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CS1D-CPU□□

# Duplex CPU units

The CS1 Duplex System Boosts the Reliability of Facilities and Equipment



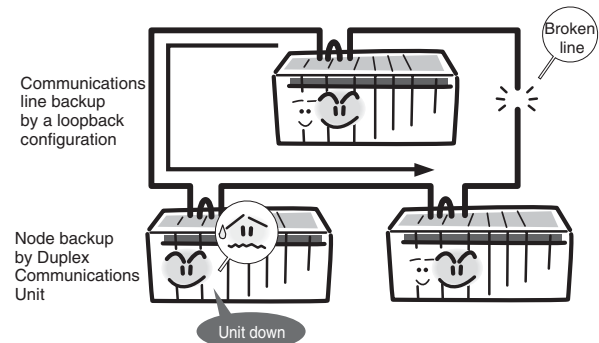
### Hot Standby System for CPU Unit Duplexing

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

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

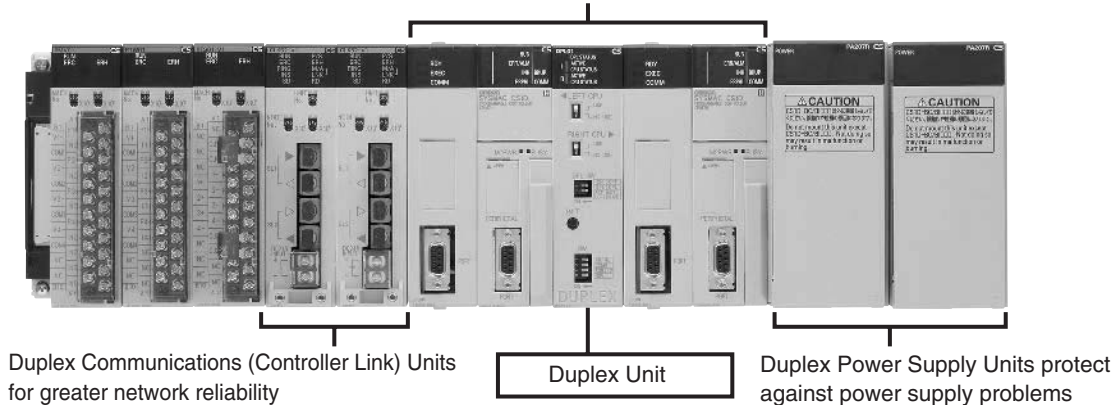
### Higher Network Reliability

Duplex Communications Units and a loopback configuration enable continuous communications even in the event of a problem.



**Note:** The CS1W-CLK12-V1 or CS1W-CLK52-V1 is required for network duplexing.

Duplex CPU Units for greater system reliability



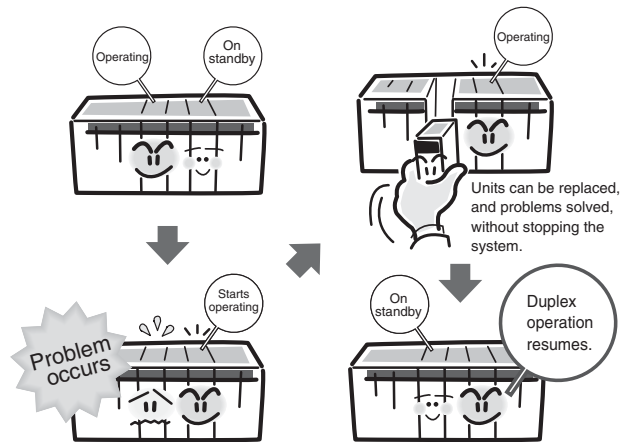
**With the Duplex PLC System, restoring the system is fast and easy.**

**The CPU, Power Supply, or Communications Unit can be replaced while the system continues to operate.**

If the CPU Unit should stop due to malfunction, operation continues with the other CPU Unit so you can replace the broken Unit without even stopping the system. The same is possible for the Power Supply and Communications Units.

**Naturally, Basic and Special I/O Units can also be replaced.**

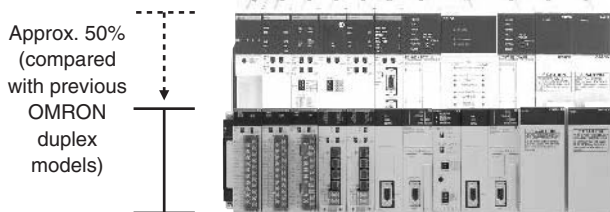
With the CS1D, Basic I/O Units, Special I/O Units, and CPU Bus Units can all be replaced during operation. The Unit being replaced stops operating during replacement, but all other Units continue to operate.



