	Mnemonic	Function code	Function
READ DATA FILE	FREAD	700	Reads the specified data or amount of data from the specified data file in file memory to the specified data area in the CPU Unit.
WRITE DATA FILE	FWRIT	701	Overwrites or appends data in the specified data file in file memory with the specified data from the data area in the CPU Unit. If the specified file doesn't exist, a new file is created with that filename.

■ Display Instructions

Name	Mnemonic	Function code	Function
DISPLAY MESSAGE	MSG	046	Reads the specified sixteen words of extended ASCII and displays the message on a Peripheral Device such as a Programming Console.

■ Clock Instructions

Name	Mnemonic	Function code	Function
CALENDAR ADD	CADD	730	Adds time to the calendar data in the specified words.
CALENDAR SUBTRACT	CSUB	731	Subtracts time from the calendar data in the specified words.
HOURS TO SECONDS	SEC	065	Converts time data in hours/minutes/seconds format to an equivalent time in seconds only.
SECONDS TO HOURS	HMS	066	Converts seconds data to an equivalent time in hours/minutes/seconds format.
CLOCK ADJUSTMENT	DATE	735	Changes the internal clock setting to the setting in the specified source words.

■ Debugging Instructions

Name	Mnemonic	Function code	Function
TRACE MEMORY SAMPLING	TRSM	045	When TRSM(045) is executed, the status of a preselected bit or word is sampled and stored in Trace Memory. TRSM(045) can be used anywhere in the program, any number of times.

■ Failure Diagnosis Instructions

Name	Mnemonic	Function code	Function
FAILURE ALARM	FAL	006	Generates or clears user-defined non-fatal errors. Non-fatal errors do not stop PLC operation. Can also be used to simulate non-fatal system errors with the CS1 CPU Units.
SEVERE FAILURE ALARM	FALS	007	Generates user-defined fatal errors. Fatal errors stop PLC operation. Can also be used to simulate fatal system errors with the CS1 CPU Units.
FAILURE POINT DETECTION	FPD	269	Diagnoses a failure in an instruction block by monitoring the time between execution of FPD(269) and execution of a diagnostic output and finding which input is preventing an output from being turned ON.

■ Other Instructions

Name	Mnemonic	Function code	Function
SET CARRY	STC	040	Turns ON the Carry Flag (CY).
CLEAR CARRY	CLC	041	Turns OFF the Carry Flag (CY).
SELECT EM BANK	EMBC	281	Changes the current EM bank.
EXTEND MAXIMUM CYCLE TIME	WDT	094	Extends the maximum cycle time, but only for the cycle in which this instruction is executed.

Name	Mnemonic	Function code	Function
SAVE CONDITION FLAGS	CCS	282	Saves the status of the condition flags.
LOAD CONDITION FLAGS	CCL	283	Reads the status of the condition flags that was saved.
CONVERT ADDRESS FROM CV	FRMCV	284	Converts a CVM1/CV-series PLC memory address to its equivalent CS-series PLC memory address.
CONVERT ADDRESS TO CV	TOCV	285	Converts a CS-series PLC memory address to its equivalent CV-series PLC memory address.
DISABLE PERIPHERAL SERVICING	IOSP	287	Disables peripheral servicing during program execution in Parallel Processing Mode or Peripheral Servicing Priority Mode.
ENABLE PERIPHERAL SERVICING	IORS	288	Enables peripheral servicing that was disabled by IOSP(287) for program execution in Parallel Processing Mode or Peripheral Servicing Priority Mode.

■ Block Programming Instructions

Name	Mnemonic	Function code	Function
BLOCK PROGRAM BEGIN	BPRG	096	Define a block programming area. For every BPRG(096) there must be a corresponding BEND(801).
BLOCK PROGRAM END	BEND	801	Define a block programming area. For every BPRG(096) there must be a corresponding BEND(801).
BLOCK PROGRAM PAUSE	BPPS	811	Pause and restart the specified block program from another block program.
BLOCK PROGRAM RESTART	BPRS	812	Pause and restart the specified block program from another block program.
CONDITIONAL BLOCK EXIT	*input_condition* EXIT	806	EXIT(806) without an operand bit exits the program if the execution condition is ON.
CONDITIONAL BLOCK EXIT	EXIT *bit_address*	806	EXIT(806) without an operand bit exits the program if the execution condition is ON.
CONDITIONAL BLOCK EXIT (NOT)	EXIT NOT *bit_address*	806	EXIT(806) without an operand bit exits the program if the execution condition is ON.
CONDITIONAL BLOCK BRANCHING	*input_condition* IF	802	If the execution condition is ON, the instructions between IF(802) and ELSE(803) will be executed and if the execution condition is OFF, the instructions between ELSE(803) and IEND(804) will be executed.
CONDITIONAL BLOCK BRANCHING	IF *bit_address*	802	If the operand bit is ON, the instructions between IF(802) and ELSE(803) will be executed. If the operand bit is OFF, the instructions between ELSE(803) and IEND(804) will be executed.
CONDITIONAL BLOCK BRANCHING (NOT)	IF NOT *bit_address*	802	The instructions between IF(802) and ELSE(803) will be executed and if the operand bit is ON, the instructions be ELSE(803) and IEND(804) will be executed is the operand bit is OFF.
CONDITIONAL BLOCK BRANCHING (ELSE)	ELSE	803	If the ELSE(803) instruction is omitted and the operand bit is ON, the instructions between IF(802) and IEND(804) will be executed
CONDITIONAL BLOCK BRANCHING END	IEND	804	If the operand bit is OFF, only the instructions after IEND(804) will be executed.
ONE CYCLE AND WAIT	*input_condition* WAIT	805	If the execution condition is ON for WAIT(805), the rest of the instruction in the block program will be skipped.
ONE CYCLE AND WAIT	WAIT *bit_address*	805	If the operand bit is OFF (ON for WAIT NOT(805)), the rest of the instructions in the block program will be skipped. In the next cycle, none of the block program will be executed except for the execution condition for WAIT(805) or WAIT(805) NOT. When the execution condition goes ON (OFF for WAIT(805) NOT), the instruction from WAIT(805) or WAIT(805) NOT to the end of the program will be executed.

Name	Mnemonic	Function code	Function
ONE CYCLE AND WAIT (NOT)	WAIT NOT *bit_address*	805	If the operand bit is OFF (ON for WAIT NOT(805)), the rest of the instructions in the block program will be skipped. In the next cycle, none of the block program will be executed except for the execution condition for WAIT(805) or WAIT(805) NOT. When the execution condition goes ON (OFF for WAIT(805) NOT), the instruction from WAIT(805) or WAIT(805) NOT to the end of the program will be executed.
TIMER WAIT	TIMW	813	Delays execution of the rest of the block program until the specified time has elapsed. Execution will be continued from the next instruction after TIMW(813) when the timer times out.
COUNTER WAIT	CNTW	814	Delays execution of the rest of the block program until the specified count has been achieved. Execution will be continued from the next instruction after CNTW(814) when the counter counts out.
HIGH-SPEED TIMER WAIT	TMHW	815	Delays execution of the rest of the block program until the specified time has elapsed. Execution will be continued from the next instruction after TMHW(815) when the timer times out.
LOOP	LOOP	809	LOOP(809) designates the beginning of the loop program.
LEND	*input_condition* LEND	810	LEND(810) or LEND(810) NOT specifies the end of the loop. When LEND(810) or LEND(810) NOT is reached, program execution will loop back to the next previous LOOP(809) until the operand bit for LEND(810) or LEND(810) NOT turns ON or OFF (respectively) or until the execution condition for LEND(810) turns ON.
LEND	LEND *bit_address*	810	If the operand bit is OFF for LEND(810) (or ON for LEND(810) NOT), execution of the loop is repeated starting with the next instruction after LOOP(809). If the operand bit is ON for LEND(810) (or OFF for LEND(810) NOT), the loop is ended and execution continues to the next instruction after LEND(810) or LEND(810) NOT.
LEND NOT	LEND NOT *bit_address*	810	LEND(810) or LEND(810) NOT specifies the end of the loop. When LEND(810) or LEND(810) NOT is reached, program execution will loop back to the next previous LOOP(809) until the operand bit for LEND(810) or LEND(810) NOT turns ON or OFF (respectively) or until the execution condition for LEND(810) turns ON.

■ Text String Processing Instructions

Name	Mnemonic	Function code	Function
MOV STRING	MOV$	664	Transfers a text string.
CONCATENATE STRING	+$	656	Links one text string to another text string.
GET STRING LEFT	LEFT$	652	Fetches a designated number of characters from the left (beginning) of a text string.
GET STRING RIGHT	RGHT$	653	Reads a designated number of characters from the right (end) of a text string.
GET STRING MIDDLE	MID$	654	Reads a designated number of characters from any position in the middle of a text string.
FIND IN STRING	FIND$	660	Finds a designated text string from within a text string.
STRING LENGTH	LEN$	650	Calculates the length of a text string.
REPLACE IN STRING	RPLC$	661	Replaces a text string with a designated text string from a designated position.
DELETE STRING	DEL$	658	Deletes a designated text string from the middle of a text string.
EXCHANGE STRING	XCHG$	665	Replaces a designated text string with another designated text string.
CLEAR STRING	CLR$	666	Clears an entire text string with NUL (00 hex).
INSERT INTO STRING	INS$	657	Deletes a designated text string from the middle of a text string.
String Comparison	LD, AND, OR + =$, <>$, <$, <=$, >$, >=$	670 (=$) 671 (<>$) 672 (<$) 673 (<=$) 674 (>$) 675 (>=$	Sting comparison instructions (=$, <>$, <$, <=$, >$, >=$) compare two text strings from the beginning, in terms of value of the ASCII codes. If the result of the comparison is true, an ON execution condition is created for a LOAD, AND, or OR.

■ Task Control Instructions

Name	Mnemonic	Function code	Function
TASK ON	TKON	820	Makes the specified task executable.
TASK OFF	TKOF	821	Puts the specified task into standby status.

Replacing C200H I/O Units

■ Replacing C200H I/O Units with CS1 I/O Units

This section shows the corresponding CS1 I/O models and notes for replacing C200H I/O Units.

16-point DC Input Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-ID212 ➡	CS1W-ID211
Description	16-point DC Input Units with terminal blocks	
Notes	The terminal arrangement must be changed.	
	The impedance increases (from 3 kΩ to 3.3 kΩ). Check that correct operation is possible in cases where increased impedance may influence operation.	
	The internal 5-V current consumption increases (from 10 mA to 100 mA). Check that the increased current is within the range of the power supply.	

32-point DC Input Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-ID218 ➡	CS1W-ID231
Description	32-point DC Input Units with connectors. The connectors, the pin arrangement, and the input specifications are the same.	
Notes	There are 2 commons instead of 1. Connect where necessary.	
	The internal 5-V current consumption increases (from 100 mA to 150 mA). Check that the increased current is within the range of the power supply.	

32-point DC Input Units (cntd.)

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-ID216 ➡	CS1W-ID231
Description	32-point DC Input Units with connectors. The connectors and the pin arrangement are the same. The input current increases, allowing use with a wider range of devices.	
Notes	There are 2 commons instead of 1. Connect where necessary.	
	The input specifications change (e.g., the impedance decreases and the input current increases from 4.1 mA to 6 mA.) Check that correct operation is possible in cases where changes in input specifications may influence operation.	
	The internal 5-V current consumption increases (from 100 mA to 150 mA). Check that the increased current is within the range of the power supply.	

64-point DC Input Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-ID219 ➡	CS1W-ID261
Description	64-point DC Input Units with connectors. The connectors, the pin arrangement, and the input specifications are the same.	
Notes	There are 4 commons instead of 2. Connect where necessary.	
	The internal 5-V current consumption increases (from 120 mA to 150 mA). Check that the increased current is within the range of the power supply.	

Replacing C200H I/O Units

64-point DC Input Units (cntd.)

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-ID217 ➡	CS1W-ID261
Description	64-point DC Input Units with connectors. The connectors and the pin arrangement are the same. The input current increases, allowing use with a wider range of devices.	
Notes	There are 4 commons instead of 2. Connect where necessary.	
	The input specifications change (e.g., the impedance decreases and the input current increases from 4.1 mA to 6 mA.) Check that correct operation is possible in cases where changes in input specifications may influence operation.	
	The internal 5-V current consumption increases (from 100 mA to 150 mA). Check that the increased current is within the range of the power supply.	

16-point Sinking Transistor Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OD212 ➡	CS1W-OD211
Description	16-point Transistor Output (sinking) Units with terminal blocks. The output current capacity increases (from 0.3 A per point and 4.8 A per Unit to 0.5 A per point and 8 A per Unit). The rated voltage range also increases (from 24 V to any voltage in the range 12 to 24 V.)	
Notes	The terminal arrangement must be changed.	
	The output specifications change. Check that correct operation is possible in cases where changes in output specifications may influence operation. (Residual voltage increases from 0.8 V to 1.5 V, ON response time increases from 0.1 ms to 0.5 ms, OFF response time increases from 0.3 ms to 1 ms.)	

16-point Sourcing Transistor Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OD21A ➡	CS1W-OD212
Description	16-point Transistor Output (sourcing) Units with terminal blocks.	
Notes	The terminal arrangement must be changed.	
	The output capacity changes (from 1 A per point and 4 A per Unit to 0.5 A per point and 5 A per Unit). Check that correct operation is possible in cases where changes in output capacity may influence operation.	
	The output specifications change. Check that correct operation is possible in cases where changes in output specifications may influence operation. (Residual voltage increases from 0.8 V to 1.5 V, ON response time increases from 0.1 ms to 0.5 ms, OFF response time increases from 0.3 ms to 1 ms.)	
	The internal 5-V current consumption increases (from 160 mA to 170 mA). The external 24-V power supply current also increases (from 35 mA to 40 mA). Check that the increased current is within the range of the power supply.	
	There are no alarm output contacts. Use the alarm bits in the Auxiliary Area.	

32-point Sinking Transistor Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OD218 ➡	CS1W-OD231
Description	32-point Transistor Output (sinking) Units with connectors. The connectors and the pin arrangement are the same. The output current capacity increases (from 100 mA to 0.5 A per point, 2.5 A per common, and 5 A per Unit). The load voltage range changes from 4.5 to 26.4 V to 10.2 to 26.4 V.	
Notes	There are 2 commons instead of 1. Connect where necessary.	
	The output specifications change. Check that correct operation is possible in cases where changes in output specifications may influence operation. (Residual voltage increases from 0.8 V to 1.5 V, ON response time increases from 0.1 ms to 0.5 ms, OFF response time increases from 0.4 ms to 1 ms.)	
	Replacement is not possible for applications with an output load range of 4.5 to 10.2 V.	
	The internal 5-V current consumption increases (from 180 mA to 270 mA). Check that the increased current is within the range of the power supply.	

64-point Sinking Transistor Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OD219 ➡	CS1W-OD261
Description	64-point Transistor Output (sinking) Units with connectors. The connectors and the pin arrangement are the same. The output current capacity increases (from 100 mA to 0.3 A per point, 1.6 A per common, and 6.4 A per Unit). The load voltage range changes from 4.5 to 26.4 V to 10.2 to 26.4 V.	
Notes	There are 4 commons instead of 2. Connect where necessary.	
	The output specifications change. Check that correct operation is possible in cases where changes in output specifications may influence operation. (Residual voltage increases from 0.8 V to 1.5 V, ON response time increases from 0.1 ms to 0.5 ms, OFF response time increases from 0.4 ms to 1 ms.)	
	Replacement is not possible for applications with an output load range of 4.5 to 10.2 V.	
	The internal 5-V current consumption increases (from 270 mA to 390 mA). Check that the increased current is within the range of the power supply.	

32-point Sourcing Transistor Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OD21B ➡	CS1W-OD232
Description	32-point Transistor Output (sourcing) Units with connectors. The connectors and the pin arrangement are the same.	
Notes	There are 2 commons instead of 1. Connect where necessary.	
	The output specifications change. Check that correct operation is possible in cases where changes in output specifications may influence operation. (Residual voltage increases from 0.8 V to 1.5 V, ON response time increases from 0.1 ms to 0.5 ms, OFF response time increases from 0.3 ms to 1 ms.)	
	The internal 5-V current consumption increases (from 180 mA to 270 mA). Check that the increased current is within the range of the power supply.	

16-point 100-VAC Input Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-IA122/ 122V ➡	CS1W-IA111
Description	16-point 100-VAC Input Units with terminal blocks. 100-VDC input also possible.	
Notes	The terminal arrangement must be changed.	
	The input specifications change. Check that correct operation is possible in cases where changes in input specifications may influence operation. (ON voltage increases from 60 VAC min. to 65 VAC min. and the input impedance (50 Hz) increases from 9.7 kΩ to 10 kΩ.)	
	The internal 5-V current consumption increases (from 10 mA to 110 mA). Check that the increased current is within the range of the power supply.	

Replacing C200H I/O Units

16-point 200-VAC Input Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-IA222/ 222V ➡	CS1W-IA211
Description	16-point 200-VAC Input Units with terminal blocks. The input specifications are the same.	
Notes	The terminal arrangement must be changed.	
	The internal 5-V current consumption increases (from 10 mA to 110 mA). Check that the increased current is within the range of the power supply.	

8-point Triac Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OA223 ➡	CS1W-OA201
Description	8-point Triac Output Units with terminal blocks. The output current capacity increases (from 4 A per Unit to 4.8 A per Unit).	
Notes	The terminal arrangement must be changed.	
	The maximum inrush current changes. Check that correct operation is possible in cases where changes in maximum inrush current may influence operation. (Changes from 15 A for a pulse width of 100 ms and 30 A for a pulse width of 10 ms to 10 A for a pulse width of 100 ms and 20 A for a pulse width of 10 ms.)	
	The internal 5-V current consumption increases (from 180 mA to 230 mA). Check that the increased current is within the range of the power supply.	

16-point Triac Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OA224 ➡	CS1W-OA211
Description	16-point Triac Output Units with terminal blocks. The number of output points increases (from 12 to 16). The output current capacity also increases (from 2 A per Unit to 4 A per Unit).	
Notes	The terminal arrangement must be changed.	
	The output specifications change. Check that correct operation is possible in cases where changes in output specifications may influence operation. (Maximum inrush current decreases from 20 A for a pulse width of 10 ms to 15 A for a pulse width of 10 ms and the residual voltage increases from 1.5 VAC (50 to 500 mA) to 1.6 VAC.)	
	The internal 5-V current consumption increases (from 270 mA to 406 mA). Check that the increased current is within the range of the power supply.	

8-point Independent Relay Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OC224/ OC224N ➡	CS1W-OC201
Description	Relay Output Units with 8 independent output points and terminal blocks. 100-VDC input also possible.	
Notes	The terminal arrangement must be changed.	
	The ON/OFF response time changes (C200H-OC224 only). Check that correct operation is possible in cases where an increased ON/OFF response time may influence operation. (Increases from 10 ms to 15 ms)	
	The internal 5-V current consumption increases (from 10 mA to 100 mA). Check that the increased current is within the range of the power supply.	

16-point Relay Output Units

Item	C200H I/O Unit	Corresponding CS1 I/O Unit
Model number	C200H-OC225/ OC226N ➡	CS1W-OC211
Description	16-point Relay Output Units with terminal blocks. Restrictions on the number of points per current for simultaneous turning ON of more than 1 contact are removed. 100-VDC input also possible.	
Notes	The terminal arrangement must be changed.	
	The ON/OFF response time changes (C200H-OC225 only). Check that correct operation is possible in cases where an increased ON/OFF response time may influence operation. (Increases from 10 ms to 15 ms)	
	The internal 5-V current consumption increases (from the range 30 to 50 mA to 130 mA at 5 V and from the range 75 to 90 mA to 96 mA at 26 V.) Check that the increased current is within the range of the power supply.	