**A high-performance PLC with advanced functions to expand control possibilities.**

**High reliability, plus high performance.**

The CPU Units in this Duplex System feature both high performance and advanced functions, providing high reliability even to applications requiring high speed.



**Of course, PLC functions have also been increased.**

- Built-in Flash memory enables battery-less operation.
- Various self-diagnostic functions are included.
- A wide range of calculation functions includes floating point calculations, character string processing, and PID calculations with auto tuning.
- Structured programming (multitask and variable programming supported)

**Installation costs and maintenance costs are reduced.**

**Allows effective use of software assets.**

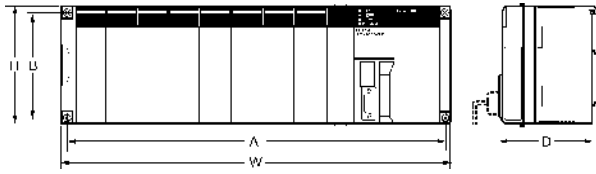
The same support software can be used in systems combining the CS1 and CJ1 Series, and all software programs and data are compatible. There is no need for ladder programs for duplexing. This means that when converting an existing system to a Duplex System, there is almost no need to revise ladder programs.

**Complete compatibility among Units.**

The CS1D Duplex System is fully compatible with the I/O Units of the entire CS Series. The same Units and materials can be used for hardware replacement and system maintenance. There is no need to purchase different Units and materials for each system, making the CS1D Duplex System highly economical.

(The CS1D only supports the CS1 Series I/O Units, not the C200H series I/O units)

Dimensions

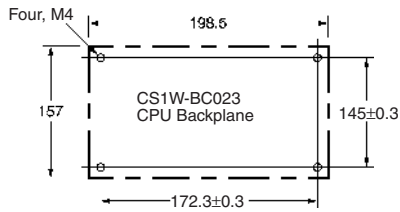


Unit: mm

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		
CS1D-BC052 (Duplex System)					

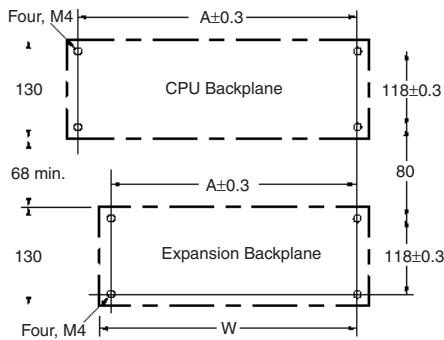
Backplanes

CPU Backplane with 2 Slots



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

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

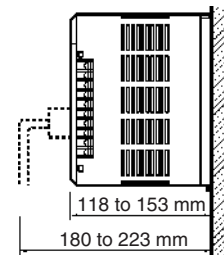


Unit: mm

Backplane	Model	A	W
CPU Backplanes	CS1W-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
	CS1D-BC052 (Duplex System)		
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
	CS1D-BI092 (Duplex System)		
C200H Expansion I/O Backplanes	C200HW-BI031 (3 slots)	175	189
	C200HW-BI051 (5 slots)	245	259
	C200HW-BI081-V1 (8 slots)	350	364
	C200HW-BI101-V1 (10 slots)	420	434

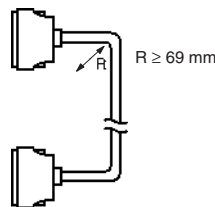
Mounting Depth

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

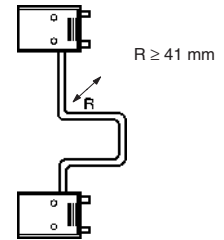


**Note:** I/O Connecting Cables require sufficient space to maintain the min. bending radius.

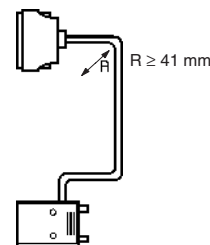
CS1 I/O Connecting Cable (Cable diameter: 8.6 mm)



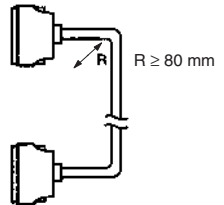
C200H I/O Connecting Cable (Cable diameter: 5.1 mm)



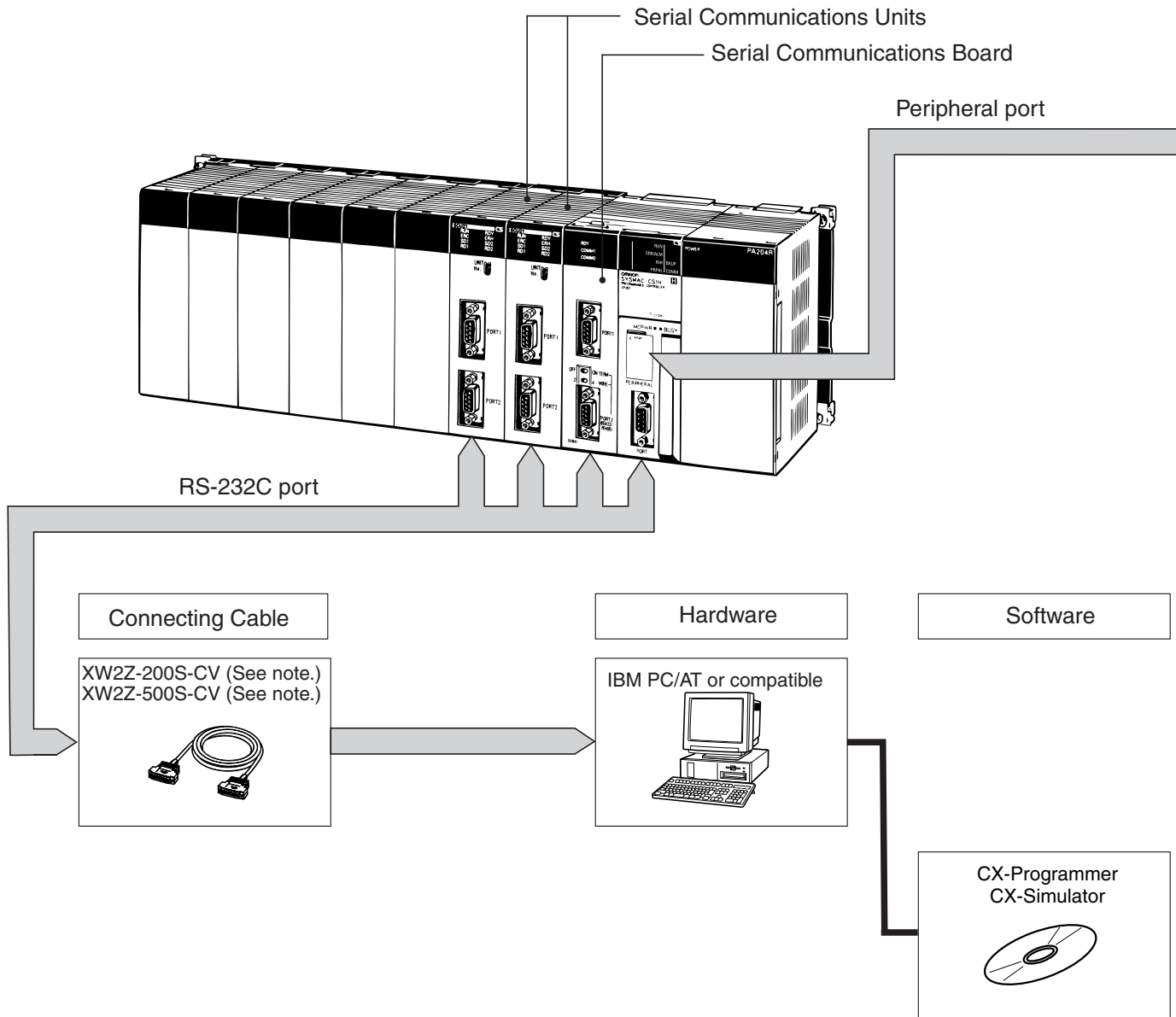
CS1 to C200H I/O Connecting Cable (Cable diameter: 5.1 mm)