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EMC Directives

OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards (see the following note). Whether the products conform to the standards in the system used by the customer, however, must be confirmed by the customer.

EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

Applicable EMC Standards

EMS (Electromagnetic Susceptibility):
EN61131-2
EMI (Electromagnetic Interference):
EN50081-2
(Radiated emission: 10-m regulations)

Low Voltage Directive

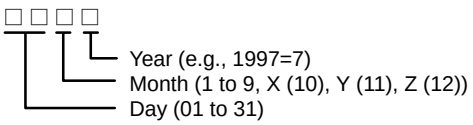
OMRON Power Supply Units and I/O Units have been determined safe when operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC according to the safety standards in EN61131-2.

■ CPU Rack

Name	Specifications			Model	Standards
CPU Units (See note.) 	I/O bits	Program capacity	Data memory capacity	---	---
	5,120	250K steps	448K words (DM: 32K words, EM: 32K words ×13 banks)	CS1H-CPU67H	U, C, N, L, CE (N, L soon to be received.)
	5,120	120K steps	256K words (DM: 32K words, EM: 32K words ×7 banks)	CS1H-CPU66H	
	5,120	60K steps	128K words (DM: 32K words, EM: 32K words ×3 banks)	CS1H-CPU65H	
	5,120	30K steps	64K words (DM: 32K words, EM: 32K words ×1 bank)	CS1H-CPU64H	
	5,120	20K steps	64K words (DM: 32K words, EM: 32K words ×1 bank)	CS1H-CPU63H	
	5,120	60K steps	128K words (DM: 32K words, EM: 32K words ×3 banks)	CS1G-CPU45H	
	1,280	30K steps	64K words (DM: 32K words, EM: 32K words ×1 bank)	CS1G-CPU44H	
	960	20K steps	64K words (DM: 32K words, EM: 32K words ×1 bank)	CS1G-CPU43H	
	960	10K steps	64K words (DM: 32K words, EM: 32K words ×1 bank)	CS1G-CPU42H	
CPU Backplanes (for CS1 Units only)	2 slots (Does not connect to Expansion Rack.)			CS1W-BC022	---
	3 slots			CS1W-BC032	
	5 slots			CS1W-BC052	
	8 slots			CS1W-BC082	
	10 slots			CS1W-BC102	
CPU Backplanes 	2 slots (Does not connect to Expansion Rack.)			CS1W-BC023	U, C, N, L, CE
	3 slots			CS1W-BC033	
	5 slots			CS1W-BC053	
	8 slots			CS1W-BC083	
	10 slots			CS1W-BC103	
Power Supply Units 	100 to 120 VAC or 200 to 240 VAC; Output capacity: 4.6 A, 5 VDC			C200HW-PA204	U, C, N, L, CE
	100 to 120 VAC or 200 to 240 VAC (with 0.8 A, 24 VDC service power supply) Output capacity: 4.6 A, 5 VDC			C200HW-PA204S	
	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 4.6 A, 5 VDC			C200HW-PA204R	U, C
	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 9 A, 5 VDC			C200HW-PA209R	U, C, N, L, CE
	24 VDC, Output capacity: 4.6 A, 5 VDC			C200HW-PD024	U, C, N, L, CE
I/O Control Unit	For Expansion Racks connected over a distance of more than 12 m (2 terminating resistors included. C200H Units cannot be used on Long-distance Expansion Racks.)			CS1W-IC102	U, C, CE
Memory Cards 	Flash memory, 8 MB			HMC-EF861	L, CE
	Flash memory, 15 MB			HMC-EF171	
	Flash memory, 30 MB			HMC-EF371	
	Flash memory, 48 MB			HMC-EF571	
	Memory Card Adapter (for computer PCMIA slot)			HMC-AP001	CE
Serial Communications Boards	2 × RS-232C ports, protocol macro function			CS1W-SCB21	U, C, N, L, CE
	1 × RS-232C port + 1 × RS-422/485 port, protocol macro function			CS1W-SCB41	

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.

Reading the production number



Ordering Guide

Name	Specifications		Model	Standards
Programming Consoles 	An English Keyboard Sheet (CS1W-KS001-E) is required. (Connects to peripheral port on CPU Unit only. Cannot be connected to RS-232C port.)		CQM1-PRO01-E	U, C, N, CE
			C200H-PRO27-E	
Programming Console Key Sheet	For C200H-PRO27 and CQM1-PRO01		CS1W-KS001-E	CE
Programming Console Connecting Cables 	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)		CS1W-CN114	
	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)		CS1W-CN224	
	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)		CS1W-CN624	
CX-Programmer	For 1 license	Windows-based Support Software for ladder programming on Windows 95, 98, Me, NT 4.0, or 2000 (Connects to peripheral port on CPU Unit or RS-232C port on CPU Unit or Serial Communications Unit/Board.)	WS02-CXPC1-EV2	---
	For 3 licenses		WS02-CXPC1-EV2 L03	
	For 10 licenses		WS02-CXPC1-EV2 L10	
Peripheral Device Connecting Cables (for peripheral port)	Connects DOS computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect RS-232C cable to peripheral port)		CS1W-CN118	CE
	Peripheral bus or Host Link	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	CS1W-CN226	
		Connects DOS computers, D-Sub 9-pin (Length: 6.0 m)	CS1W-CN626	
Peripheral Device Connecting Cables (for RS-232C port)	Peripheral bus or Host Link, antistatic	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-CV	---
		Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-CV	
	Host Link	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-V	
		Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-V	
CX-Simulator	Windows-based Support Software for simulating ladder program operation on Windows 95, 98, Me, NT 4.0, or 2000		WS02-SIMC1-E	---
CX-Protocol	Windows-based Protocol Creation Software for Windows 95, 98, Me, NT 4.0, or 2000		WS02-PSTC1-E	---
Battery Set	For CS1 Series only. (Install a replacement battery within 2 years of the production date.)		CS1W-BAT01	L, CE

■ Expansion Racks

Name	Specifications	Model	Standards
CS1 Expansion Backplanes (for CS1 Units only)	3 slots	CS1W-BI032	---
	5 slots	CS1W-BI052	
	8 slots	CS1W-BI082	
	10 slots	CS1W-BI102	
CS1 Expansion Backplanes 	3 slots	CS1W-BI033	U, C, N, L, CE
	5 slots	CS1W-BI053	
	8 slots	CS1W-BI083	
	10 slots	CS1W-BI103	
C200H Expansion I/O Backplanes 	3 slots	C200HW-BI031	U, C, N, L, CE
	5 slots	C200HW-BI051	
	8 slots	C200HW-BI081-V1	
	10 slots	C200HW-BI101-V1	
Power Supply Units 	100 to 120 VAC or 200 to 240 VAC, Output capacity: 4.6 A, 5 VDC	C200HW-PA204	
	100 to 120 VAC or 200 to 240 VAC (with service supply: 0.8 A, 24 VDC), Output capacity: 4.6 A, 5 VDC	C200HW-PA204S	
	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 4.6 A, 5 VDC	C200HW-PA204R	U, C
	24 VDC	C200HW-PD024	U, C, N, L, CE
	100 to 120 VAC or 200 to 240 VAC (with RUN output) Output capacity: 9 A, 5 VDC	C200HW-PA209R	U, C, N, L, CE

Name	Specifications		Model	Standards
I/O Interface Unit	For Expansion Racks connected over a distance of more than 12 m. (C200H Units cannot be used on Long-distance Expansion Racks.)		CS1W-II102	U, C, CE
CS1 I/O Connecting Cables	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes.	Length: 0.3 m	CS1W-CN313	L, CE
		Length: 0.7 m	CS1W-CN713	
		Length: 2 m	CS1W-CN223	
		Length: 3 m	CS1W-CN323	
		Length: 5 m	CS1W-CN523	
		Length: 10 m	CS1W-CN133	
		Length: 12 m	CS1W-CN133-B2	
Long-distance Expansion Rack Cables	Connect I/O Control Unit to I/O Interface Unit or connects two I/O Interface Units	Length: 0.3 m	CV500-CN312	N, L, CE
		Length: 0.6 m	CV500-CN612	N, CE
		Length: 1 m	CV500-CN122	
		Length: 2 m	CV500-CN222	CE
		Length: 3 m	CV500-CN322	
		Length: 5 m	CV500-CN522	
		Length: 10 m	CV500-CN132	
		Length: 20 m	CV500-CN232	
		Length: 30 m	CV500-CN332	
		Length: 40 m	CV500-CN432	
		Length: 50 m	CV500-CN532	
CS1 to C200H I/O Connecting Cables	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	Length: 0.3 m	CS1W-CN311	L, CE
		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 Cables	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	Length: 0.3 m	C200H-CN311	N, L, CE
		Length: 0.7 m	C200H-CN711	
		Length: 2 m	C200H-CN221	
		Length: 5 m	C200H-CN521	L, CE
		Length: 10 m	C200H-CN131	

Ordering Guide

■ C200H Basic I/O Units

Name	Specifications	Model	Mountable Racks					Bits allocated (CIO 0000 to CIO 0319)	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
DC Input Units 	12 to 24 VDC, 8 inputs	C200H-ID211	Yes	Yes	Yes	No	Yes	16	U, C, N, L, CE
	24 VDC, 16 inputs	C200H-ID212	Yes	Yes	Yes	No	Yes	16	
AC Input Units 	100 to 120 VAC, 8 inputs	C200H-IA121	Yes	Yes	Yes	No	Yes	16	U, C, N, L
	100 to 120 VAC, 16 inputs	C200H-IA122	Yes	Yes	Yes	No	Yes	16	
	100 to 120 VAC, 16 inputs	C200H-IA122V	Yes	Yes	Yes	No	Yes	16	CE
	200 to 240 VAC, 8 inputs	C200H-IA221	Yes	Yes	Yes	No	Yes	16	U, C, N, L
	200 to 240 VAC, 16 inputs	C200H-IA222	Yes	Yes	Yes	No	Yes	16	
	200 to 240 VAC, 16 inputs	C200H-IA222V	Yes	Yes	Yes	No	Yes	16	CE
AC/DC Input Units 	12 to 24 VAC/VDC, 8 inputs	C200H-IM211	Yes	Yes	Yes	No	Yes	16	U, C, N, L, CE
	24 VAC/VDC, 16 inputs	C200H-IM212	Yes	Yes	Yes	No	Yes	16	
B7A Input Units 	16 inputs	C200H-B7AI1	Yes	Yes	Yes	No	Yes	16	U, C, CE
	32 inputs	C200H-B7A12	Yes	Yes	Yes	No	No (See note 2.)	32	U, C
Interrupt Input Unit 	12 to 24 VDC, 8 inputs	C200HS-INT01	Yes	Yes (See note 1.)	Yes (See note 1.)	No (See note 1.)	No	16	U, C, CE
Relay Bit Output Units 	250 VAC/24 VDC, 2 A, 8 outputs max.	C200H-OC221	Yes	Yes	Yes	No	Yes	16	U, C, N
	250 VAC/24 VDC, 2 A, 12 outputs max.	C200H-OC222	Yes	Yes	Yes	No	Yes	16	
	250 VAC/24 VDC, 2 A, 12 outputs max.	C200H-OC222N	Yes	Yes	Yes	No	Yes	16	CE
	250 VAC/24 VDC, 2 A, 16 outputs max.	C200H-OC225	Yes	Yes	Yes	No	Yes	16	U, C, N, L
	250 VAC/24 VDC, 2 A, 16 outputs max.	C200H-OC226N	Yes	Yes	Yes	No	Yes	16	CE
	250 VAC/24 VDC, 2 A, independent contacts, 5 outputs max.	C200H-OC223	Yes	Yes	Yes	No	Yes	16	U, C, N, L
	250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	C200H-OC224	Yes	Yes	Yes	No	Yes	16	
	250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	C200H-OC224N	Yes	Yes	Yes	No	Yes	16	CE

Name	Specifications	Model	Mountable Racks					Bits allocated (CIO 0000 to CIO 0319)	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Transistor Output Units 	12 to 48 VDC, 1 A, 8 sinking outputs	C200H-OD411	Yes	Yes	Yes	No	Yes	16	U, C, N, L, CE
	24 VDC, 2.1 A, 8 sinking outputs	C200H-OD213	Yes	Yes	Yes	No	Yes	16	
	24 VDC, 0.8 A, 8 sourcing outputs, load short-circuit protection.	C200H-OD214	Yes	Yes	Yes	No	Yes	16	U, C, N, L
	5 to 24 VDC, 0.3 A, 8 sourcing outputs	C200H-OD216	Yes	Yes	Yes	No	Yes	16	
	24 VDC, 0.3 A, 12 sinking outputs	C200H-OD211	Yes	Yes	Yes	No	Yes	16	U, C, N, L, CE
	5 to 24 VDC, 0.3 A, 12 sourcing outputs	C200H-OD217	Yes	Yes	Yes	No	Yes	16	
	24 VDC, 0.3 A, 16 sinking outputs	C200H-OD212	Yes	Yes	Yes	No	Yes	16	
	24 VDC, 1 A, 16 sourcing outputs, load short-circuit protection.	C200H-OD21A	Yes	Yes	Yes	No	Yes	16	CE
B7A Output Units 	16 outputs	C200H-B7AO1	Yes	Yes	Yes	No	Yes	16	U, C, CE
	32 outputs	C200H-B7A02	Yes	Yes	Yes	No	No (See note 2.)	32	U, C
Triac Output Units 	250 VAC, 1.2 A, 8 outputs	C200H-OA223	Yes	Yes	Yes	No	Yes	16	CE
	250 VAC, 0.3 A, 12 outputs	C200H-OA222V	Yes	Yes	Yes	No	Yes	16	
	250 VAC, 0.5 A, 12 outputs	C200H-OA224	Yes	Yes	Yes	No	Yes	16	U, C, N, L
Analog Timer Unit 	4-point timer	C200H-TM001	Yes	Yes	Yes	No	Yes	16	U, C
	External Variable Resistor Connector:	C4K-CN223	---						---

Note: 1. Interrupt Input Units cannot be used to input interrupts on any but the CPU Rack. They will function as normal I/O Units on other Racks.
2. C200H-B7A12/02/21/22 are C200H Group-2 Units.
3. The C200H-ID001 (no-voltage contacts, 8 inputs, NPN) and C200H-ID002 (no-voltage contacts, 8 inputs, PNP) cannot be used.

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

Name	Specifications	Model	Mountable Racks					Bits allocated (CIO 0000 to CIO 0319)	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
DC Input Units 	24 VDC, 32 inputs	C200H-ID216	Yes	Yes	Yes	No	No	32	U, C, N, L, CE
	24 VDC, 64 inputs	C200H-ID217	Yes	Yes	Yes	No	No	64	
	24 VDC, 32 inputs, 6 mA	C200H-ID218	Yes	Yes	Yes	No	No	32	U, C, CE
	24 VDC, 64 inputs, 6 mA	C200H-ID219	Yes	Yes	Yes	No	No	64	
	12 VDC, 64 inputs	C200H-ID111	Yes	Yes	Yes	No	No	64	U, C

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Name	Specifications	Model	Mountable Racks					Bits allocated (CIO 0000 to CIO 0319)	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Transistor Output Units	16 mA/4.5 V to 100 mA/26.4 V, 32 sinking outputs	C200H-OD218	Yes	Yes	Yes	No	No	32	U, C, N, L, CE
	0.5 A/ 24 VDC, 32 sourcing outputs, load short-circuit protection	C200H-OD21B	Yes	Yes	Yes	No	No	32	U, C, CE
	16 mA/4.5 V to 100 mA/26.4 V, 64 sinking outputs	C200H-OD219	Yes	Yes	Yes	No	No	64	U, C, N, L, CE
B7A Input Units	32 inputs	C200H-B7A12	Yes	Yes	Yes	No	No (See note.)	32	U, C
B7A Output Units	32 outputs	C200H-B7A02	Yes	Yes	Yes	No	No (See note.)	32	
B7A I/O Units	16 inputs, 16 outputs	C200H-B7A21	Yes	Yes	Yes	No	No (See note.)	16	
	32 inputs, 32 outputs	C200H-B7A22	Yes	Yes	Yes	No	No (See note.)	32	

Note: The C200H-B7A12/02/21/22 are C200H Group-2 Units.

Connectors for C200H Group-2 High-density I/O Units

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

Note: 1. Refer to the XW2□ Connector-Terminal Block Conversion Unit catalog for details. (Square boxes indicate the cable length.)

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

■ CS1 High-density I/O Units

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

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Name	Specifications	Model	Mountable Racks					Bits allocated (CIO 0000 to CIO 0319)	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
DC Input/ Transistor Output Units 	24 VDC, 6 mA, 32 inputs, 12 to 24 VDC, 0.3 A, 32 sinking outputs	CS1W-MD261	Yes	No	Yes	Yes	No	Inputs: 32 Outputs: 32	U, C, N, CE
	24 VDC, 6 mA, 32 inputs, 24 VDC, 0.3 A, 32 sourcing outputs	CS1W-MD262	Yes	No	Yes	Yes	No	Inputs: 32 Outputs: 32	
	24 VDC, approx. 5 A, 48 inputs, 12 to 24 VDC, 0.1 A, 48 outputs, sinking inputs/outputs	CS1W-MD291	Yes	No	Yes	Yes	No	Inputs: 48 Outputs: 48	U, C, N, L, CE
	24 VDC, approx. 5 A, 48 inputs, 12 to 24 VDC, 0.1 A, 48 outputs, sourcing inputs/outputs	CS1W-MD292	Yes	No	Yes	Yes	No	Inputs: 48 Outputs: 48	

Note: Interrupt input is not available when mounted on these Racks (i.e., used as normal I/O Unit).

Connectors for CS1 High-density I/O Units

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

Note: Refer to the XW2□ Connector-Terminal Block Conversion Unit catalog for details. (Square boxes indicate the cable length.)

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

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

Connectors for C200H High-density I/O Units

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

Note: Refer to the XW2□ Connector-Terminal Block Conversion Unit catalog for details. (Square boxes indicate the cable length.)