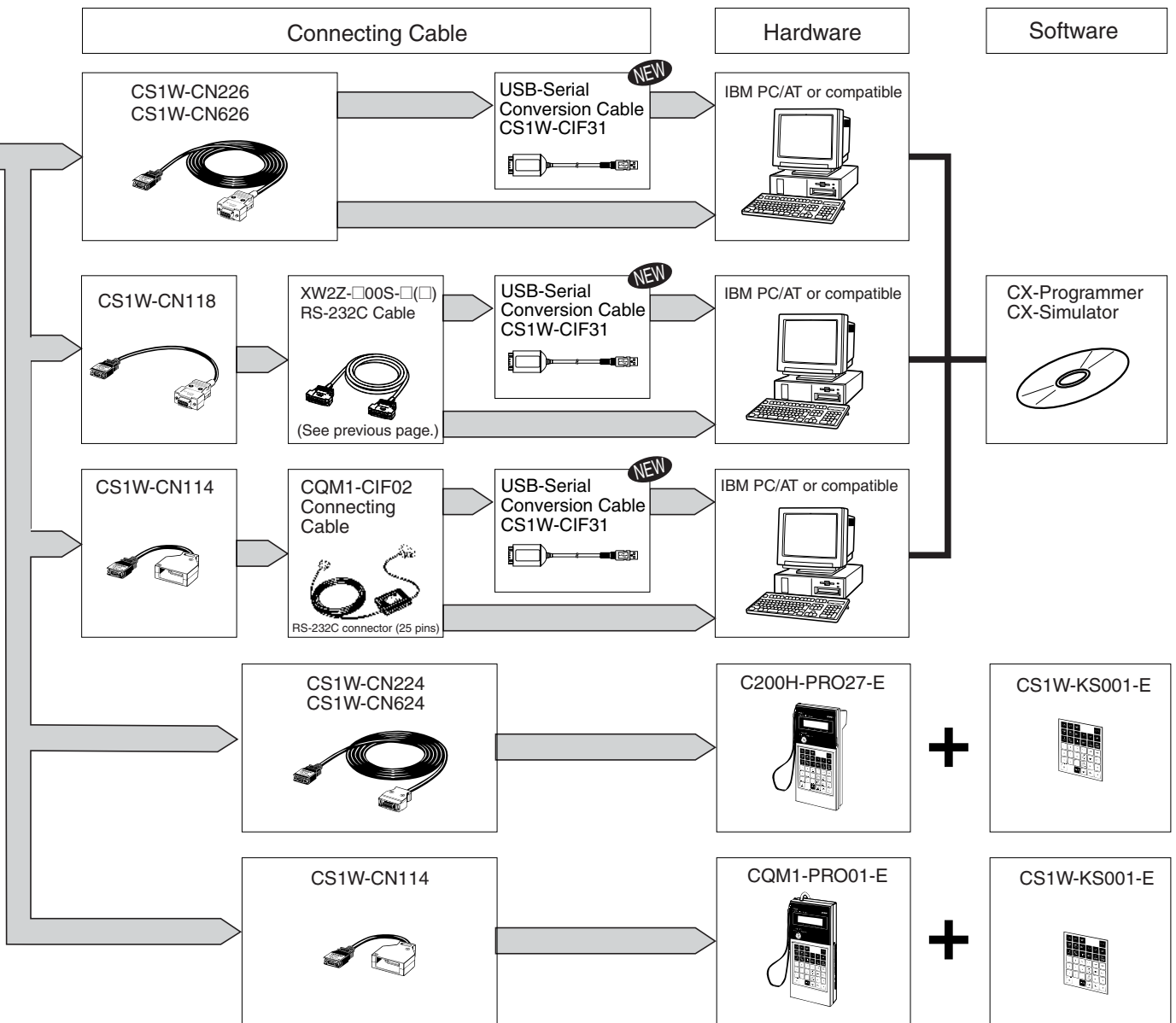
Long-distance Connecting Cable (Cable diameter: 10 mm)



Connections to Programming Devices

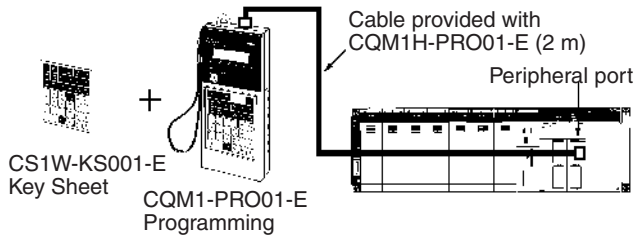


- Note:**
1. Refer to the next page for details of cables for connecting to computers. Choose the appropriate cable for the communications mode.
  2. The following cables can be used for a Host Link connection (but not a peripheral bus connection):