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■ C200H Special I/O Units

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

Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Heat/Cool Temperature Control Units 	Thermocouple input, time-proportioning PID, or ON/OFF transistor output	C200H-TV001	Yes	Yes	Yes	No	Yes	0 to 9	U, C, CE
	Thermocouple input, time-proportioning PID, or ON/OFF voltage output	C200H-TV002	Yes	Yes	Yes	No	Yes		
	Thermocouple input, PID current output	C200H-TV003	Yes	Yes	Yes	No	Yes		
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF transistor output	C200H-TV101	Yes	Yes	Yes	No	Yes		
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF voltage output	C200H-TV102	Yes	Yes	Yes	No	Yes		
	Temperature-resistance thermometer input, PID current output	C200H-TV103	Yes	Yes	Yes	No	Yes		
Temperature Sensor Units 	Thermocouple input, K/J selectable	C200H-TS001	Yes	Yes	Yes	No	Yes	0 to 9	U, C
	Thermocouple input, K/L selectable	C200H-TS002	Yes	Yes	Yes	No	Yes		
	Temperature-resistance thermometer, JPt 100	C200H-TS101	Yes	Yes	Yes	No	Yes		
	Temperature-resistance thermometer, Pt 100	C200H-TS102	Yes	Yes	Yes	No	Yes		
PID Control Units 	Voltage output/current input, time-proportioning PID, or ON/OFF transistor output	C200H-PID01	Yes	Yes	Yes	No	Yes	0 to 9	U, C, CE
	Voltage output/current input, time-proportioning PID, or ON/OFF voltage output	C200H-PID02	Yes	Yes	Yes	No	Yes		
	Voltage output/current input, PID current output	C200H-PID03	Yes	Yes	Yes	No	Yes		

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Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Data Setting Console 	Used with PID Control Units. Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01	---					---	---
	Connecting Cable, 2 m	C200H-CN225	---						
	Connecting Cable, 4 m	C200H-CN425	---						
Cam Positioner Unit 	48 cam outputs (16 external outputs and 32 internal outputs), Resolver speed: 20 µs (5 kHz)	C200H-CP114	Yes	Yes	Yes	No	Yes	0 to 9	U, C
Data Setting Console 	Used with Cam Positioner Unit. Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01	---					---	---
	Connecting Cable, 2 m	C200H-CN225	---						
	Connecting Cable, 4 m	C200H-CN425	---						
ASCII Units 	24-Kbyte RAM, 2 RS-232C ports	C200H-ASC02	Yes	Yes	Yes	No	Yes	0 to F	U, C, CE
	200-Kbyte RAM, 2 RS-232C ports	C200H-ASC11	Yes	Yes	Yes	No	Yes		
	200-Kbyte RAM, RS-232C port, RS-422/485 port	C200H-ASC21	Yes	Yes	Yes	No	Yes		
	200-Kbyte RAM, 3 RS-232C ports (1 terminal only)	C200H-ASC31	Yes	Yes	Yes	No	Yes		
Analog Input Units 	4 to 20 mA, 1 to 5/0 to 10 V (selectable), 4 inputs, 1/4,000 resolution	C200H-AD001	Yes	Yes	Yes	No	Yes	0 to 9	U, C, N, L
	4 to 20 mA, 1 to 5/0 to 10 V/–10 to +10 V (selectable); 8 inputs; 1/4,000 resolution	C200H-AD002	Yes	Yes	Yes	No	Yes	0 to F	U, C, N, L, CE
	4 to 20 mA, 1 to 5/0 to 10 V/–10 to +10 V (selectable); 8 inputs; 1/4,000 resolution	C200H-AD003	Yes	Yes	Yes	No	Yes		

Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Analog Output Units 	4 to 20 mA, 1 to 5/0 to 10 V (selectable); 2 outputs; 1/4,075 resolution	C200H-DA001	Yes	Yes	Yes	No	Yes	0 to 9	U, C, N, L
	4 to 20 mA, –10 to +10 V (selectable), 4 outputs; voltage: 1/8,190 current: 1/4,095	C200H-DA002	Yes	Yes	Yes	No	Yes	0 to F	U, C, N, L, CE
	1 to 5 V, –10 to +10 V (selectable), 8 outputs; 1/4,000 resolution	C200H-DA003	Yes	Yes	Yes	No	Yes		
	4 to 20 mA, 8 outputs; 1/4,000 resolution	C200H-DA004	Yes	Yes	Yes	No	Yes		
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.)	C200H-MAD01	Yes	Yes	Yes	No	Yes		
High-speed Counter Units 	One-axis pulse input, counting rate: 50 kcps max.	C200H-CT001-V1	Yes	Yes	Yes	No	Yes	0 to 9	U, C, CE
	One-axis pulse input, counting rate: 75 kcps max., line driver compatible	C200H-CT002	Yes	Yes	Yes	No	Yes		
	Two-axis pulse input, counting rate: 75 kcps max., line driver compatible	C200H-CT021	Yes	Yes	Yes	No	Yes	0 to F	
	Solder terminal; 40p and a Connector Cover	C500-CE401	---					---	---
	Solderless terminal; 40p and a Connector Cover (Crimped)	C500-CE402	---						
	Pressure welded terminal; 40p	C500-CE403	---						
	Solder terminal; 40p and a Connector Cover (Horizontal-type)	C500-CE404	---						
	Crimp-style terminal; 40p and a Connector Cover (Horizontal-type)	C500-CE405	---						

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Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Motion Control Units 	G-language programmable, two-axis analog outputs	C200H-MC221	Yes	Yes	Yes	No	Yes	0 to F	U, C, CE
	MC Support Software IBM PC/AT or compatible	CV500-ZN3AT1-E	---					---	---
	Connecting Cable: 3.3 m	CV500-CIF01	---						
	Teaching Box	CVM1-PRO01	---						U, C, CE
	Connection cable for Teaching Box: 2 m long	CV500-CN224	---						CE
	Memory Pack	CVM1-MP702	---						U, C, CE
	Terminal Block Conversion Unit Simplifies wiring.	XW2B-20J6-6	---						---
	Connecting Cable for Terminal Block Conversion Unit	XW2Z-100J-F1	---						
Position Control Units 	One-axis pulse-train open-collector output	C200HW-NC113	Yes	Yes	Yes	No	Yes	0 to F	U, C, CE
	Two-axis pulse-train open-collector output	C200HW-NC213	Yes	Yes	Yes	No	Yes		
	Four-axis pulse-train open-collector output	C200HW-NC413	Yes	Yes	Yes	No	Yes		

Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Position Control Units 	NC Support Software (SYSMAC-NCT)	WS01-NCTF1-E	---					---	---
	Peripheral Port Connecting Cables for computer	CS1W-CN226 (2 m)	---					---	CE
		CS1W-CN626 (6 m)							
	RS-232C Port Connecting Cables for computer	XW2Z-200S-CV (2 m) NCT V1.11 or earlier	---						---
		XW2Z-500S-CV (5 m) NCT V1.11 or earlier							
		XW2Z-200S (2 m) (See note 1.)							
		XW2Z-500S (5 m) (See note 1.)							
	1-axis Relay Unit for C200HW-NC113	XW2B-20J6-1B							
	2-axis Relay Unit for C200HW-NC213/NC413	XW2B-40J6-2B							
	1-axis U, H, M Connecting Cables for C200HW-NC113	XW2Z-050J-A6 (0.5 m)							
		XW2Z-100J-A6 (1 m)							
	2-axis U, H, M Connecting Cables for C200HW-NC213/NC413	XW2Z-050J-A7 (0.5 m)							
		XW2Z-100J-A7 (1 m)							
	1-axis UEP Connecting Cables for C200HW-NC113	XW2Z-050J-A8 (0.5 m)							
		XW2Z-100J-A8 (1 m)							
	2-axis UEP Connecting Cables for C200HW-NC213/NC413	XW2Z-050J-A9 (0.5 m)	---					---	---
		XW2Z-100J-A9 (1 m)							
ID Sensor Units 	Electromagnetic coupling	C200H-IDS01-V1	Yes	Yes	Yes	No	Yes	0 to 9	U, C
	Microwave type	C200H-IDS21	Yes	Yes	Yes	No	Yes		---
Fuzzy Logic Unit	Use with Fuzzy Support Software	C200H-FZ001	Yes	Yes	Yes	No	Yes	0 to 9	N
	Fuzzy Support Software (IBM PC/AT or compatible)	C500-SU981-E	---					---	---

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.

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Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
DeviceNet Master Unit (See note 1.) 	DeviceNet Remote I/O Master, 300 bits max.	C200HW-DRM21-V1	Yes	Yes	Yes	No	No	0 to F	U, C, N, L, CE
DeviceNet I/O Link Unit 	DeviceNet Remote I/O Slave, 64 bits max.	C200HW-DRT21	Yes	Yes	Yes	No	No	0 to F	U, C, N, CE
CompoBus/S Master Units 	CompoBus/S Remote I/O, 256 bits max.	C200HW-SRM21-V1	Yes	Yes	Yes	No	No	0 to F	U, C, N, L, CE
PC Link Unit (See note 2.) 	PC Link, single level: 32 units, multilevel: 16 Units	C200H-LK401	Yes	Yes	Yes	No	No	0 to 9	N, L, CE

Note 1. The DeviceNet Slaves are allocated up to 2,048 I/O bits (100 words) in the DeviceNet Area.

2. PC Link Units are allocated up to 1,024 bits (64 words) in the Link Area.

■ CS1 Special I/O Units

Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Customizable Counter Units	Pulse input: 2 pts Pulse output: 2 pts Contact input: 12 pts Contact output: 8 pts	CS1W-HCP22	Yes	No	Yes	Yes	No	0 to 95	U, C, CE
	Pulse input: 2 pts Analog output: 2 pts Contact input: 12 pts Contact output: 8 pts	CS1W-HCA22							
	Contact input: 12 pts Contact output: 8 pts	CS1W-HIO01							
Analog Input Units	4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000	CS1W-AD041	Yes	No	Yes	Yes	No	0 to 95	U, C, 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							
Analog Output Units	4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000	CS1W-DA041							
	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000	CS1W-DA08V							
	8 outputs (4 to 20 mA) Resolution: 1/4,000	CS1W-DA08C							
Analog I/O Unit 	4 inputs (4 to 20 mA, 1 to 5 V, etc.) 4 outputs (1 to 5 V, 0 to 10 V, etc.)	CS1W-MAD44							

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Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Process I/O Units									
Isolated Thermocouple Input Unit	4 inputs, B, E, J, K, N, R, S, T ±80 mV	CS1W-PTS01	Yes	No	Yes	Yes	No	0 to 95	U, C, CE
Isolated Temperature - resistance Thermometer Input Unit	4 inputs, Pt100, JPt	CS1W-PTS02							
Isolated Temperature - resistance Thermometer Input Unit (Ni508.4 Ω)	4 inputs, Ni508.4Ω	CS1W-PTS03							
Isolated Two-wire Transmission Device Input Unit	4 inputs, 4 to 20 mA, 1 to 5 V	CS1W-PTW01							
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							
Isolated Pulse Input Unit	4 inputs	CS1W-PPS01							
Isolated Control Output Unit	4 outputs, 4 to 20 mA, 1 to 5 V	CS1W-PMV01							
Power Transducer Input Unit	8 inputs, 0 to 1 mA, ±1 mA	CS1W-PTR01							
100-mV DC Input Unit	8 inputs, 0 to 100 mA, ±100 mV	CS1W-PTR02							
Support Software	Setting tool software for the Processing I/O Units, OS: Windows 95, 98, NT 4.0 (see note)	WS02-PUTC1-E	---					---	---
High-speed Counter Units	Pulse input: 2 pts Counting speed: 500 kcps max.	CS1W-CT021	Yes	No	Yes	Yes	No	0 to 92	U, C, CE
	Pulse input: 4 pts Counting speed: 500 kcps max.	CS1W-CT041							
Motion Control Units 	4 axes, analog outputs, G language	CS1W-MC421	Yes	No	Yes	Yes	No	0 to 93	U, C, CE
	2 axes, analog outputs, G language	CS1W-MC221							
MC Support Software	Windows 95, 98, or NT	WS02-MCTC1-EV2	---					---	---

Name	Specifications	Model	Mountable Racks					Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks		
Computer Connecting Cables	Peripheral port on CPU Unit	CS1W-CN226 (2 m)	---						CE
		CS1W-CN626 (6 m)							
	RS-232C port on CPU Unit	XW2Z-200S-CV (2 m)							---
		XW2Z-500S-CV (5 m)							
Teaching Box		CVM1-PRO01	---					---	U, C, CE
Teaching Box Connecting Cable (2 m)		CV500-CN224							CE
Memory Pack		CVM1-MP702							U, C, CE
MC Terminal Block Conversion Unit for 2 Axes (simplifies wiring I/O connectors)		XW2B-20J6-6							---
MC Terminal Block Conversion Unit for 4 Axes (simplifies wiring I/O connectors)		XW2B-40J6-7							
MC Terminal Block Conversion Unit Cable		XW2Z-100J-F1							

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

■ CS1 CPU Bus Units

Name	Specifications	Model	Mountable Racks					Words allocated (CIO 1500 to CIO 1899)	Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Controller Link Units	Twisted pair	CS1W-CLK21	Yes	No	Yes	Yes	No	25 words	0 to F	U, C, N, L, CE
	Optical ring (H-PCF cable)	CS1W-CLK12	Yes	No	Yes	Yes	No	25 words		U, C, CE (L to be received soon.)
	Optical ring (GI cable)	CS1W-CLK52	Yes	No	Yes	Yes	No	25 words		U, C, CE (L to be received soon.)
Controller Link Support Board	For PCI Bus (wire type), with Support Software	3G8F7-CLK21-E	---					---	---	CE
	For PCI Bus (H-PCF optical type), with Support Software	3G8F7-CLK12-E	---					---		
	For PCI Bus (GI optical type)	3G8F7-CLK52-E	---					---	---	
SYSMAC LINK Units	Coaxial cable (5C-2V cable)	CS1W-SLK21	Yes	No	Yes	Yes	No	25 words	0 to F	U, C, CE
	Optical cable (H-PCF cable)	CS1W-SLK11						25 words		U, C, N, CE

Ordering Guide

Name	Specifications	Model	Mountable Racks					Words allocated (CIO 1500 to CIO 1899)	Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
SYSMAC LINK Support Boards	For PCI Bus (coaxial type), with Support Software	3G8F7-SLK21-E	---					---	---	CE
	For PCI Bus (H-PCF optical type), with Support Software	3G8F7-SLK11-E	---					---	---	
Serial Communications Unit	Two RS-232C Ports	CS1W-SCU21	Yes	No	Yes	Yes	No	25 words	0 to F	U, C, N, L, CE
RS-232C–RS-422A Conversion Unit	1 RS-232C port and 1 RS-422A terminal block	NT-AL001	---					---	---	---
Ethernet Unit	10Base-5	CS1W-ETN01	Yes	No	Yes	Yes	No	25 words	0 to F	U, C, N, L, CE
	10Base-T	CS1W-ETN11								
DeviceNet Unit	Functions as master and/or slave; allows control of 2,048 points max. per master.	CS1W-DRM21	Yes	No	Yes	Yes	No	---	0 to F	U, C, CE
Loop Control Unit	Control loops: 32 Processes: 250	CS1W-LC001	Yes	No	No	No	No	---	0 to F	U, C, N, CE

Name	Specifications	Model	Mountable Racks					Words allocated (CIO 1500 to CIO 1899)	Unit No.	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
CX-Process	For Loop Control Unit, Programming Tool and Monitor Tool software, OS for Tool: Windows 95, 98, NT 4.0, OS for Monitor: Windows NT 4.0 (License key sold separately)	WS02-LCTC1-J	---					---	---	---
License Key for Monitor Software	Hardware key for Monitor software, with license	WS02-LCTK1-JL01	---					---	---	---
Peripheral Device Connecting Cables (for peripheral port)	Connects DOS computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect RS-232C cable to peripheral port)	CS1W-CN118	---					---	---	CE
	Peripheral bus or Host Link, Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	CS1W-CN226	---					---	---	
	Peripheral bus or Host Link, Connects DOS computers, D-Sub 9-pin (Length: 6.0 m)	CS1W-CN626	---					---	---	
Peripheral Device Connecting Cables (for RS-232C port)	Peripheral bus or Host Link, Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-V	---					---	---	---
	Peripheral bus or Host Link, Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-V	---					---	---	

Note: Can be used on Window 95 or 98 too (MS-DOS full screen display).

■ DeviceNet Configurator

Name	Specifications	Model number	Standards
DeviceNet Configurator	Software only (Windows 95, 98, NT 4.0, or 2000)	WS02-CFDC1-E	---
	ISA board with software (Windows 95, 98, or NT 4.0)	3G8F5-DRM21-E	---
	PC card with software (Windows 95 or 98)	3G8E2-DRM21-E	

Ordering Guide

■ Setting and Monitoring Software

Name	Specifications	Model number	Standards
DeviceNet Analyzer	---	WS02-ALDF-E	---
NX-Server	DDE edition	WS02-NXD1-E	---
	SDK edition	WS02-NXDS1	
	RT edition	WS02-NXDR1	

■ DeviceNet Slaves

Slave	Specifications		Model	Standards
Programmable Slaves	Controller with SYSMAC CPM2C CPU No. of remote I/O link points: 1,024 max. Provides CompoBus/S Master.	4 transistor outputs (sinking)	CPM2C-S100C-DRT	U, C, CE
		4 transistor outputs (sourcing)	CPM2C-S110C-DRT	
I/O Link Units	512 internal inputs/512 internal outputs (between CS1 or C200HX/HG/HE PLC and Master)		C200HW-DRT21	
	16 internal inputs/16 internal outputs (between CQM1/CQM1H PLC and Master)		CQM1-DRT21	
	32 internal inputs/32 internal outputs (between CPM1A/CPM2A PLC and Master)		CPM1A-DRT21	
Remote Transistor I/O Terminals	8 inputs (NPN, + common)		DRT1-ID08	
	8 inputs (PNP, – common)		DRT1-ID08-1	
	8 outputs (NPN, – common)		DRT1-OD08	
	8 outputs (PNP, + common)		DRT1-OD08-1	
	16 inputs (NPN, + common)		DRT1-ID16	
	16 inputs (PNP, – common)		DRT1-ID16-1	
	16 outputs (NPN, – common)		DRT1-OD16	
	16 outputs (PNP, + common)		DRT1-OD16-1	
	8 input points (NPN with + common) 8 input points (NPN with – common)		DRT1-MD16	

Slave		Specifications	Model	Standards
Remote Transistor I/O Terminals with 3-tier Terminal Block	Common power supply for communications and internal circuits	16 input points (NPN with + common)	DRT1-ID16TA	---
		16 input points (PNP with – common)	DRT1-ID16TA-1	
		8 input points (NPN with + common) 8 output points (NPN with – common)	DRT1-MD16TA	
		8 input points (PNP with – common) 8 output points (PNP with + common)	DRT1-MD16TA-1	
		16 output points (NPN with – common)	DRT1-OD16TA	
		16 output points (PNP with + common)	DRT1-OD16TA-1	
	Separate power supplies for communications and internal circuits	16 inputs (NPN, + common)	DRT1-ID16T	CE
		16 inputs (PNP, – common)	DRT1-ID16T-1	
		16 I/O (NPN, – common)	DRT1-MD16T	
		16 I/O (PNP, + common)	DRT1-MD16T-1	
		16 outputs (NPN, – common)	DRT1-OD16T	
		16 outputs (PNP, + common)	DRT1-OD16T-1	
Remote Transistor I/O Terminals with Connectors		32 inputs (NPN, + common)	DRT1-ID32ML	
		32 inputs (PNP, – common)	DRT1-ID32ML-1	
		32 outputs (NPN, – common)	DRT1-OD32ML	
		32 outputs (PNP, + common)	DRT1-OD32ML-1	
		32 I/O (NPN, – common)	DRT1-MD32ML	
		32 I/O (PNP, + common)	DRT1-MD32ML-1	
	Mounting Bracket B	---	SRT2-ATT02	---
Remote Adapters		16 inputs (NPN, + common)	DRT1-ID16X	U, C, CE
		16 inputs (PNP, – common)	DRT1-ID16X-1	
		16 outputs (NPN, – common)	DRT1-OD16X	
		16 outputs (PNP, + common)	DRT1-OD16X-1	
	Flat Cable Connectors with MIL Plugs	Straight DIP pins	XG4A-2031	---
		L-shaped DIP pins	XG4A-2034	
DeviceNet Fiber Amplifier Sensor Communications Unit		Connects to up to 16 Fiber Amplifier Units for the E3X-DA-N	E3X-DRT21	
		Fiber Amplifier Unit (See note 1.)	E3X-DA6-P	
		Reduced-wiring Connector (See note 1.)	E3X-CN02	
		Terminal Unit	E39-TM1	
Sensor Terminals (for 2-wire Sensors)		8 sensor I/O points (NPN), 2 inputs per Sensor	DRT1-HD16S	
		8 sensor I/O points (PNP)	DRT1-ND16S	
	Cable Connectors	0.3 to 0.5 mm^2 (See note 2.)	XS8A-0441	
		0.14 to 0.2 mm^2 (See note 2.)	XS8A-0442	

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Slave	Specifications		Model	Standards
Water-resistant Terminals (transistor I/O)	4 inputs (NPN, + common)		DRT1-ID04CL	CE
	4 inputs (PNP, – common)		DRT1-ID04CL-1	
	8 inputs (NPN, + common)		DRT1-ID08CL	
	8 inputs (PNP, – common)		DRT1-ID08CL-1	
	4 outputs (NPN, – common)		DRT1-OD04CL	
	4 outputs (PNP, + common)		DRT1-OD04CL-1	
	8 outputs (NPN, – common)		DRT1-OD08CL	
	8 outputs (PNP, + common)		DRT1-OD08CL-1	
Environmentally Resistant Transistor I/O Terminals	8 inputs (NPN, + common)		DRT1-ID08C	
	16 inputs (NPN, + common)		DRT1-HD16C	
	16 inputs (PNP, – common)		DRT1-HD16C-1	
	8 outputs (NPN, – common)		DRT1-OD08C	
	16 outputs (NPN, – common)		DRT1-WD16C	
	16 outputs (PNP, + common)		DRT1-WD16C-1	
	8 inputs/8 outputs (NPN, + common/– common)		DRT1-MD16C	
	8 inputs/8 outputs (PNP, – common/+ common)		DRT1-MD16C-1	
B7AC Interface Terminal	3 sets of 10 inputs (branching to 3 B7AC Link Terminals)		DRT1-B7AC	U, C, CE
Analog Input Terminals	2 or 4 inputs (2 or 4 words) (voltage or current)		DRT1-AD04	CE
	4 inputs (4 words) (voltage or current)		DRT1-AD04H	
Analog Output Terminals	2 outputs (2 words)	Current: 0 to 20 mA, 4 to 20 mA	DRT1-DA02	
		Voltage: 1 to 5 V, 0 to 10 V, – 10 to 10 V		
Temperature Input Terminals	4 inputs (4 words)	Inputs: R, S, K1, K2, J1, J2, T, E, B, N, L1, L2, U, W, PLII	DRT1-TS04T	
		Inputs: Pt100, JPt100	DRT1-TS04P	
RS-232C Unit	Two RS-232C ports, 16 inputs (signal status)		DRT1-232C	U, C, CE
Digital Controller	DeviceNet-compatible Digital Controller		E5EK-AA2-DRT	---
High-density Temperature Controllers	DeviceNet-compatible High-density Temperature Controllers		E5ZE-8□D1-□B-V2	
Multi-function Compact Inverter DeviceNet Communications Unit	DeviceNet Communications Unit for the 3G3MV		3G3MV-PDRT1-SINV	
High-function General-purpose Inverter DeviceNet Communications Unit	DeviceNet Communications Unit for the 3G3RV and 3G3FV		3G3FV-PDRT1-SIN	
Intelligent Flags III	DeviceNet-compatible ID system		V600-HAM42-DRT	
Vision Sensor Controller	DeviceNet-compatible vision system		F150-C10EV3-DRT	
One-axis Positioner	DeviceNet-compatible One-axis Positioner		3F88M-DRT141	
Connection Cable	2 m		3F88M-PRO01	
Programmable Terminal DeviceNet Interface Unit	DeviceNet Interface Unit for the NT31/NT631 Series		NT-DRT21	
DeviceNet Wireless Units	DeviceNet Wireless Master Unit		WD30-M	
	DeviceNet Wireless Slave Unit		WD30-S	

Note: 1. Order Fiber Amplifier Units and Reduced-wiring Connectors as sets.

2. XS8A-0441 and XS8A-0442 Connectors are packed in sets of 10. Order these Connectors in multiples of 10.

■ DeviceNet MULTIPLE I/O TERMINAL Units

Name		Model number	I/O points	Specifications	Standards
Communications Unit		DRT1-COM	---	Total Slave I/O points: 1,024 max.	U, C, CE
Digital I/O Units	Units with Terminal Blocks	GT1-ID16	16 inputs	NPN (+ common)	
		GT1-ID16-1	16 inputs	PNP (– common)	
		GT1-OD16	16 outputs	NPN (– common)	
		GT1-OD16-1	16 outputs	PNP (+ common)	
	Units with MOLEX Connectors	GT1-ID16MX	16 inputs	NPN (+ common)	
		GT1-ID16MX-1	16 inputs	PNP (– common)	
		GT1-OD16MX	16 outputs	NPN (– common)	
		GT1-OD16MX-1	16 outputs	PNP (+ common)	
	Units with Fujitsu Connectors	GT1-ID16ML	16 inputs	NPN (+ common)	
		GT1-ID16ML-1	16 inputs	PNP (– common)	
		GT1-OD16ML	16 outputs	NPN (– common)	
		GT1-OD16ML-1	16 outputs	PNP (+ common)	
	Units with D-Sub 25-pin Connectors	GT1-ID16DS	16 inputs	NPN (+ common)	
		GT1-ID16DS-1	16 inputs	PNP (– common)	
		GT1-OD16DS	16 outputs	NPN (– common)	
		GT1-OD16DS-1	16 outputs	PNP (+ common)	
	Units with High-density Fujitsu Connectors	GT1-ID32ML	32 inputs	NPN (+ common)	
		GT1-ID32ML-1	32 inputs	PNP (– common)	
		GT1-OD32ML	32 outputs	NPN (– common)	
		GT1-OD32ML-1	32 outputs	PNP (+ common)	
Analog Input Units		GT1-AD08MX	8 inputs	MOLEX connector	
		GT1-AD04	4 inputs	Terminal block	
Analog Output Units		GT1-DA04MX	4 outputs	MOLEX connector	
		GT1-DA04	4 outputs	Terminal block	
Temperature Input Units		GT1-TS04T	4 inputs	Thermocouple	
		GT1-TS04P	4 inputs	Platinum resistance thermometer	
Counter Unit		GT1-CT01	1 input, 2 outputs	1 input, 2 outputs Counter Unit with encoder input	CE
Relay Output Units		GT1-ROP08	8 outputs	8 relay outputs, 2A, SPST-NO	U, C, CE
		GT1-ROS16	16 outputs	8 relay outputs, 5A, SPST-NO	
I/O Unit Connecting Cable		GCN1-100	---	1 m	---

■ CompoBus/S Slave Units

Name	Model number	Specifications	Standards
I/O Link Units	CPM2C-SRT21	For CPM2C; 8 input points, 8 output points	CE
	CPM1A-SRT21	For CPM1A/CPM2A; 8 input points, 8 output points	U, C, CE

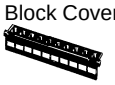
Ordering Guide

Name	Model number	Specifications	Standards
Remote I/O Terminals with Transistors	SRT2-ID04	4 input points, NPN (+ common)	U, C, CE
	SRT2-ID04-1	4 input points, PNP (– common)	
	SRT2-OD04	4 output points, NPN (– common)	
	SRT2-OD04-1	4 output points, PNP (+ common)	
	SRT2-ID08	8 input points, NPN (+ common)	
	SRT2-ID08-1	8 input points, PNP (– common)	
	SRT2-OD08	8 output points, NPN (– common)	
	SRT2-OD08-1	8 output points, PNP (+ common)	
	SRT2-ID16	16 input points, NPN (+ common)	
	SRT2-ID16-1	16 input points, PNP (– common)	
	SRT2-OD16	16 output points, NPN (– common)	
	SRT2-OD16-1	16 output points, PNP (+ common)	
Remote I/O Terminals with Transistors and 3-tier Terminal Block	SRT2-ID16T	16 input points, NPN (+ common)	
	SRT2-ID16T-1	16 input points, PNP (– common)	
	SRT2-MD16T	16 I/O points, NPN (inputs: + common, outputs: – common)	
	SRT2-MD16T-1	16 I/O points, PNP (inputs: – common, outputs: + common)	
	SRT2-OD16T	16 output points, NPN (– common)	
	SRT2-OD16T-1	16 output points, PNP (+ common)	
Remote Input Terminals with Transistors and Connectors (4/8 points)	SRT2-ID04MX	4 input points, NPN (+ common)	CE
	SRT2-ID08MX	8 input points, PNP (+ common)	
Remote Output Terminals with Relays	SRT2-ROC08	8 relay output points	U, C, CE
	SRT2-ROC16	16 relay output points	
	SRT2-ROF08	8 power MOSFET relay output points	
	SRT2-ROF16	16 power MOSFET relay output points	
Remote I/O Terminals with Transistors and Connectors	SRT2-ID32ML	32 input points, NPN (+ common)	CE
	SRT2-ID32ML-1	32 input points, PNP (– common)	
	SRT2-OD32ML	32 output points, NPN (– common)	
	SRT2-OD32ML-1	32 output points, PNP (+ common)	
	SRT2-MD32ML	32 I/O points, NPN (inputs: + common, outputs: – common)	
	SRT2-MD32ML-1	32 I/O points, PNP (inputs: – common, outputs: + common)	
	SRT2-VID08S	8 input points, NPN (+ common)	U, C, CE
	SRT2-VID08S-1	8 input points, PNP (– common)	
	SRT2-VOD08S	8 output points, NPN (– common)	
	SRT2-VOD08S-1	8 output points, PNP (+ common)	
	SRT2-VID16ML	16 input points, NPN (+ common)	
	SRT2-VID16ML-1	16 input points, PNP (– common)	
	SRT2-VOD16ML	16 output points, NPN (– common)	
	SRT2-VOD16ML-1	16 output points, PNP (+ common)	
	SRT2-ATT01	Mounting Bracket A	
	SRT2-ATT02	Mounting Bracket B	

Name	Model number	Specifications	Standards
Waterproof Terminals (with Transistors)	SRT2-ID04CL	4 input points, NPN (+ common)	CE
	SRT2-ID04CL-1	4 input points, PNP (– common)	
	SRT2-OD04CL	4 output points, NPN (– common)	
	SRT2-OD04CL-1	4 output points, PNP (+ common)	
	SRT2-ID08CL	8 input points, NPN (+ common)	
	SRT2-ID08CL-1	8 input points, PNP (– common)	
	SRT2-OD08CL	8 output points, NPN (– common)	
	SRT2-OD08CL-1	8 output points, PNP (+ common)	
CompoBus/S Fiber Amplifier Sensor Communication Unit	E3X-SRT21	Connects to up to 14 Fiber Amplifier Units	
Sensor Terminals	SRT2-ID08S	8 Sensor inputs (NPN)	---
	SRT2-ND08S	4 remote-teaching Sensor inputs, 4 outputs (NPN)	
	SRT2-OD08S	8 Sensor outputs (NPN)	
Analog Input Terminal	SRT2-AD04	1 to 4 inputs (set via DIP switch)	U, C. CE
Analog Output Terminal	SRT2-DA02	1 or 2 outputs (set via DIP switch)	
Remote I/O Modules	SRT2-ID16P	16 input points, NPN (+ common)	---
	SRT2-OD16P	16 output points, NPN (– common)	
Positioner Drivers (Cannot be used in Long-distance Communications Mode.)	FND-X06H-SRT	200-VAC input, 6 A	U, CE, CU
	FND-X12H-SRT	200-VAC input, 12 A	
	FND-X25H-SRT	200-VAC input, 25 A	
	FND-X50H-SRT	200-VAC input, 50 A	
	FND-X06L-SRT	100-VAC input, 6 A	
	FND-X12L-SRT	100-VAC input, 12 A	

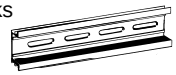
Ordering Guide

■ Optional Products

Name	Specifications		Model	Standards
I/O Unit Cover 	Cover for 10-pin terminal block		C200H-COV11	---
Terminal Block Covers 	Short protection for 10-pin terminal block (package of 10 covers); 8 pts		C200H-COV02	
	Short protection for 19-pin terminal block (package of 10 covers); 12 pts		C200H-COV03	
C200H Unit Connector Cover 	Protective cover for unused I/O Connecting Cable connectors		C500-COV01	
CS1 Special I/O Unit Connector Cover	Protective cover for unused I/O Connecting Cable connectors		CV500-COV01	
C200H Expansion I/O Backplane Insulation Plates 	Electrically insulate C200H Expansion I/O Backplanes from the control panel to increase noise resistance.	For 3-slot Backplane	C200HW-ATT32	N, L, CE
		For 5-slot Backplane	C200HW-ATT52	
		For 8-slot Backplane	C200HW-ATT82	
		For 10-slot Backplane	C200HW-ATTA2	
Relay 	24 VDC, for C200H-OC221/OC222/OC223/OC224/OC225		G6B-1174P-FD-US	---
Programming Console Mounting Bracket 	Used to attach C200H-PRO27-E Hand-held Programming Console to a panel.		C200H-ATT01	
Space Unit	Used for empty I/O slot.		C200H-SP001	---
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

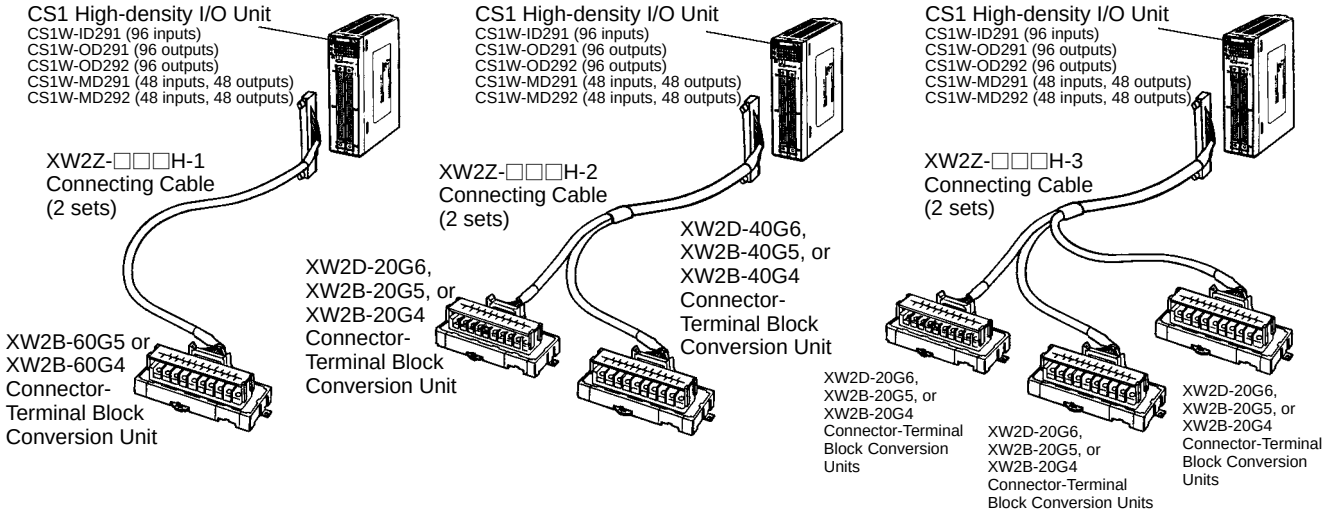
Name	Specifications	Model number	Standards
DIN Track Mounting Bracket 	1 set (2 included)	C200H-DIN01	---
DIN Tracks 	Length: 50 cm; height: 7.3 cm	PFP-50N	
	Length: 1 m; height: 7.3 cm	PFP-100N	
	Length: 50 cm; height: 16 mm	PFP-100N2	
End Plate 	---	PFP-M	
Spacer 	---	PFP-S	

Wiring Devices for High-density I/O Units

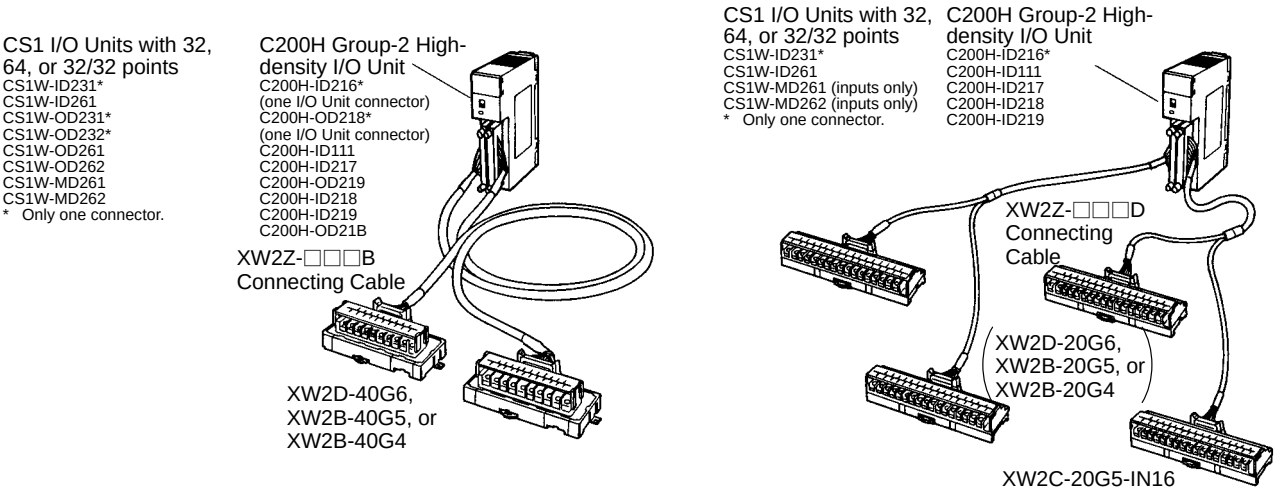
XW2Z Connecting Cables and XW2□ Connector-Terminal Block Conversion Units

Connect High-density I/O Units to Terminal Blocks

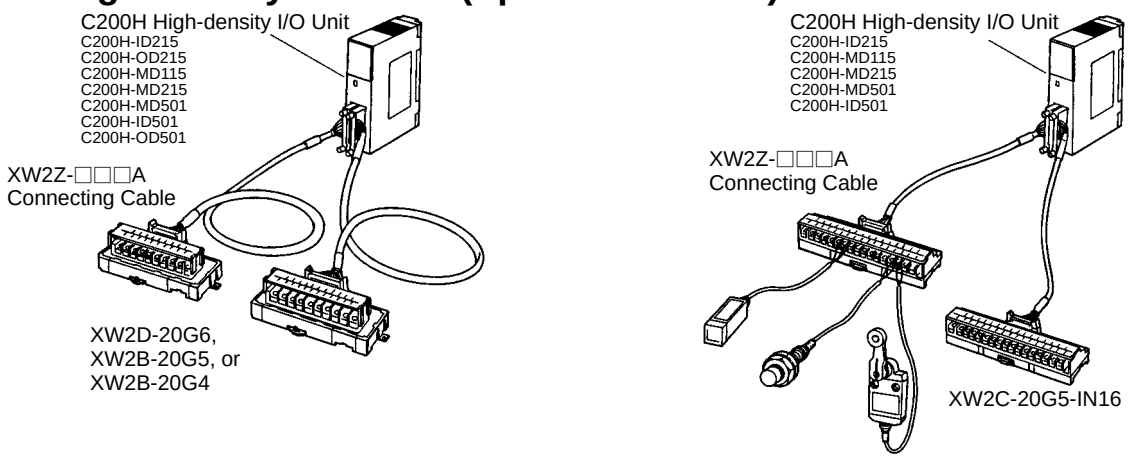
■ CS1 High-density (96 or 48/48 I/O Points) I/O Units (Basic I/O Units)



■ CS1 High-density (32, 64, or 32/32 I/O Points) and C200H Group-2 High-density I/O Units (Basic I/O Units)



■ C200H High-density I/O Units (Special I/O Units)

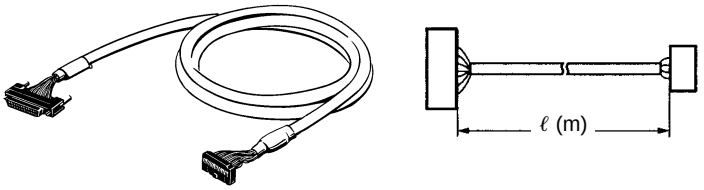


Wiring Devices for High-density I/O Units

XW2Z-□□□H-1 Connecting Cables

CS1 High-density I/O Units	Connecting Cables (See note 1.)		Applicable Connector-Terminal Block Conversion Unit (See note 2.)
	Cable length ℓ (m)	Model number	
CS1W-ID291 (96 inputs) CS1W-OD291 (96 outputs) CS1W-OD292 (96 outputs) CS1W-MD291 (48 inputs, 48 outputs) CS1W-MD292 (48 inputs, 48 outputs)	0.5	XW2Z-050H-1	XW2B-60G5 or XW2B-60G4
	1	XW2Z-100H-1	
	1.5	XW2Z-150H-1	
	2	XW2Z-200H-1	
	3	XW2Z-300H-1	
	5	XW2Z-500H-1	
	7	XW2Z-700H-1	
	10	XW2Z-010H-1	
	1	XW2Z-100H-1G	
	1.5	XW2Z-150H-1G	
	2	XW2Z-200H-1G	
	3	XW2Z-300H-1G	
	5	XW2Z-500H-1G	

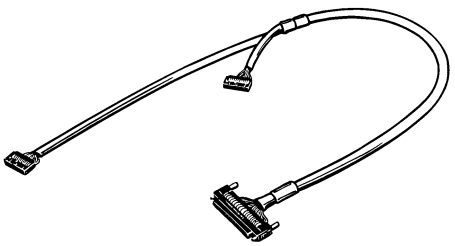
Note:
1. Up to two cables required for each PLC I/O Unit.
2. One Conversion Unit required for each cable.
3. CS1 signal names connecting to the Conversion Unit are different for XW2Z-□□□H-□ and XW2Z-□□□H-□G. Refer to *I/O Signal Tables* for details.