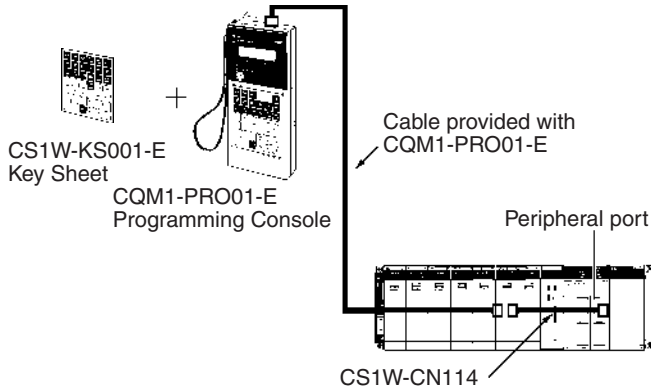
Programming Consoles

**CQM1H-PRO01-E**



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

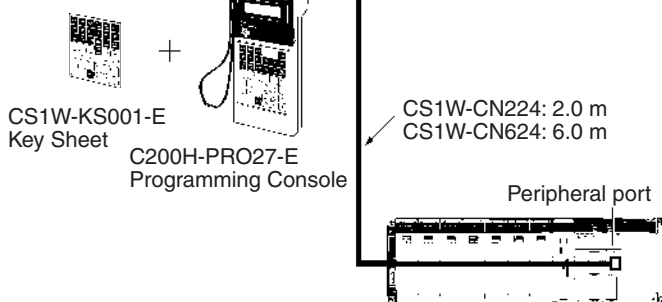
**CQM1-PRO01-E (See note.)**



**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**

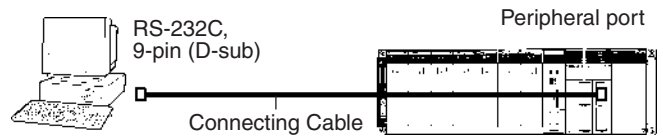


Model	Cable	Cable length
C200H-PRO27-E	CS1W-CN224	2.0 m
	CS1W-CN624	6.0 m

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

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

**Connecting to the Peripheral Port**



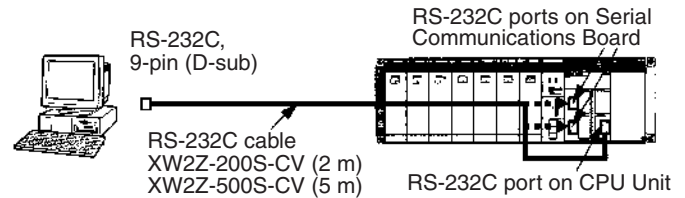
**Peripheral Port Connecting Cables**

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
	XW2Z-200S-V or XW2Z-500S-V		

**Connecting to the RS-232C Port**



**RS-232C Port Connecting Cables**

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

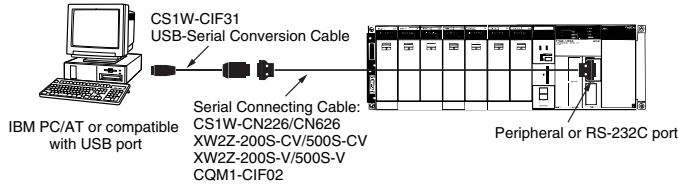
**Note:** Cables with model numbers ending in "CV" are antistatic. The following cables can be used for an RS-232C connection from the computer to an RS-232C port. (Unlike cables with model numbers ending in "-CV," however, these cables do not support peripheral bus connection and do not have anti-static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

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

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

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

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



Applicable Software

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

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

Applicable Communications Middleware

FinsGateway and CX-Server

Applicable PLCs and PTs

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

PLCs

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

PTs

NS Series and NT Series

General Specifications of USB-Serial Conversion Cable

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

OS with Drivers for USB-Serial Conversion Cable

Windows 98, ME, 2000, or XP

Peripheral Port Connecting Cables

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

RS-232C Port Connecting Cables

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

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



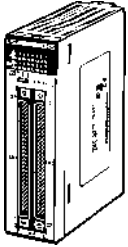
I/O Allocations

I/O Allocations

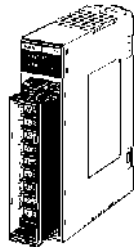
In CS1 PLCs, part of the I/O memory is allocated to each Unit. Units are divided into the following 3 groups for allocations.

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

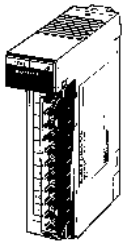
Basic I/O Units



CS1 Basic I/O Units



C200H Basic I/O Units



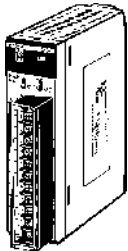
C200H Group-2 High-density I/O Units  
(See Note 2.)

Allocations

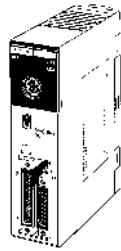
CIO Area:  
CIO 0000 to CIO 0319 (See Note 1.)  
(Memory is allocated in word units in order of mounting position in the Racks.)