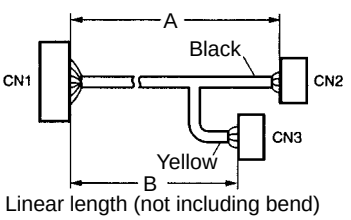


XW2Z-□□□H-2 Connecting Cables

CS1 High-density I/O Units	Connecting Cables (See note 1.)			Applicable Connector-Terminal Block Conversion Unit (See note 2.)
	Cable lengths (m)		Model number	
	A	B		
CS1W-ID291 (96 inputs) CS1W-OD291 (96 outputs) CS1W-OD292 (96 outputs) CS1W-MD291 (48 inputs, 48 outputs) CS1W-MD292 (48 inputs, 48 outputs)	1	0.75	XW2Z-100H-2	XW2D-20G6, XW2B-20G5, XW2B-20G4, XW2D-40G6, XW2B-40G5, or XW2B-40G4
	1.5	1.25	XW2Z-150H-2	
	2	1.75	XW2Z-200H-2	
	3	2.75	XW2Z-300H-2	
	5	4.75	XW2Z-500H-2	
	10	9.75	XW2Z-010H-2	
	1	0.75	XW2Z-100H-2G	
	1.5	1.25	XW2Z-150H-2G	
	2	1.75	XW2Z-200H-2G	
	3.5	2.75	XW2Z-300H-2G	
	5	4.75	XW2Z-500H-2G	

Note:
1. Up to two cables required for each PLC I/O Unit.
2. One XW2□-20G□ and one XW2□-40G□ Conversion Unit required for each cable.
3. CS1 signal names connecting to the Conversion Unit are different for XW2Z-□□□H-□ and XW2Z-□□□H-□G. Refer to *I/O Signal Tables* for details.

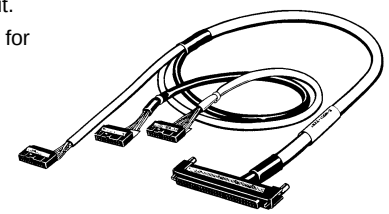


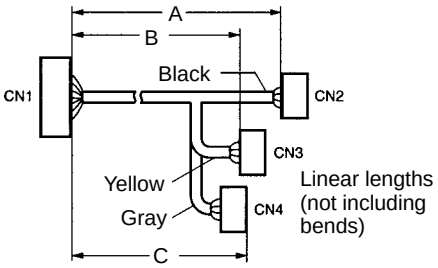


XW2Z-□□□H-3 Connecting Cables

CS1 High-density I/O Units	Connecting Cables (See note 1.)				Applicable Connector-Terminal Block Conversion Unit (See note 2.)
	Cable lengths (m)			Model number	
	A	B	C		
CS1W-ID291 (96 inputs) CS1W-OD291 (96 outputs) CS1W-OD292 (96 outputs) CS1W-MD291 (48 inputs, 48 outputs) CS1W-MD292 (48 inputs, 48 outputs)	1	0.75	1	XW2Z-100H-3	XW2B-20G6, XW2B-20G5, or XW2B-20G4
	1.5	1.25	1.5	XW2Z-150H-3	
	2	1.75	2	XW2Z-200H-3	
	3	2.75	3	XW2Z-300H-3	
	5	4.75	5	XW2Z-500H-3	
	10	9.75	10	XW2Z-010H-3	

Note: 1. Up to two cables required for each PLC I/O Unit.
2. Three XW2□-20G□ Conversion Units required for each cable.





■ I/O Signal Tables (Example for CS1W-OD291, CN1)

XW2Z-□□□H-□ Connecting Cables

XW2Z-□□□H-3	XW2□-20G□ Wd N (CN2): 0 1 2 3 4 5 6 7 COM NC / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / 8 9 10 11 12 13 14 15 +V NC Wd N+1 (CN3): 0 1 2 3 4 5 6 7 COM NC / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / 8 9 10 11 12 13 14 15 +V NC Wd N+2 (CN4): 0 1 2 3 4 5 6 7 COM NC / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / 8 9 10 11 12 13 14 15 +V NC
XW2Z-□□□H-2	XW2□-40G□ Wd N (CN2): 0 1 2 3 4 5 6 7 COM NC / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / 8 9 10 11 12 13 14 15 +V NC Wd N+1 (CN2): 0 1 2 3 4 5 6 7 COM NC / ㉑ ㉓ ㉕ ㉗ ㉙ ㉛ ㉝ ㉟ ㊲ ㊴ / ㉒ ㉔ ㉖ ㉘ ㉚ ㉜ ㉞ ㊱ ㊳ ㊵ / 8 9 10 11 12 13 14 15 +V NC XW2B-20G□ Wd N+2 (CN3): 0 1 2 3 4 5 6 7 COM NC / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / 8 9 10 11 12 13 14 15 +V NC
XW2Z-□□□H-1	XW2B-60G□ Wd N (CN2): 0 1 2 3 4 5 6 7 COM / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / 8 9 10 11 12 13 14 15 +V Wd N+1 (CN2): 0 1 2 3 4 5 6 7 COM / ㉑ ㉓ ㉕ ㉗ ㉙ ㉛ ㉝ ㉟ ㊲ ㊴ / ㉒ ㉔ ㉖ ㉘ ㉚ ㉜ ㉞ ㊱ ㊳ ㊵ / 8 9 10 11 12 13 14 15 +V Wd N+2 (CN2): 0 1 2 3 4 5 6 7 COM NC NC NC / ㊶ ㊸ ㊺ ㊼ ㊾ ㊿ (51) (53) (55) (57) (59) / ㊷ ㊹ ㊻ ㊽ ㊿ (52) (54) (56) (58) (60) / 8 9 10 11 12 13 14 15 +V NC NC NC

XW2Z-□□□H-□G/G79-□□□C-□□□-□□□ Connecting Cables

G79-□□□C-□□□-□□□	XW2□-20G□ Wd N (CN2): +V NC 15 14 13 12 11 10 9 8 / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / NC COM 7 6 5 4 3 2 1 0 Wd N+1 (CN3): +V NC 15 14 13 12 11 10 9 8 / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / NC COM 7 6 5 4 3 2 1 0 Wd N+2 (CN4): +V NC 15 14 13 12 11 10 9 8 / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / NC COM 7 6 5 4 3 2 1 0
XW2Z-□□□H-2G	XW2□-40G□ Wd N (CN2): +V NC 15 14 13 12 11 10 9 8 / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / NC COM 7 6 5 4 3 2 1 0 Wd N+1 (CN2): +V NC 15 14 13 12 11 10 9 8 / ㉑ ㉓ ㉕ ㉗ ㉙ ㉛ ㉝ ㉟ ㊲ ㊴ / ㉒ ㉔ ㉖ ㉘ ㉚ ㉜ ㉞ ㊱ ㊳ ㊵ / NC COM 7 6 5 4 3 2 1 0 XW2B-20G□ Wd N+2 (CN3): +V NC 15 14 13 12 11 10 9 8 / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / NC COM 7 6 5 4 3 2 1 0
XW2Z-□□□H-1G	XW2B-60G□ Wd N (CN2): +V NC 15 14 13 12 11 10 9 8 / ① ③ ⑤ ⑦ ⑨ ⑪ ⑬ ⑮ ⑰ ⑲ / ② ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑯ ⑱ ⑳ / NC COM 7 6 5 4 3 2 1 0 Wd N+1 (CN2): +V NC 15 14 13 12 11 10 9 8 / ㉑ ㉓ ㉕ ㉗ ㉙ ㉛ ㉝ ㉟ ㊲ ㊴ / ㉒ ㉔ ㉖ ㉘ ㉚ ㉜ ㉞ ㊱ ㊳ ㊵ / NC COM 7 6 5 4 3 2 1 0 Wd N+2 (CN2): +V NC 15 14 13 12 11 10 9 8 / ㊶ ㊸ ㊺ ㊼ ㊾ ㊿ (51) (53) (55) (57) (59) / ㊷ ㊹ ㊻ ㊽ ㊿ (52) (54) (56) (58) (60) / NC COM 7 6 5 4 3 2 1 0

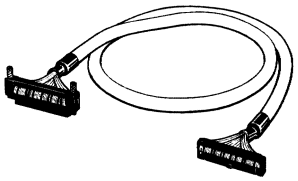
Note: The XW2Z-□□□H-□G I/O signal arrangement is oriented the same as the connector cable for the G79 I/O Relay Terminal.

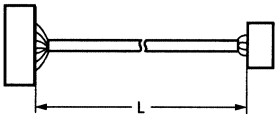
Wiring Devices for High-density I/O Units

XW2Z-□□□B

Applicable PLC Units		Applicable Cables (See note 1.)		Applicable Connector-Terminal Block Conversion Unit (See note 2.)
		Cable length (m)	Model	
CS1W-ID231*	C200H-ID216*	500	XW2Z-050B	XW2D-40G6 XW2B-40G5 XW2B-40G4
CS1W-ID261	C200H-ID217	1,000	XW2Z-100B	
CS1W-OD231*	C200H-ID218	1,500	XW2Z-150B	
CS1W-OD232	C200H-ID219	2,000	XW2Z-200B	
CS1W-OD261	C200H-ID111	3,000	XW2Z-300B	
CS1W-OD262	C200H-OD218*	5,000	XW2Z-500B	
CS1W-MD261	C200H-OD21B			
CS1W-MD262	C200H-OD219			

Note: 1. Up to two Cables required for each PLC Unit.
2. One required for each Cable.
3. Two connectors are provided with each PLC Unit with 64 I/O points except for those with and asterisk. Up to 2 each of the Cables and Conversion Unit is required for each I/O Unit with 64 I/O points.

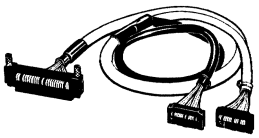


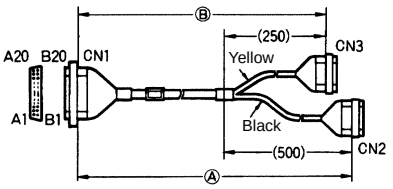


XW2Z-□□□D

Applicable PLC Units		Applicable Cables (See note 1.)			Applicable Connector-Terminal Block Conversion Unit (See note 2.)
		Cable length A (m)	Cable length B (m)	Model	
CS1W-ID231*	C200H-ID216*	1,000	750	XW2Z-100D	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G5-IN16
CS1W-ID261	C200H-ID217	1,500	1,250	XW2Z-150D	
CS1W-MD261 (See note 4.)	C200H-ID218	2,000	1,750	XW2Z-200D	
	C200H-ID219	3,000	2,750	XW2Z-300D	
CS1W-MD262 (See note 4.)	C200H-ID111	5,000	4,750	XW2Z-500D	

Note: 1. Up to two Cables required for each PLC Unit.
2. One required for each Cable.
3. Two connectors are provided with each PLC Unit with 64 I/O points except for those with and asterisk. Up to 2 each of the Cables and Conversion Unit is required for each I/O Unit with 64 I/O points.
4. Only the inputs can be connected with the CS1W-MD261 and CS1W-MD262.



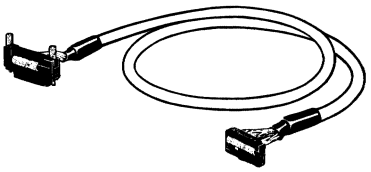


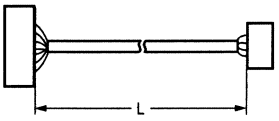
Note: Connector CN2 (black side) is for CN1 row A and Connector CN3 (yellow side) is for CN1 row B.

XW2Z-□□□A

Applicable PLC Units	Applicable Cables (See note 1.)		Applicable Connector-Terminal Block Conversion Unit (See note 2.)
	Cable length (m)	Model	
C200H-ID215 C200H-ID501 C200H-OD215 C200H-OD501 C200H-MD215 C200H-MD115 C200H-MD501	500	XW2Z-050A	XW2D-20G6 XW2B-20G5 XW2B-20G4
	1,000	XW2Z-100A	
	1,500	XW2Z-150A	
	2,000	XW2Z-200A	
C200H-ID215 C200H-ID501 C200H-MD215 C200H-MD115 C200H-MD501	2,000	XW2Z-200A	XW2C-20G5-IN16
	3,000	XW2Z-300A	
	5,000	XW2Z-500A	

Note: 1. Up to two Cables required for each PLC Unit.
2. One required for each Cable.



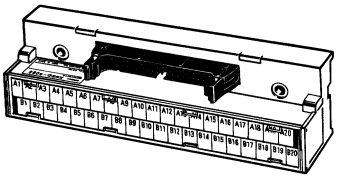


Wiring Devices for High-density I/O Units

XW2□ Connector-Terminal Block Conversion Units

XW2D Connector-Terminal Block Conversion Units (Slim Type)

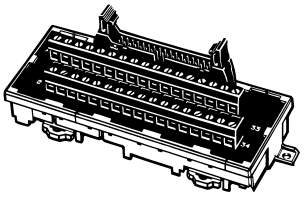
- Mounting area 35% less than 40-point XW2B models enabling down-sizing of control panel and automatic devices.
- Fallout-prevention mechanism used with terminal screws.
- Round crimp terminals and Y-shaped crimp terminals can be used together.



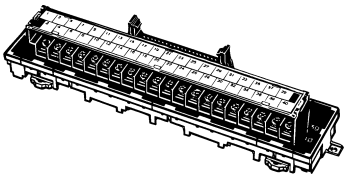
XW2D-□□G6 (M3 screws)

XW2B Connector-Terminal Block Conversion Units (Through Type)

- Mount to DIN track or via screws.
- MIL flat cable connectors or multi-pin square connectors available.
- Terminal blocks available with M3 or M3.5 screws.



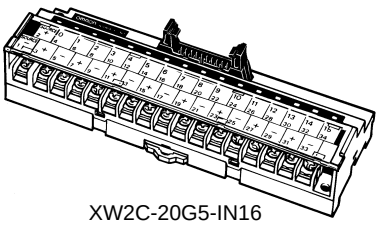
XW2B-□□G4 (M3 screws)



XW2B-□□G5 (M3.5 screws)

XW2C Connector-Terminal Block Conversion Units (with Common)

- Equipped with common terminal for I/O device power supply.
- ON/OFF status indicators.
- Mount to DIN track or via screws.



XW2C-20G5-IN16

■ Models

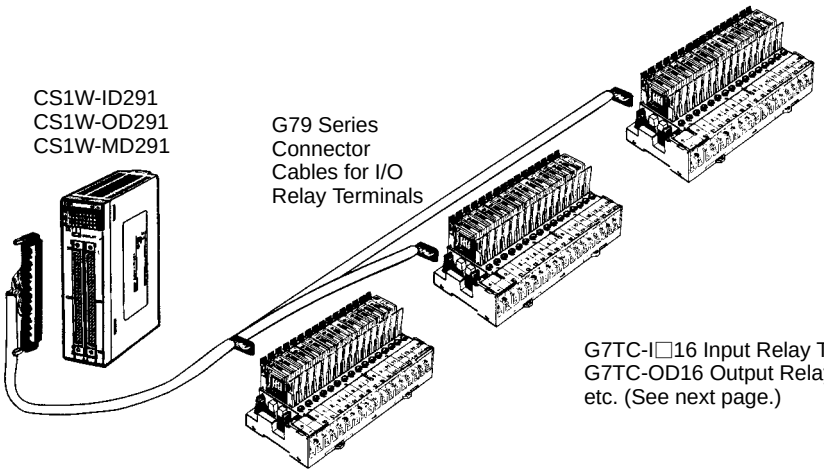
Name		I/O	Model number
Connector-Terminal Block Conversion Units (Common Type)		16 inputs	XW2C-20G5-IN16
Connector-Terminal Block Conversion Units (Slim Type)	M3	16 points	XW2D-20G6
		32 points	XW2D-40G6
Connector-Terminal Block Conversion Units (Through Type)	M3.5	16 points	XW2B-20G5
	M3		XW2B-20G4
	M3.5	32 points	XW2B-40G5
	M3		XW2B-40G4
	M3.5	96 points	XW2B-60G5
	M3		XW2B-60G4

G79 I/O Relay Terminal Connector Cables and G7TC, G70A, and G70D I/O Relay Terminals for Connector Cables

Connect High-density I/O Units to Relay Terminals

■ CS1 High-density I/O Units with 48/48 or 96 I/O Points (Basic I/O Units)

1:3 Connector Cables

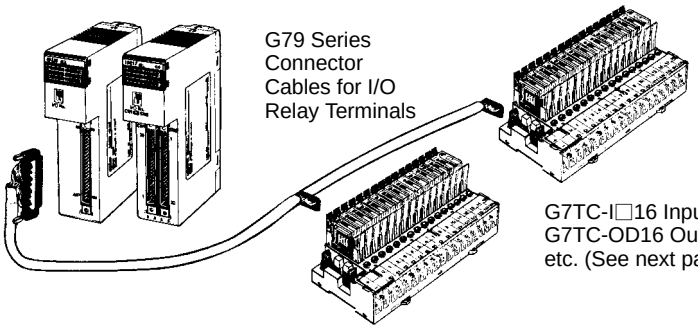


■ CS1 High-density (32, 64, or 32/32 I/O Points) and C200H Group-2 High-density I/O Units (Basic I/O Units)

1:2 Connector Cables

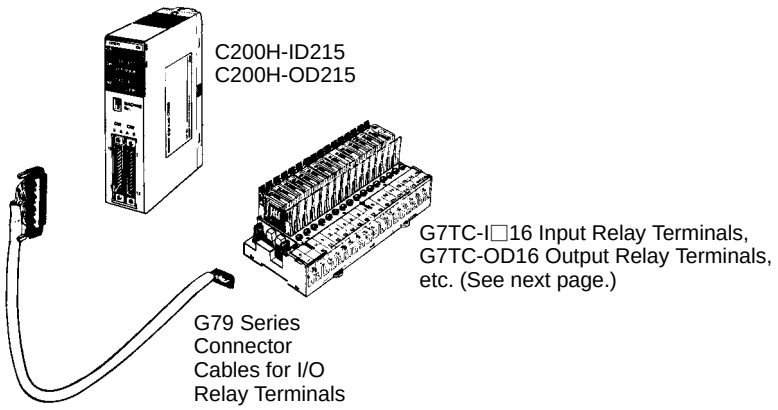
CS1W-ID231
CS1W-ID261
CS1W-OD231
CS1W-OD232
CS1W-OD261
CS1W-OD262
CS1W-MD261
CS1W-MD262

C200H-ID216
C200H-ID217
C200H-ID218
C200H-ID219
C200H-OD218
C200H-OD219
C200H-OD21B



■ C200H High-density I/O Units (Special I/O Units)

1:1 Connector Cables



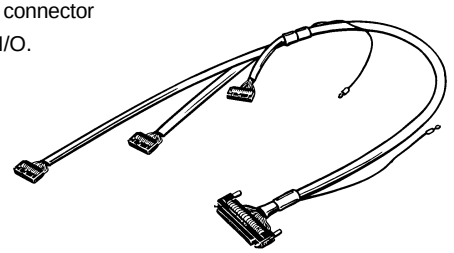
Wiring Devices for High-density I/O Units

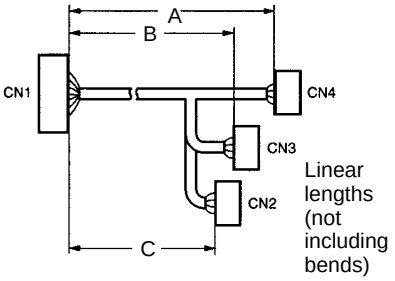
G79 I/O Relay Terminal Connector Cables

G79-□□□C-□-□

CS1 High-density I/O Units (96, 48/48 points) (Basic I/O Units)		I/O Relay Terminal Connector Cables (See note 1.)				Applicable Relay Terminals (See note 2.)
		Cable lengths (m)			Model numbers	
Model	I/O	A	B	C		Model numbers
CS1W-ID291	96 inputs	1.5 2 3	1.25 1.75 2.75	1 1.5 2.5	G79-150C-125-100 G79-200C-175-150 G79-300C-275-250	G7TC-I□16
CS1W-OD291	96 outputs					G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 (plus relays)
CS1W-MD291	48 inputs					G7TC-I□16
	48 outputs					G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 (plus relays)

Note: 1. One connector required for each I/O Unit connector
2. Relay Terminals required for number of I/O.