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

Special I/O Units



CS1 Special I/O Units



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

Allocations

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

- Note 1. Although there are 96 unit number settings, a maximum of 80 Units can actually be mounted to a PLC because that is the maximum number of slots possible.
- Note 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

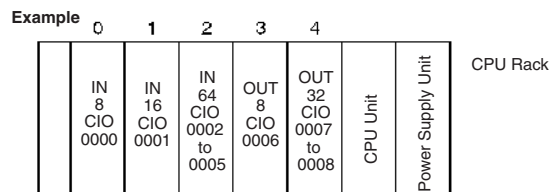
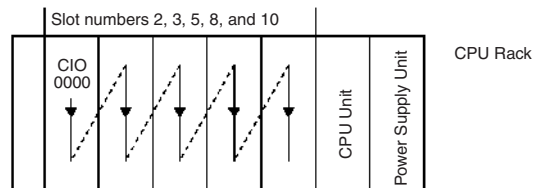
Basic I/O Units can be mounted to the CPU Rack, CS1 Expansion Racks, and C200HX/HG/HE Expansion I/O Racks.

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

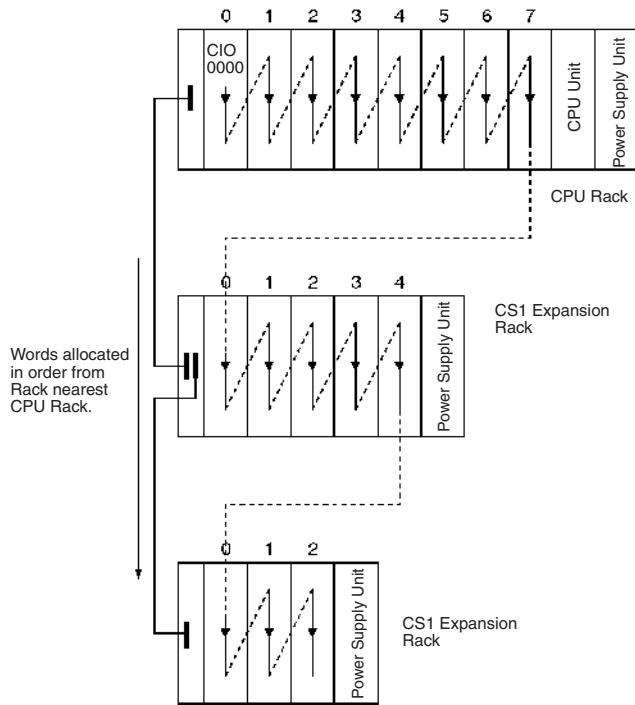
Allocation Methods

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.

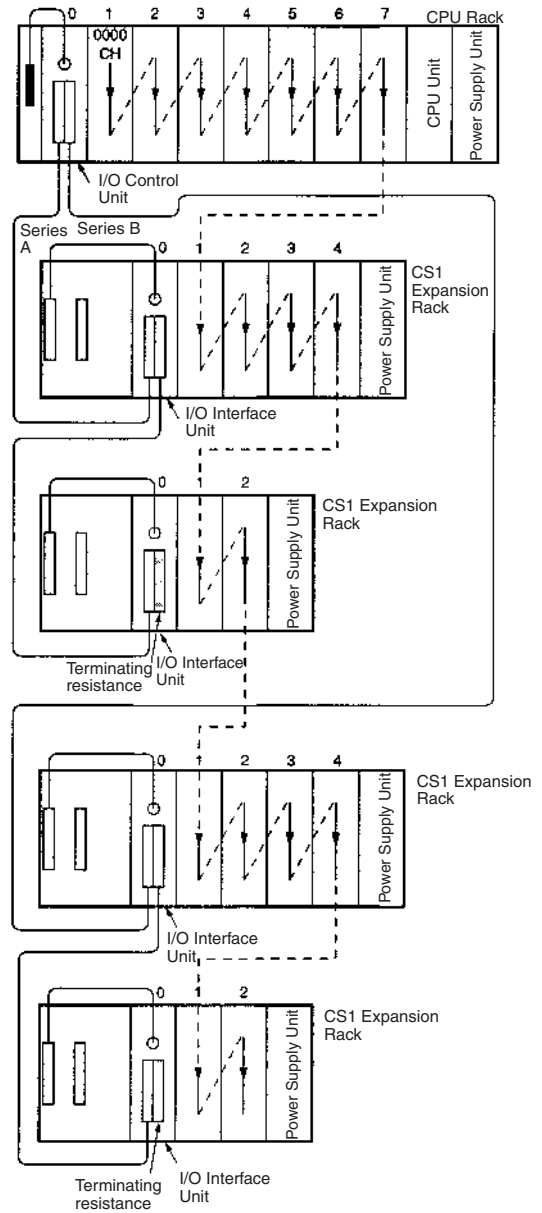


**2. Allocations to CS1 Expansion and C200H Expansion I/O Racks**  
I/O allocations to Basic I/O Units continue from the CPU Rack to the Expansion Racks. Words are allocated from left to right and each Unit is allocated as many words as it requires in word units, just like Units in the CPU Rack.



**3. CS1 Long-distance Expansion Racks**

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



**Allocations to Special I/O Units**

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

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

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

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

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

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

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

**Allocations to CS1 CPU Bus Units**

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

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

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

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

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

**Current Consumption**

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

**CPU Racks and Expansion Racks**

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

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

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

**Condition 2: Maximum Total Current Supply**

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

**Example Calculations**

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

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

**5- V DC Voltage Group**

Name	Model	Consumption (A)
CPU Units (These values include current consumption by a Programming Console.)	CS1H-CPU67H	0.82 (See note.)
	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.)
Loop Control Boards	CS1W-LCB01	0.22 (See note.)
	CS1W-LCB05	0.22 (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	0.11
	CS1W-BC032	0.11
	CS1W-BC052	0.11
	CS1W-BC082	0.11
	CS1W-BC102	0.11
CPU Backplanes	CS1W-BC023	0.11
	CS1W-BC033	0.11
	CS1W-BC053	0.11
	CS1W-BC083	0.11
	CS1W-BC103	0.11
I/O Control Unit	CS1W-IC102	0.92
CS1 Expansion Backplanes (for CS1 Units only)	CS1W-BI032	0.23
	CS1W-BI052	0.23
	CS1W-BI082	0.23
	CS1W-BI102	0.23
CS1 Expansion Backplanes	CS1W-BI033	0.23
	CS1W-BI053	0.23
	CS1W-BI083	0.23
	CS1W-BI103	0.23
I/O Interface Unit	CS1W-II102	0.23
C200H Expansion I/O Backplanes	C200HW-BI031	0.15
	C200HW-BI051	0.15
	C200HW-BI081-V1	0.15
	C200HW-BI101-V1	0.15

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

**Basic I/O Units**

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

Category	Name	Model	Consumption (A)	
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	
CS1 I/O Units	DC Input/Transistor Output Units	CS1W-MD261	0.27	
		CS1W-MD262	0.27	
		CS1W-MD291	0.35	
		CS1W-MD292	0.35	
	TTL I/O Unit	CS1W-MD561	0.27	
C200H I/O Units	B7A Interface Units	C200H-B7A21	0.10	
		C200H-B7A22	0.10	
	Analog Timer Unit	C200H-TM001	0.06	

Special I/O Units

Category	Name	Model	Consumption (A)
C200H High-density I/O Units (Special I/O Units)	DC Input Unit	C200H-ID215	0.13
	TTL Input Unit	C200H-ID501	0.13
	Transistor Output Unit	C200H-OD215	0.22
	TTL Output Unit	C200H-OD501	0.22
	TTL I/O Unit	C200H-MD501	0.18
	DC Input Transistor Output Unit	C200H-MD215	0.18
C200H Special I/O Units	Temperature Control Units	C200H-MD115	0.18
		C200H-TC001	0.33
		C200H-TC002	0.33
		C200H-TC003	0.33
		C200H-TC101	0.33
		C200H-TC102	0.33
	Heat/Cool Temperature Control Units	C200H-TC103	0.33
		C200H-TV001	0.33
		C200H-TV002	0.33
		C200H-TV003	0.33
		C200H-TV101	0.33
		C200H-TV102	0.33
	Temperature Sensor Units	C200H-TV103	0.33
		C200H-TS001	0.45
		C200H-TS002	0.45
		C200H-TS101	0.45
	PID Control Units	C200H-TS102	0.45
		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)	
	C200HW-MC402-E	0.60	
Position Control Units	C200HW-NC113	0.30	
	C200HW-NC213	0.30	
	C200HW-NC413	0.50	
ID Sensor Units	C200H-IDS01-V1	0.25	
	C200H-IDS21	0.25	
Fuzzy Logic Unit	C200H-FZ001	0.30	
Voice Unit	C200H-OV001	0.30	
DeviceNet Master Unit	C200HW-DRM21-V1	0.25	
DeviceNet I/O Link Unit	C200HW-DRT21	0.25	
CANopen Unit	C200HW-CORT21-V1	0.25	
PROFIBUS-DP Master Unit	C200HW-PRM21	0.60	
PROFIBUS-DP I/O Link Unit	C200HW-PRT21	0.25	
CompoBus/S Master Unit	C200HW-SRM21-V1	0.15	
PC Link Unit	C200H-LK401	0.35	