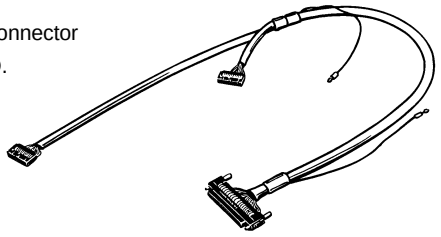


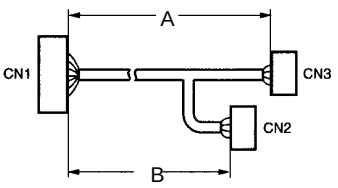
Linear lengths (not including bends)

G79-I□□□C-□/G79-O□□□C-□

CS1 High-density (32, 64, 32/32 points) and C200H Group-2 High-density I/O Units (Basic I/O Units)		I/O Relay Terminal Connector Cables (See note 1.)			Applicable Relay Terminals (See note 2.)
		Cable lengths (m)		Model numbers	
Model	I/O	A	B		Model numbers
CS1W-ID231 CS1W-ID261 CS1W-MD261 (Inputs) C200H-ID216 C200H-ID217 C200H-ID218 C200H-ID219	32 inputs 64 inputs	1 1.5 2 3 5	0.75 1.25 1.75 2.75 4.75	G79-I100C-75 G79-I150C-125 G79-I200C-175 G79-I300C-275 G79-I500C-475	G7TC-I□16
CS1W-OD231 CS1W-OD261 CS1W-MD261 (Outputs) C200H-OD218 C200H-OD219	32 outputs 64 outputs	1 1.5 2 3 5	0.75 1.25 1.75 2.75 4.75	G79-O100C-75 G79-O150C-125 G79-O200C-175 G79-P300C-275 G79-O500C-475	G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 (plus relays)
CS1W-OD232 CS1W-OD262 CS1W-MD262 (Outputs) C200H-OD21B	32 outputs 64 outputs	1 1.5 2 3 5	0.75 1.25 1.75 2.75 4.75	G79-O100C-75 G79-O150C-125 G79-O200C-175 G79-O300C-275 G79-O500C-475	G70D-□016-1 G70A-ZOC16-4 (plus relays)

Note: 1. One connector required for each I/O Unit connector
2. Relay Terminals required for number of I/O.



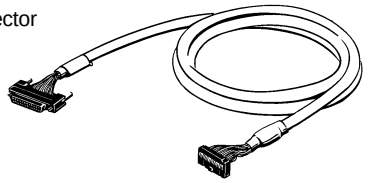


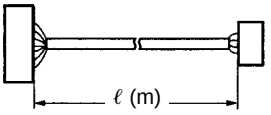
Linear length (not including bend)

G79-□□□C

C200H High-density I/O Units (Special I/O Units)		I/O Relay Terminal Connector Cables (See note 1.)		Applicable Relay Terminals (See note 2.)
Model	**I/O**	**Cable length ℓ (m)**	**Model numbers**	**Model numbers**
C200H-ID215	32 inputs	1 1.5 2 3 5	G79-100C G79-150C G79-200C G79-300C G79-500C	G7TC-I□16
C200H-OD215	32 outputs			G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 (plus relays)

Note: 1. One connector required for each I/O Unit connector
2. Relay Terminals required for number of I/O.



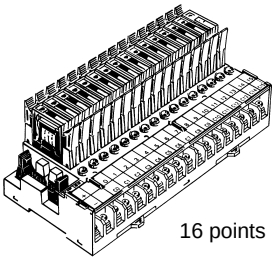


G7TC, G70A, and G70D I/O Relay Terminals for Connector Cables

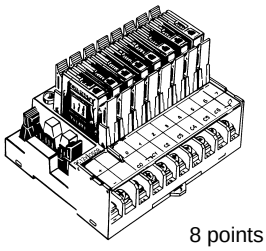
■ G7TC:

I/O Relay Terminals with High-capacity Relays

- Models with 8 outputs, 16 outputs, or 16 inputs.
- PNP model with 16 outputs.
- Compact: 182 x 85 x 68 mm (WxDxH) (8-pt: 102 mm W).
- G7T I/O relays (SPST-NO, 5 A/relay) mounted.
- Models available meeting UL and CSA standards.
- Model with 16 independent points.
- G3TA I/O Solid-state Relays can be mounted.



16 points

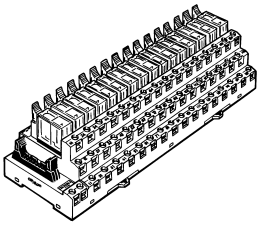


8 points

■ G70A-ZOC16:

I/O Relay Terminals with User-selected Relays

- 16-output relay terminal sockets.
- PNP models available.
- Compact: 234 x 75 x 64 mm (WxDxH).
- Mount G2R Power Relays, G3R Solid-state Relays, G3RZ Power MOS FET Relays, or H3RN Timers as required (Relays/Timers sold separately).
- High-capacity terminal block: 10 A.
- VDE standards met.
- Model with 16 independent points.



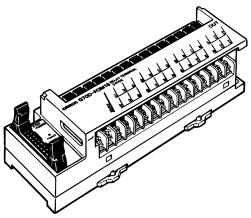
Note: Relays sold separately.

Wiring Devices for High-density I/O Units

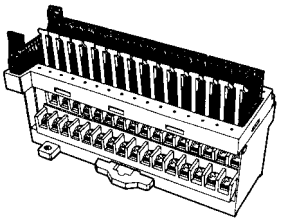
■ G70D:

16-point I/O Relay Terminals with G6D and G3DZ

- 16-output relay terminal.
- Pick from a flat design (156 x 51 x 39 mm (WxDxH)) or vertical design (135 x 46 x 81 mm (WxDxH))
- G6C Power Relays (SPST-NO, 3 A/relay for flat design and 3 A/common for vertical design) or G3DZ Power MOS FET Relays (SPST-NO, 0.3 A/relay) mounted.
- Flat design: 2 outputs/common,
  Vertical design: 16 independent outputs.



Flat Design
(G70D-SOC16/FOM16)



Vertical Design
(G70D-VSOC16/VFOM16)

■ Models

Model	Rated voltage
G7TC-ID16	24 VDC
G7TC-IA16	100/110 VAC
	200/220 VAC
G7TC-OC16	24 VDC
G70A-ZOC16-3	Relays sold separately.
G70D-SOC16	24 VDC
G70D-VSOC16	24 VDC
G70D-FOM16	24 VDC
G70D-VFOM16	24 VDC

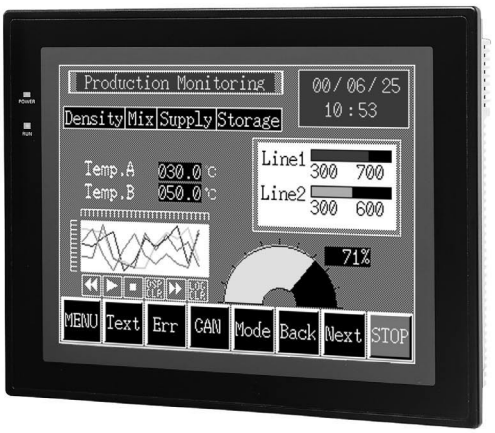
Programmable Terminals

■ NT631/31 Series

Supporting the CS1Series with More Power than Ever Before

The NC631 TFT Programmable Terminal uses high-luminance liquid crystals for the brightest displays.

NT31C

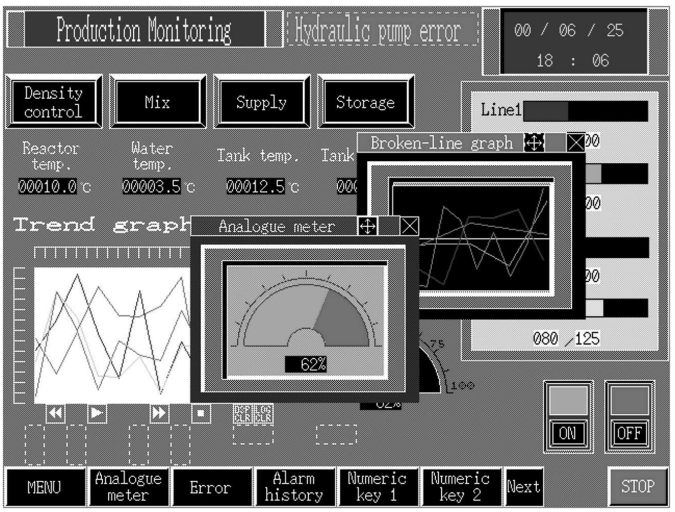


NT631C

Software Advancements for More Advanced Displays

Hardware: Multi-window Functionality for More Efficient Screen Applications

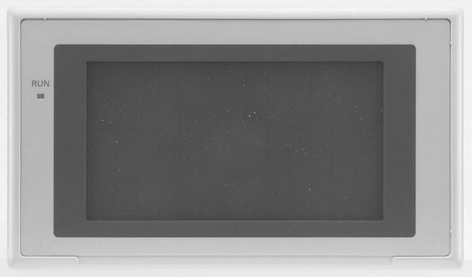
Up to three windows can be displayed at the same time and many more display components can be positioned. Just touch the screen to move a window, display analog meters along with other forms of graph displays.



Programmable Terminals

Compact PT: The NT21

Connects to CS1 PLCs via NT Link and Host Link

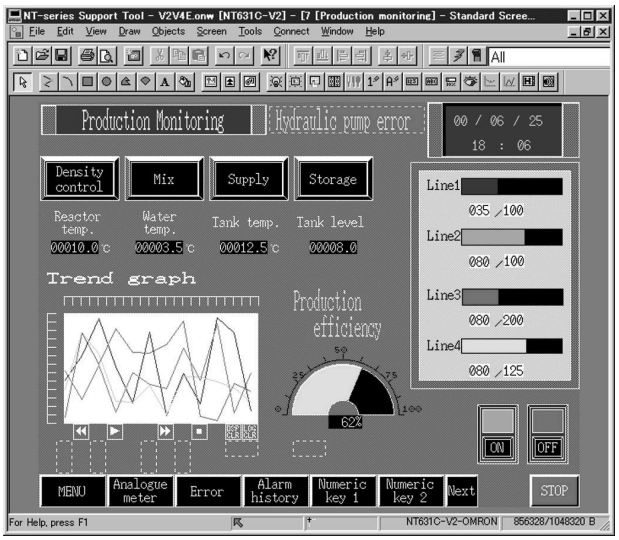


NT21

More Powerful NT Support Software (V4) Shortens Screen Creation Procedures

Software: The Following New Functions ***NEW***

- Copy screens and tables between files.
- Edit function for grouping parts.
- Preview images and libraries.
- ON/OFF simulation for lamps and touch switches.
- Use I/O comments from CX-Server.
- Import/export label information as CSV files (Translation Support Utility).



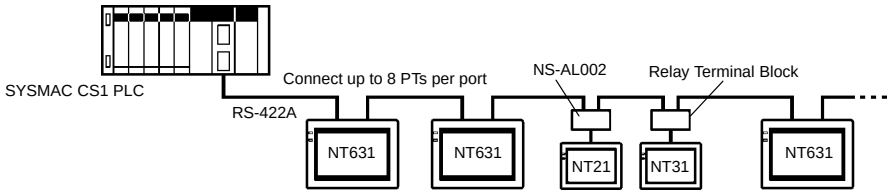
Version 2 NT631 and NT31 PTs ***NEW***

Even More Advance Capabilities

- High-speed NT Links for CS1 PLCs.
- Device monitoring.
- Interlocks.
- Calculations.
- And many other functional improvements.

1:N NT Links: Improved Functionality for PLC Compatibility

- Connect more than one PT to each port on the CS1 CPU Unit.
- Give priority treatment to registered PT communications.
- Connect up to eight PTs to each CS1H/CS1G PLC port with 1:N NT Links.



Relay Terminal Blocks are required to connect more than one NT31(C) PT.

Product	Specifications		Model
NT631 Programmable Terminals	TFT color	Body color: Beige	NT631C-ST151-EV2
		Body color: Black	NT631C-ST151B-EV2
	STN color	Body color: Beige	NT631C-ST141-EV2
		Body color: Black	NT631C-ST141B-EV2
	EL	Body color: Beige	NT631-ST211-EV2
		Body color: Black	NT631-ST211B-EV2
NT31 Programmable Terminals	STN color	Body color: Beige	NT31C-ST141-EV2
		Body color: Black	NT31C-ST141B-EV2
	STN black and white	Body color: Beige	NT31-ST121-EV2
		Body color: Black	NT31-ST121B-EV2
NT21 Programmable Terminals	STN blue and white	Body color: Beige	NT21-ST121-E
		Body color: Black	NT21-ST121B-E
Support Software	English	Windows 95/98/Me/NT/2000, CD-ROM	NT-ZJCAT1-EV4
	Memory Unit for screen transfers+	For both NT631, NT31 and NT21	NT-MF261
Cables	Screen transfers	IBM PC/AT or compatible	XW2Z-S002
	Printer	To print hard copies of screens	NT-CNT121
Options	DeviceNet Interface Unit		NT-DRT21
	Non-reflective Protective Sheets (display area only)	For NT631C/NT631 (5 sheets)	NT610-KBA04
		For NT31C/NT31 (5 sheets)	NT30-KBA04
	Chemical-resistive Cover (silicon cover)	For NT631C/NT631	NT625-KBA01
		For NT31C/NT31	NT30-KBA01
	Backlight Unit	For NT631C-ST151□	NT631C-CFL01
		For NT631C-ST141□	NT631C-CFL02
		For NT31C/31	NT31C-CFL01
	Bar Code Reader	Refer to the Bar Code Reader catalog.	V520-RH21-6
	RS-232C/RS-422A Converter Unit	For NT21, NT31 and NT631	NS-AL002

Note: 1. Ask your sales representative about Japanese and Chinese versions.

2. If the system program is installed from version 4 of the Support Software for PTs without “-V1” in the model number, the new version 4 features can be used (except for high-resolution fonts and the Memory Unit).

Servo Systems

■ R7M-A/R7D-AP AC SMARTSTEP Servomotors/Servo Drivers

SMARTSTEP Provides an Easy-Setup Operation Environment

Connections

A lineup of control cables ensures easy connections between the Driver and a variety of controllers. A single cable is all that is required to connect the motor as well. Special reduction gears are available.

Setup

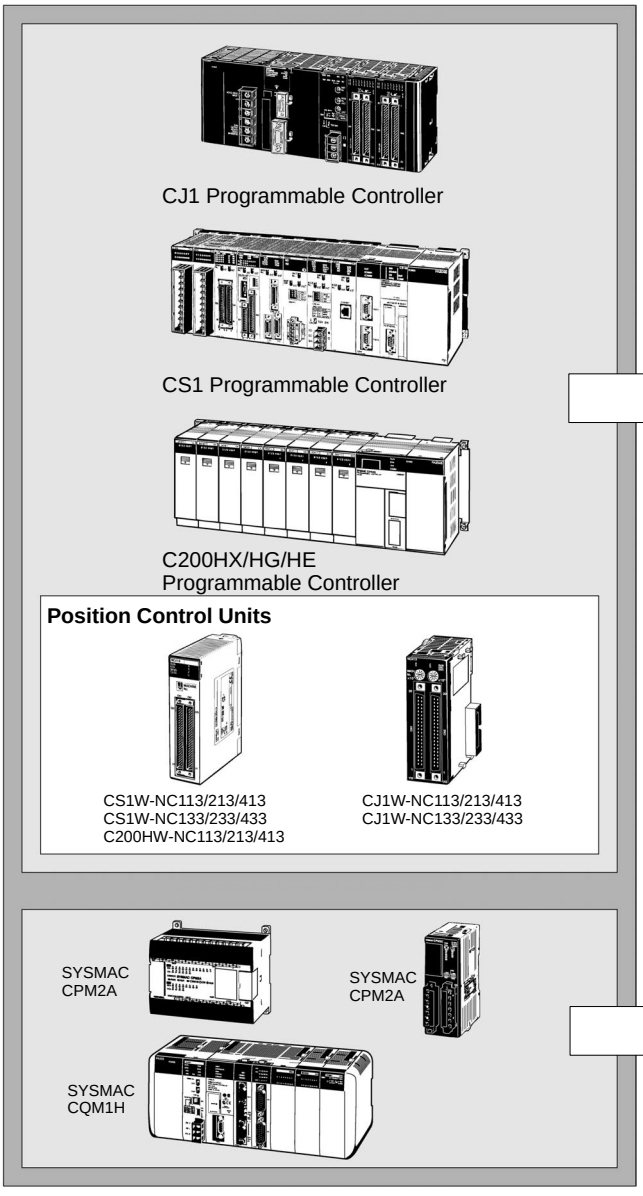
Easy system setup is possible from front-panel switches. The system does not require time-consuming parameter settings and the Servomotor can be used as easily as a stepping motor.

Servomotor Capacities

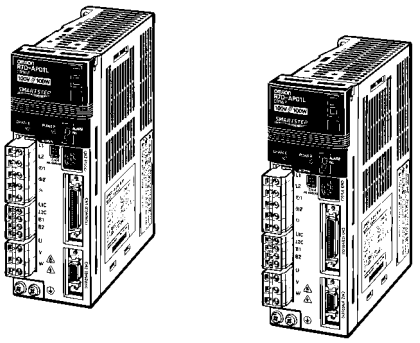
30 W, 50 W, 100 W, 200 W, 400 W, 750 W

System Configuration

Controllers



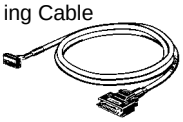
Servo Drivers



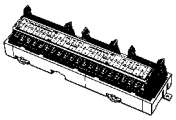
The illustrations shown here are examples only.

Pulse train references

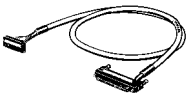
XW2Z-□□□J-B5
Servo Driver Connecting Cable



XW2B-□□J6-□B
Servo Relay Unit

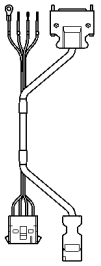


XW2Z-□□□J-A□
Position Control Unit Connecting Cable



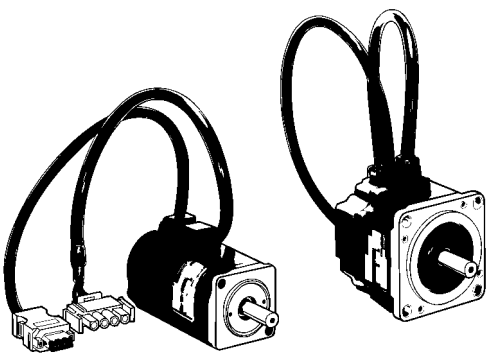
Motor Cables

R7A-CEA□□□S
(without brakes)
R7A-CEA□□□B
(with brakes)



Motor power feedback signals

Servomotors



The illustrations shown here are examples only.

Servo Systems

■ R88M-W/R88D-W AC Servomotors/Servo Drivers (OMNUC W Series)

The Performance, Response, Speed, and Control Accuracy Required of Servos Onsite: Greatly Improve Machine Performance and Productivity

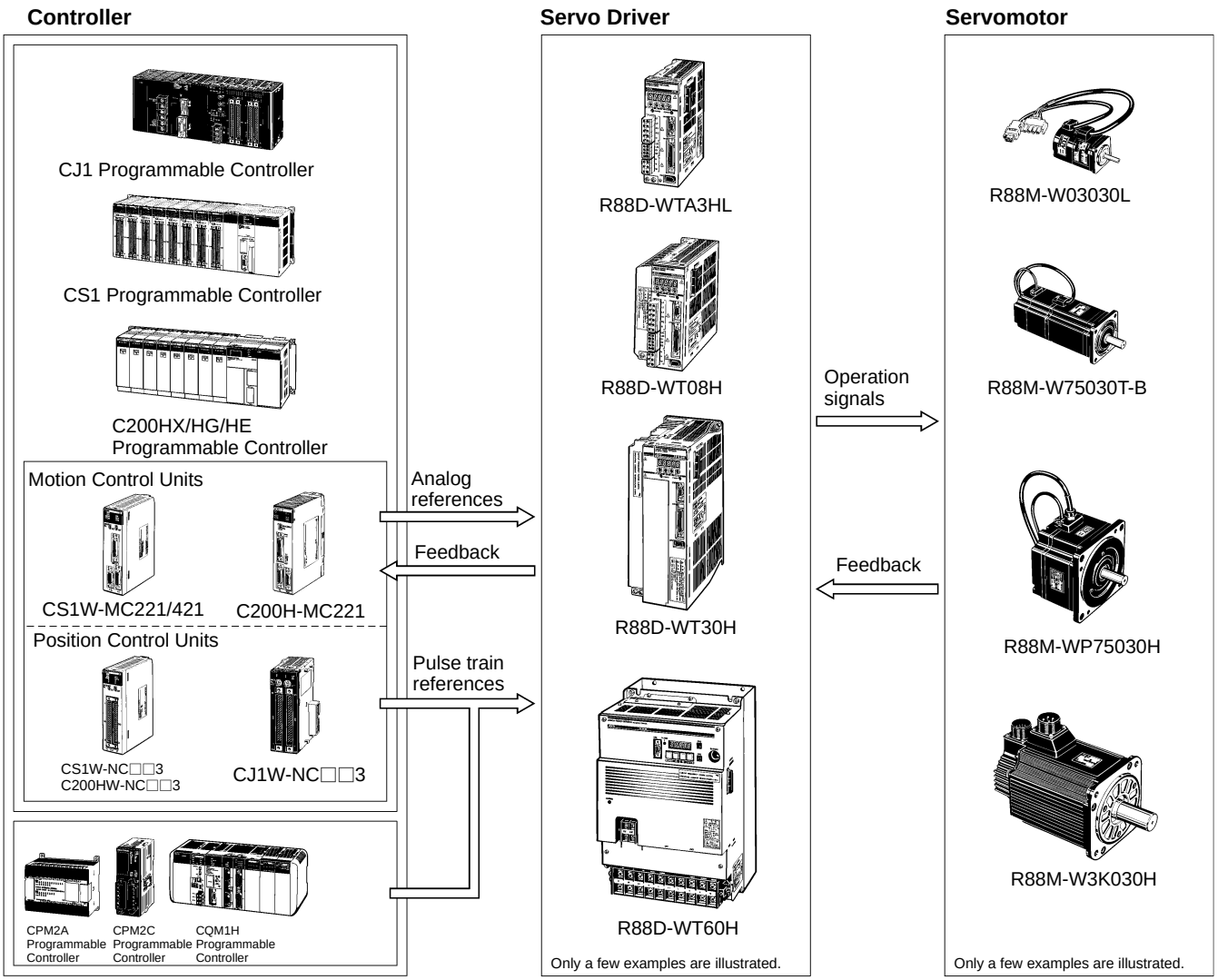
AC Servo Drivers

- Control algorithms greatly reduce positioning time (1/3rd of OMRON U Series).
- Online auto-tuning to automatically measure machine characteristics and easily adjust the servo gain.

AC Servomotors

- Comprehensive lineup: Models with brakes, models with gears, 1,000-r/min models (300 W to 5.5 kW), and 3,000-r/min models (30 W to 5 kW).
- Greatly reduce motor speed ripple for smoother operation.
- Maximum speeds of 5,000 r/min and high-resolution serial encoder for a fast, accurate drive (not provided on all models).

System Configuration



■ R88M-U/R88D-U AC Servomotors/Servo Drivers (OMNUC U Series)

Powerful Functions in a Compact Design for High-speed, High-precision Control

AC Servo Drivers

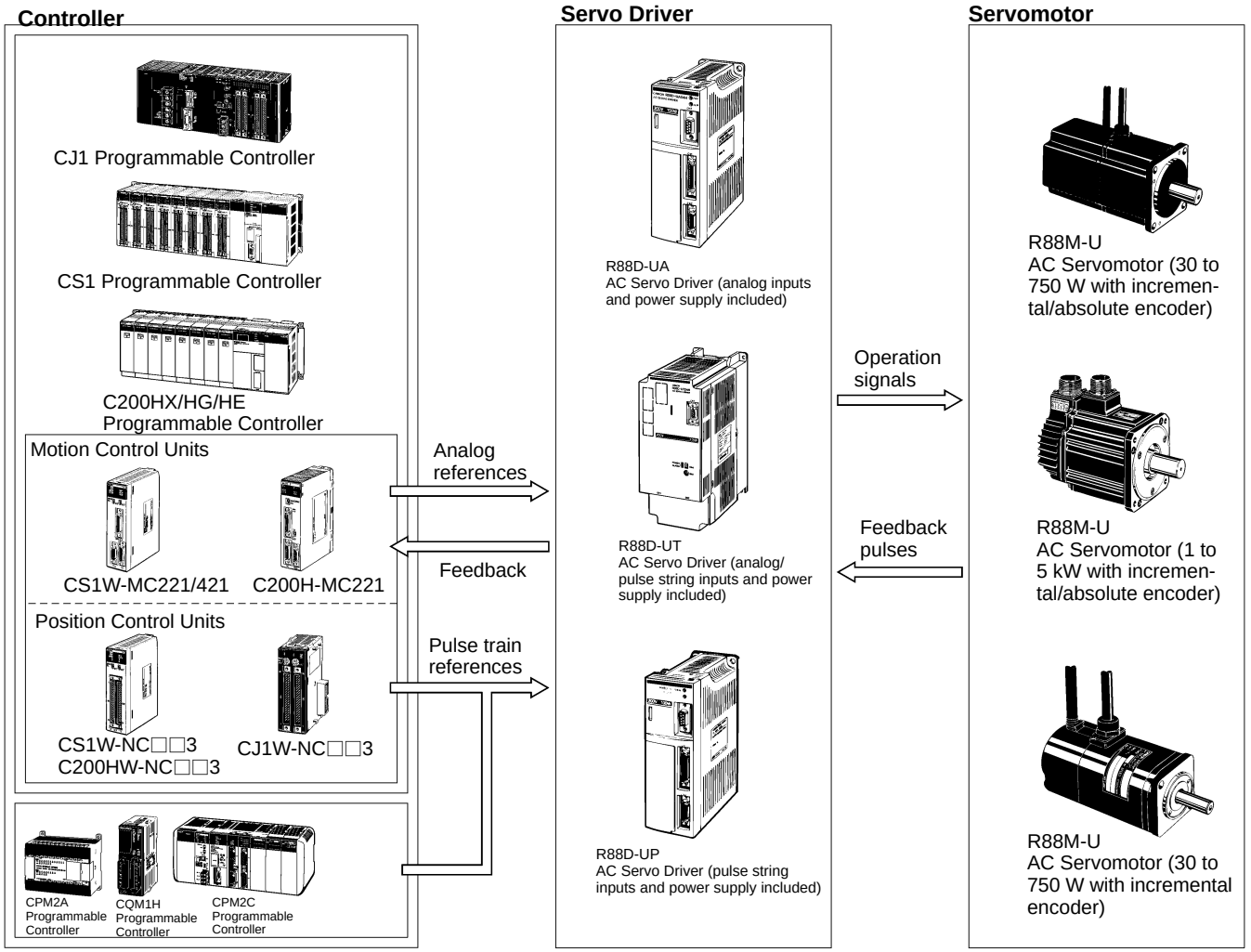
- High-speed response of 250 Hz servo frequency characteristic to reduce positioning time.
- Auto-tuning to automatically adjust the control system gain.

AC Servomotors

- Speed control range of 1:5,000 for smooth low-speed operation.
- Motors available with Incremental or absolute encoders with capacities from 30 W to 5 kW.

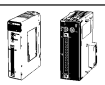
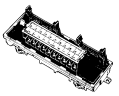
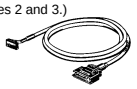
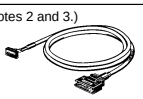
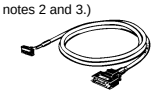
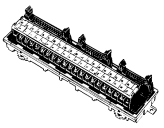
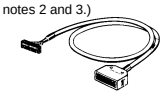
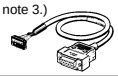
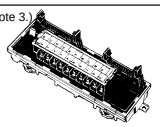
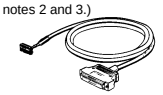
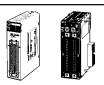
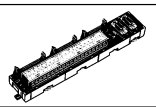
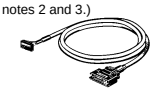
System Configuration

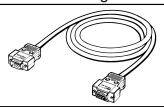
Note: Motors with absolute encoders can be used with the CV500-MC221/MC421 Motion Control Units.



■ XW2B Servo Relay Units

Combinations of Servo Relay Units, Servo Drivers, and Position Control

Position Control Units	Position Control Unit Connecting Cables	Servo Relay Units	Servo Driver Connecting Cables	Servo Drivers
			(See notes 2 and 3.) 	
C200H-NC112	XW2Z-□□□J-A1	XW2B-20J6-1B (See note 1.)	SMARTSTEP A-series Connecting Cable	SMARTSTEP A-series Servo Driver
	XW2Z-□□□J-A4 (For R88D-UEP/R7D-AP only)		XW2Z-□□□J-B5 Communications function not supported (XW2B-□□J6-□B only.)	R7D-AP□□□
C200HW-NC113 CS1W-NC113	XW2Z-□□□J-A6			
	XW2Z-□□□J-A8 (For R88D-UEP/R7D-AP only)			
CS1W-NC133	XW2Z-□□□J-A10			
	XW2Z-□□□J-A12 (For R88D-UEP/R7D-AP only)			
CJ1W-NC113	XW2Z-□□□J-A14			
	XW2Z-□□□J-A16 (For R88D-UEP/R7D-AP only)			
CJ1W-NC133	XW2Z-□□□J-A18			
	XW2Z-□□□J-A20 (For R88D-UEP/R7D-AP only)			
			(See notes 2 and 3.) 	
			OMNUC W-series Connecting Cable	OMNUC W-series Servo Driver
			XW2Z-□□□J-B4	R88D-WT□□H□
			(See notes 2 and 3.) 	
			OMNUC U-series Connecting Cable	OMNUC U-series Servo Driver
			XW2Z-□□□J-B1	R88D-UP□□□
			XW2Z-□□□J-B4	R88D-UT□□□
			XW2Z-□□□J-B5	R88D-UEP□□□ (See note 4.)
			(See notes 2 and 3.) 	
C200H-NC211	XW2Z-□□□J-A2	XW2B-40J6-2B (See note 1.)	OMNUC M-series Connecting Cable	OMNUC M-series Servo Driver
	XW2Z-□□□J-A5 (For R88D-UEP/R7D-AP only)		XW2Z-□□□J-B2	R88D-MT□□
C200HW-NC213/413 CS1W-NC213/413	XW2Z-□□□J-A7			
	XW2Z-□□□J-A9 (For R88D-UEP/R7D-AP only)			
CS1W-NC233/433	XW2Z-□□□J-A11			
	XW2Z-□□□J-A13 (For R88D-UEP/R7D-AP only)			
CJ1W-NC213/413	XW2Z-□□□J-A15			
	XW2Z-□□□J-A17 (For R88D-UEP/R7D-AP only)			
CJ1W-NC233/433	XW2Z-□□□J-A19			
	XW2Z-□□□J-A21 (For R88D-UEP/R7D-AP only)			
	(See note 3.) 	(See note 3.) 	(See notes 2 and 3.) 	
CQM1-CPU43-V1 CQM1H-PLB21	XW2Z-□□□J-A3	XW2B-20J6-3B (See note 1.)	OMNUC H-series Connecting Cable	OMNUC H-series Servo Driver
CS1W-HCP222 (for 1 axis)	XW2Z-□□□J-A22		XW2Z-□□□J-B3	R88D-H□□□
CS1W-HCP22 (for 2 axes)	XW2Z-□□□J-A23			
			(See notes 2 and 3.) 	
CS1W-NC213/413	XW2Z-□□□J-A9	XW2B-40J6-4A	SMARTSTEP A-series Connecting Cable	SMARTSTEP A-series Servo Driver
CS1W-NC233/433	XW2Z-□□□J-A13		XW2Z-□□□J-B7 Communications function supported (XW2B-40J6-4A only).	R7D-AP□□□
CS1W-NC213/413	XW2Z-□□□J-A17			
CS1W-NC233/433	XW2Z-□□□J-A21			

Serial Communications Unit/Board	Serial Communications Unit/ Board Connecting Cable
	
CS1W-SCB41	XW2Z-□□□J-C1
CJ1W-SCU41	

Note:

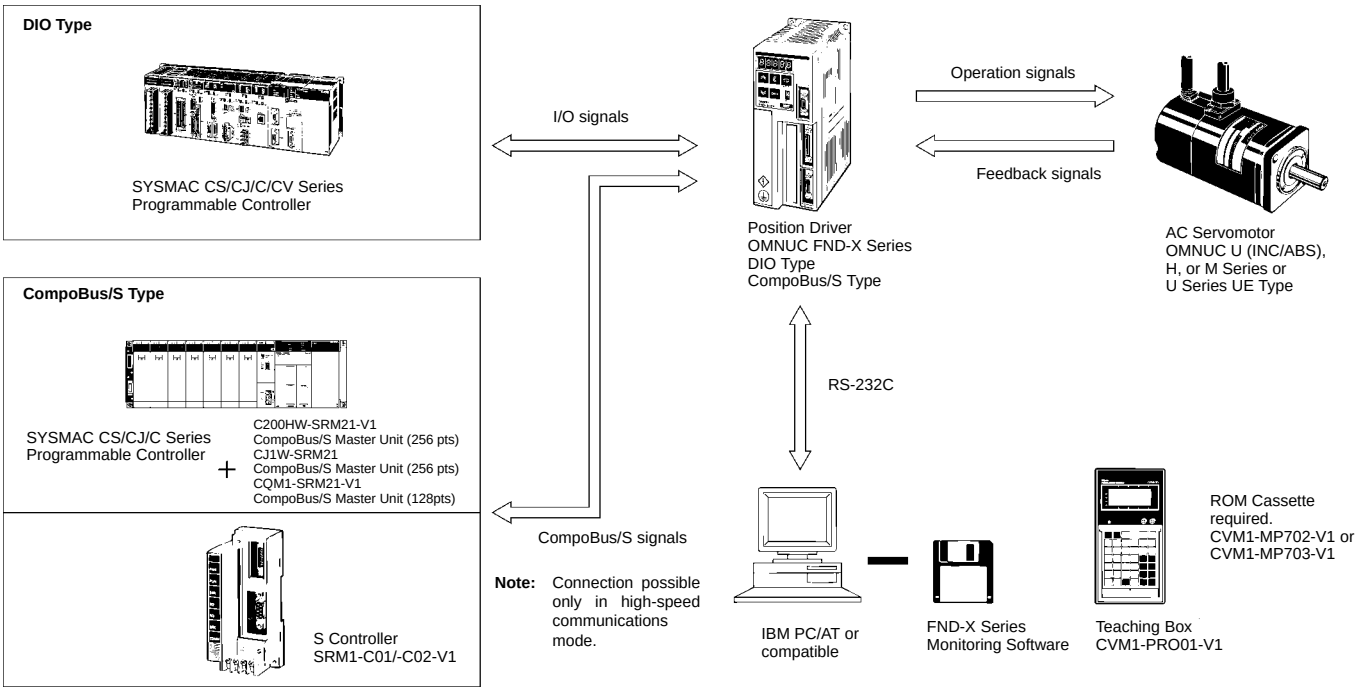
1. Satisfies the functions of conventional models such as the XW2B-20J6-2, XW2B-40J6-2, and XW2B-20J6-3 and can be connected to the R88D-UEP□□□.
2. When connecting to a C200H-NC211, C200HW-NC213/-413, or CS1W-NC213/-233/-413/-433, two Servo Driver Connecting Cables are required for one Relay Unit.
3. When using the CQM1-CPU43-V1 for two axes, two Position Control Unit Connecting Cables, two Relay Units, and two Servo Driver Connecting Cables are required.
4. Use the following Connecting Cables:
   C200H-NC112: XW2Z-□□□J-A4 C200HW-NC113, CS1W-NC113: XW2Z-□□□J-A8
   C200H-NC211: XW2Z-□□□J-A5 C200HW-NC213/-413, CS1W-NC213: XW2Z-□□□J-A9

■ FND-X Position Drivers (OMNUC FND-X Series)

An Inverter with Built-in Positioner Functions for Easy Positioning Systems

- Both DIO and CompoBus/S models available.
- Connect to OMNUC U, H, and M Series or U Series UE Type AC Servomotors.
- Two Control Modes: Feeder control and PTP control
- Three Operating Modes: Independent operation, automatic incremental operation, and continuous operation.
- Easy Positioning: Just enter the point number and turn ON the start signal.
- S-curve acceleration/deceleration, backlash compensation, slip compensation, deceleration stops, and many other features.

System Configuration



Models

Position Drivers

Specifications			Model
DIO Type	200-VAC input	6 A	FND-X06H
		12 A	FND-X12H
		25 A	FND-X25H
		50 A	FND-X50H
	100-VAC input	6 A	FND-X06L
		12 A	FND-X12L
CompoBus/S Type	200-VAC input	6 A	FND-X06H-SRT
		12 A	FND-X12H-SRT
		25 A	FND-X25H-SRT
		50 A	FND-X50H-SRT
	100-VAC input	6 A	FND-X06L-SRT
		12 A	FND-X12L-SRT

Teaching Boxes

Specifications			Model
Teaching Box			CVM1-PRO01-V1 (See note.)
ROM Cassette	FND-X or MC/NC Units		CVM1-MP702-V1
	FND-X only		CVM1-MP703-V1
Connecting Cable		2 m	CV500-CN22A
		4 m	CV500-CN42A
		6 m	CV500-CN62A

Note: A ROM Cassette and Connecting cable are required for the Teaching Box.

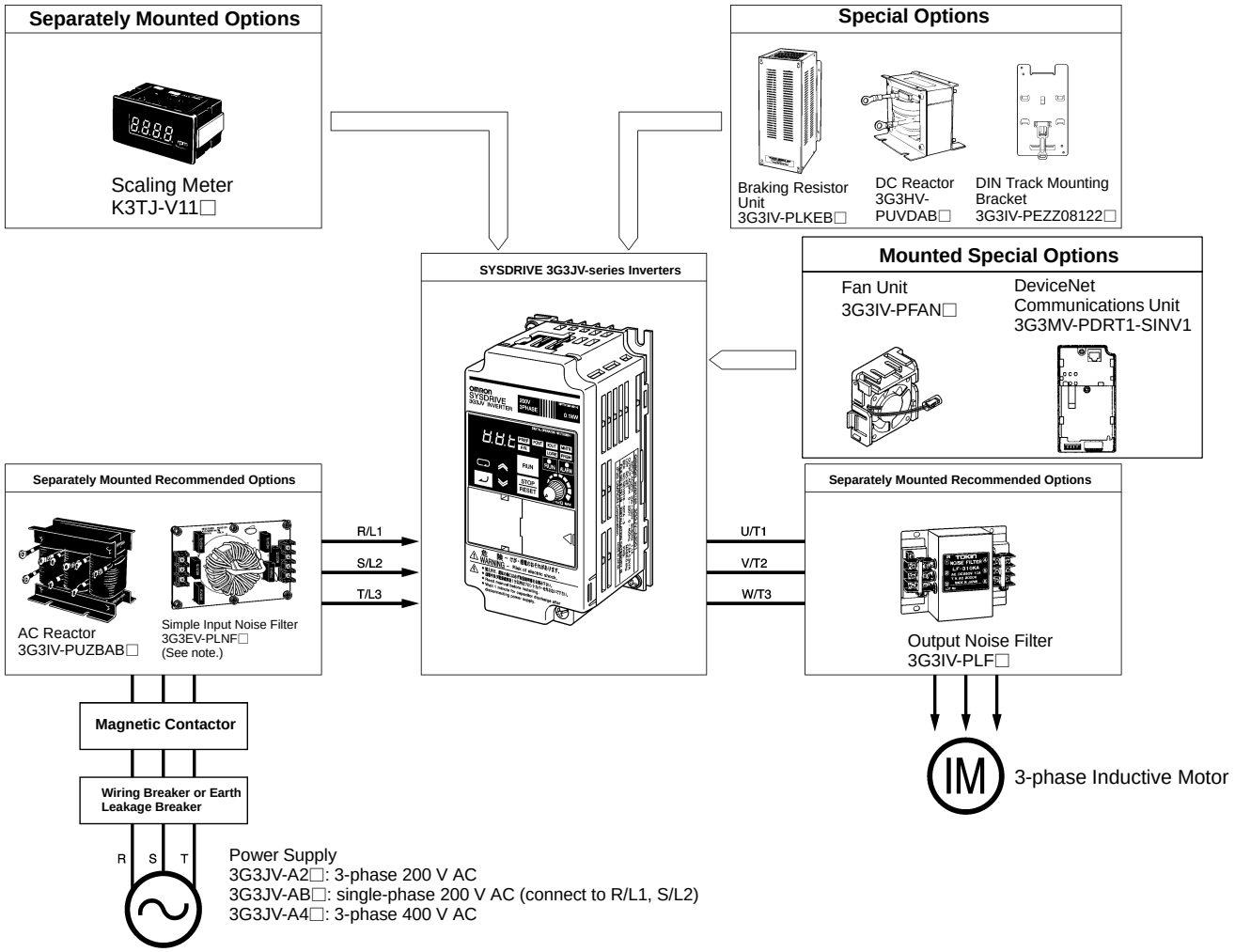
Inverters

■ SYSDRIVE 3G3JV Series Compact Simplified Inverters

Economic Compact Inverter with Versatile Functions for Easy Application, Maintenance, and Speed Control

- The speed adjuster on the front panel ensures easy speed control.
- A compact model with versatile ease-to-use functions.
- Built into panels with ease with simple wiring.
- A cooling fan can be snapped on for easy mounting. The life of the fan is prolonged because the fan turns ON only when the Inverter is in operation.
- A lineup of versatile models is available for a variety of applications.
  3-phase 200 VAC (0.1 to 3.7 kW), single-phase 200 VAC (0.1 to 1.5 kW), single-phase 400 VAC (0.2 to 3.7 kW)

System Configuration



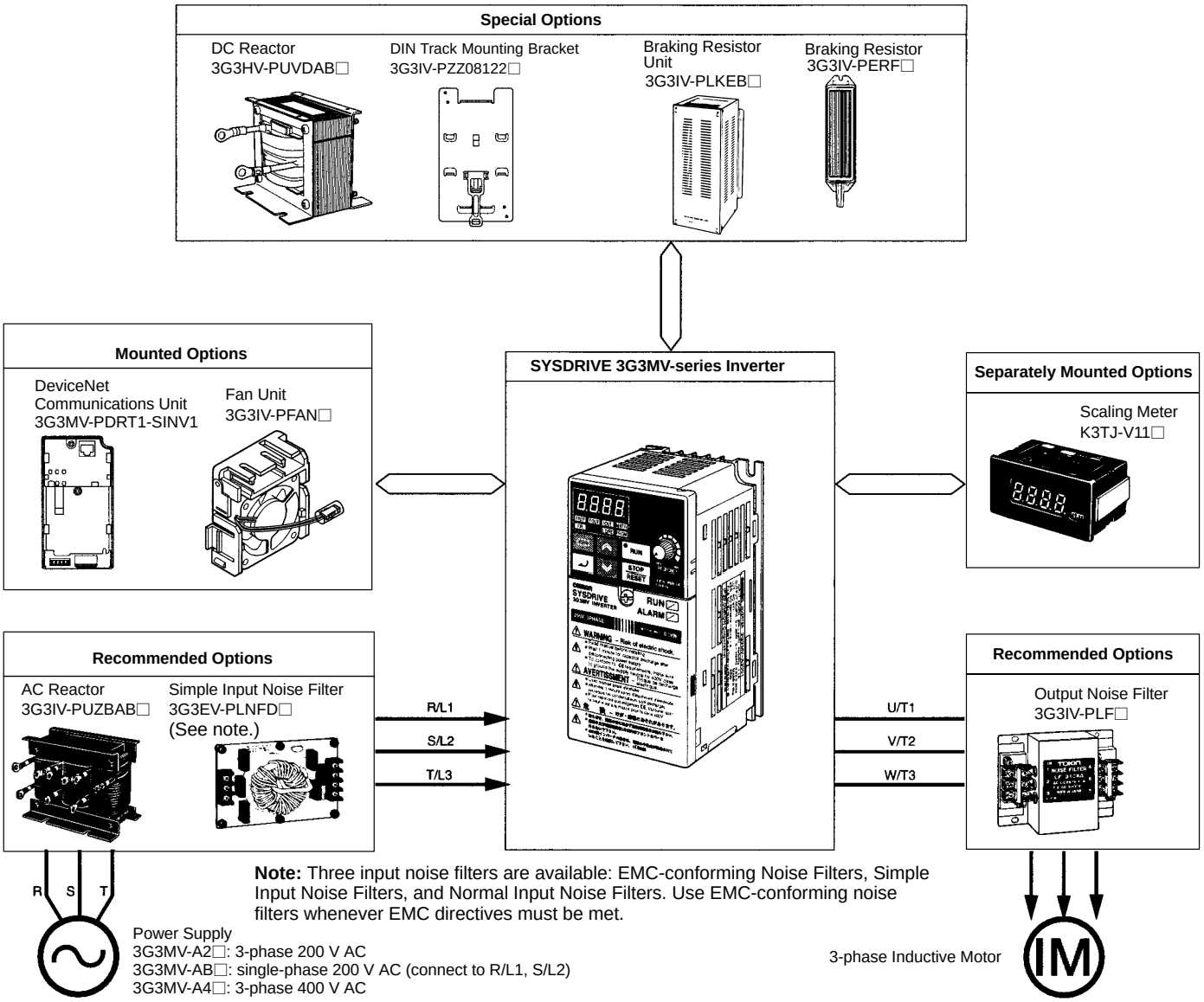
Note: Two input noise filters are available: EMC-conforming Input Noise Filers and Simple Input Noise Filters.

■ SYSDRIVE 3G3MV Series Multi-functional Compact Inverters

Powerful with Complete Functions and New Networking Capabilities

- Sensor-free vector control function to deliver high torque at low speeds: 150% torque at 1 Hz.
- RS-422/485 communications provided as standard feature. DeviceNet Communications Unit available as option.
- Easy to use: Speed adjustment provided on front panel.
- Many control and protection functions provided as standard features.
- Energy-saving operation, PID control, and more.
- 3-phase 200 VAC: 0.1 to 7.5 kW, single-phase 200 VAC: 0.1 to 3.7 kW, 3-phase 400 VAC: 0.2 to 7.5 kW

System Configuration



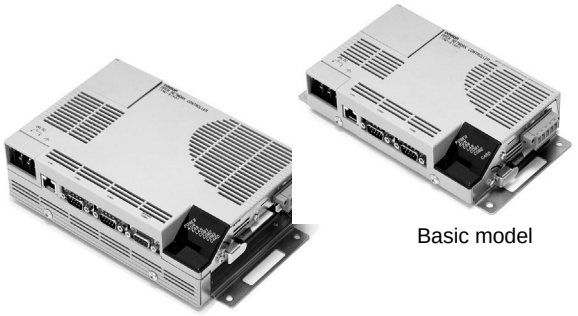
Note: Three input noise filters are available: EMC-conforming Noise Filters, Simple Input Noise Filters, and Normal Input Noise Filters. Use EMC-conforming noise filters whenever EMC directives must be met.

Open Network Controllers

■ ITNC-EI□01 (-DRM/-CST) Open Network Controller

Compact Network Controller for FA Sites for Onsite Data via the Web

- Supports standard protocols and languages for data communications, including TCP/IP, Telnet, FTP, ActiveX Package, and HTML.
- High data compatibility with OMRON products, such as SYSMAC-series PLCs.
- Enables remote connections for remote monitoring.
- Optional software applications are available to reduce product designing steps.
- Can be used as CS1 processing unit if the ITNC-EIS01-CST or ITNC-EIX01-CST model (provided with CS1 bus interface) is used.



Basic model

Expansion model

Ordering Information

Product	Specifications	Model
Basic model	Expansion slot: No; Communications port: RS-232C x 2; DeviceNet: No	ITNC-EIS01
Basic model with DeviceNet	Expansion slot: No; Communications port: RS-232C x 2; DeviceNet: Yes	ITNC-EIS01-DRM
Expansion model	Expansion slot: Yes; Communications port: RS-232C x 2 and RS-422 or RS-485 x 1; DeviceNet: No	ITNC-EIX01
Expansion model with DeviceNet	Expansion slot: Yes; Communications port: RS-232C x 2 and RS-422 or RS-485 x 1; DeviceNet: Yes	ITNC-EIX01-DRM
Basic model with CS1 bus interface	Expansion slot: No; Communications port: RS-232C x 2 (See note 3.)	ITNC-EIS01-CST
Expansion model with CS1 bus interface	Expansion slot: Yes; Communications port: RS-232C x 2 and RS-422 or RS-485 x 1 (See note 3.)	ITNC-EIX01-CST
CS1 bus cable	Cable length: 1 m	ITBC-CN001-CST
CS1 bus cable	Cable length: 5 m	ITBC-CN005-CST
CS1 bus cable	Cable length: 12 m	ITBC-CN012-CST
Basic model vertical mounting bracket	---	ITNC-AP001
Expansion model vertical mounting bracket	---	ITNC-AP002
DIN track mounting bracket	Used for both basic and expansion models	ITNC-DIN01
ISaGRAF Target Software	---	ITNC-TG1Q-F
Data Collection and Delivery Service Software Ver. 1.10	The Flash Memory (sold separately) with a minimum capacity of 8 MB is required.	ITNC-DL1Q-F
NetX Server for DeviceNet for DeviceNet ONC Edition Ver. 1.00	---	ITNC-NS1Q-F
Connection Unit Ver. 1.00 for PLCs other than OMRON's (Mitsubishi Electric's A-series Computer Link Unit)	---	ITNC-MD1Q-F
Web Tool Kit Software Ver. 1.00	The Flash Memory (sold separately) with a minimum capacity of 15 MB is required.	ITNC-WK1Q-CD
RemoteKit Software Ver. 1.10	The Flash Memory (sold separately) with a minimum capacity of 8 MB is required to collect large quantities of data.	ITNC-RK1Q-CD

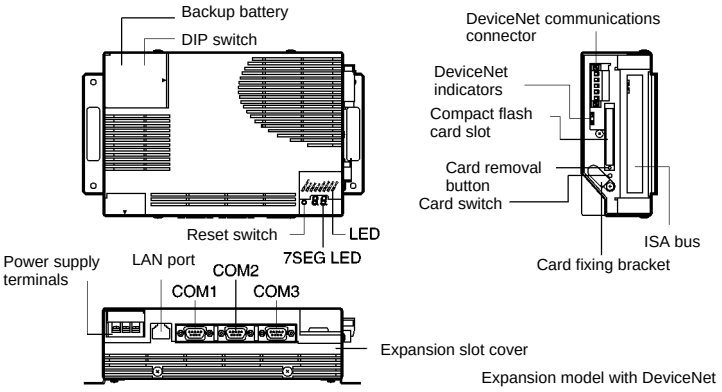
Note: 1. Either a single Controller Link Board or SYSMAC Board can be mounted to the expansion slot (ISD bus slot).

2. The manufacture of the product will stop shortly. Use the RemoteKit Software for mail service. Web functions will be provided from a dedicated Web site.

3. Refer to Catalog (V212) for details of models with CS1 bus interfaces.

Highly Reliable for Tough Sites

The Open Network Controller is as compact as a postcard. The Unit has excellent environmental resistance with ideal specifications for tough sites, withstanding 1.5-kV noise at an ambient operating temperature between 0 and 55°C. The series includes models that support connection to DeviceNet and the CS1 bus.



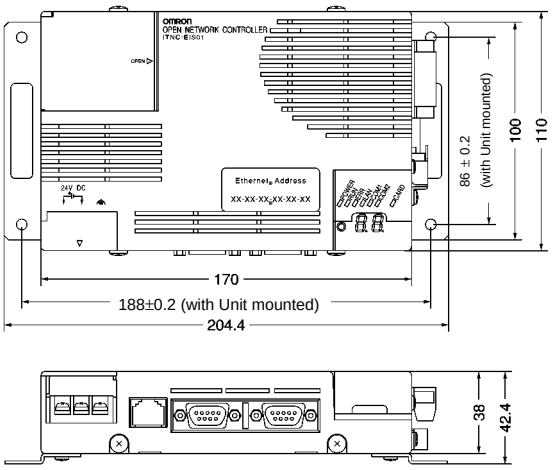
General Specifications

Item	ITNC-EIS01	ITNC-EIS01-DRM	ITNC-EIX01	ITNC-EIX01-DRM
Rated supply voltage	24 VDC			
Permissible voltage fluctuation range	20.4 to 27.6 VDC			
Power consumption	15 W max.		20 W max.	
Inrush current	40 A max.			
Insulation resistance	20 MΩ minimum (at 100V DC) between whole DC external terminals and ground terminal			
Dielectric strength	500V AC (50/60 Hz) for 1 minute between whole DC external terminals and ground terminal with a maximum leakage current of 10 mA			
Noise immunity	2 kV (power line) conforming to IEC 61000-4-4			
Vibration resistance	10 to 57 Hz: 0.075-mm amplitude (conforming to JIS C0911) 57 to 150 Hz: accelerating 9.8 m/s^2 for 80 minutes each in X, Y, and Z directions (8-minute sweeping for 10 times) 2 to 55 Hz (DIN track mounting): 2.94 m/s^2 for 20 minutes each in X, Y, and Z directions			
Shock resistance	147 m/s^2 for three times each in X, Y, and Z directions (conforming to JIS C0912)			
Ambient temperature	Operating: 0 to 55°C Storage: –20 to 75°C (excluding battery)			
Ambient humidity	10% to 90% (with no condensation)			
Ambient atmosphere	With no corrosive gas			
Ground	Ground at a resistance not exceeding 100Ω.			
Construction	Panel built-in type			
Weight	0.6 kg max.	0.7 kg max.	0.9 kg max.	1.0 kg max.
Dimensions	204.4 × 110 × 42.4 (W × D × H) mm		234.4 × 136 × 62.4 (W × D × H) mm	
Safety standards	EC Directives and UL/CSA			

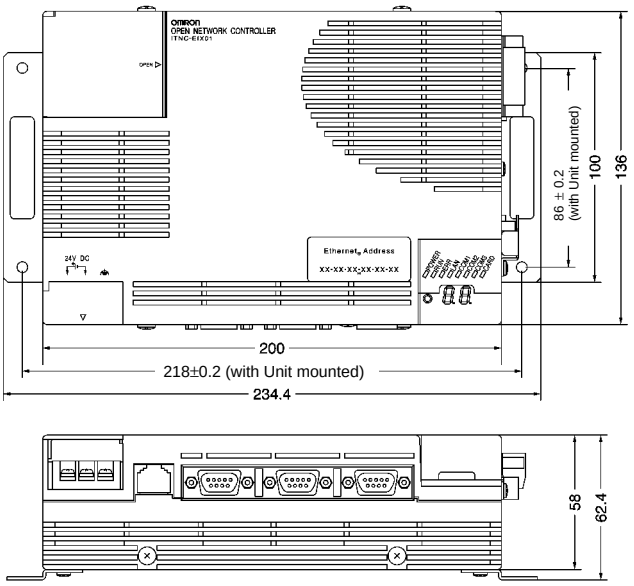
Open Network Controllers

Dimensions

Standard Models
ITNC-EIS01
ITNC-EIS01-DRM
ITNC-EIS01-CST



Expansion Models
ITNC-EIX01
ITNC-EIX01-DRM
ITNC-EIX01-CST



Benefits of Introduction

Utility Monitoring System
Automatically collects utility data, such as power consumption, air consumption, water consumption, and a variety of analog data items of factories through DeviceNet slaves and serial devices. Utility monitoring and setting through a Web server are possible with a Web browser.

Data Collection Controller
Operates as a gateway that collects and distributes data from PLCs connected to controller links. Collected data can be monitored through Web servers. Furthermore, such data can be transmitted to hosts through an FTP server.

Construction of Ethernet for FA Sites
Connects to devices with only a serial interface to enable data exchange through the Ethernet. The construction of the Ethernet network (on the Internet or an intranet basis) is possible without changing existing devices or facilities.

Control Machine with Ethernet
OMRON's SYSMAC Board can be mounted so that Open Network Controllers can control data collection, modification, and distribution for great improvement in control efficiently.