Category	Name	Model	Consumption (A)
CS1 Special 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
		CS1W-PTS11	0.12
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	0.15
		CS1W-PTS12	0.12
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
		CS1W-PTS13	0.12
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.15
	Isolated DC Input Unit	CS1W-PDC01	0.15
		CS1W-PDC11	0.12
	Isolated Pulse Input Unit	CS1W-PPS01	0.20
	Isolated Control Output Unit	CS1W-PMV01	0.15
	Power Transducer Input Unit	CS1W-PTR01	0.15
		CS1W-PTR02	0.15
	100-mV DC Input Unit	CS1W-MC221	0.60 (w/Teaching Box: 0.80 A)
		CS1W-MC421	0.70 (w/Teaching Box: 1.00 A)
		CS1W-MCH71	0.8
	Position Control Units	CS1W-NC113/ 133	0.25
		CS1W-NC213/ 233	0.36
		CS1W-NC413/ 433	0.36
	High-speed Counter Units	CS1W-CT021	0.45
		CS1W-CT041	0.45
		CS1W-CTS21	0.32
	SSI Input Unit	CS1W-CTS21	0.60
	Customizable Counter Units	CS1W-HCP22-V1	0.80
CS1W-HCA12-V1		0.75	
CS1W-HCA22-V1		0.60	
GP-IB Interface Unit	CS1W-HIO01-V1	0.26	
	CS1W-GPI01	0.26	
RFID Sensor Unit	CS1W-V600C11	0.26	
	CS1W-V600C12	0.32	

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-V1	0.65
		CS1W-CLK21-V1	0.33
		CS1W-CLK12-V1	0.52
	SYSMAC LINK Unit	CS1W-SLK21	0.48
		CS1W-SLK11	0.47
	Serial Communications Unit	CS1W-SCU21	0.29 (See Note.)
	Ethernet Unit	CS1W-ETN01/11/21	0.40
	DeviceNet Unit	CS1W-DRM21	0.29
	PROFIBUS-DP Master Unit	CS1W-PRM21	0.40

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

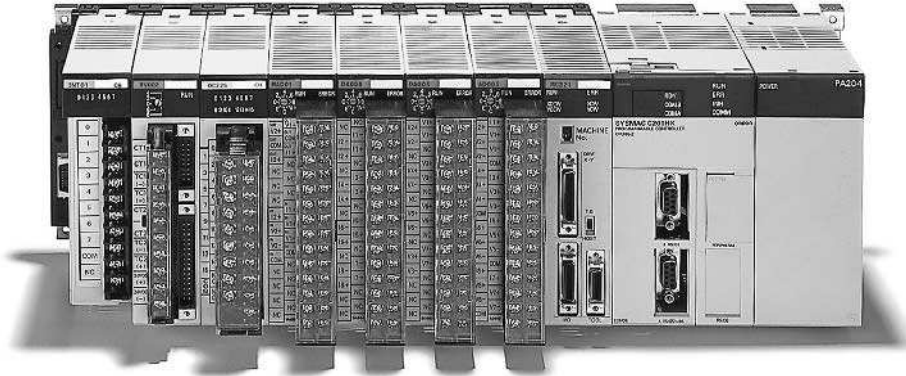
26-V Current Consumption

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	
	Transistor Output Units	C200H-OC222N	0.09 for 8 points ON at the same time
		C200H-OC226N	
C200H Output Units	Transistor Output Units	C200H-OC224N	0.075 for 8 points ON at the same time
		C200H-OD216	
CS1 Output Units	Relay Output Units	C200H-OD217	0.075 for 8 points ON at the same time
		CS1W-OC201	
CS1 Output Units	Relay Output Units	CS1W-OC211	0.006 for each point ON at the same time
		C200H Special I/O Units	Analog Input Unit
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□□□-V1	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
		CS1W-PTS11	0.08
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	0.15
		CS1W-PTS12	0.07
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.16
		Isolated DC Input Unit	CS1W-PDC01
	CS1W-PDC11		
	Isolated Pulse Input Unit	CS1W-PPS01	0.16
	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	
RFID Sensor Unit	CS1W-V600C1□	0.12	

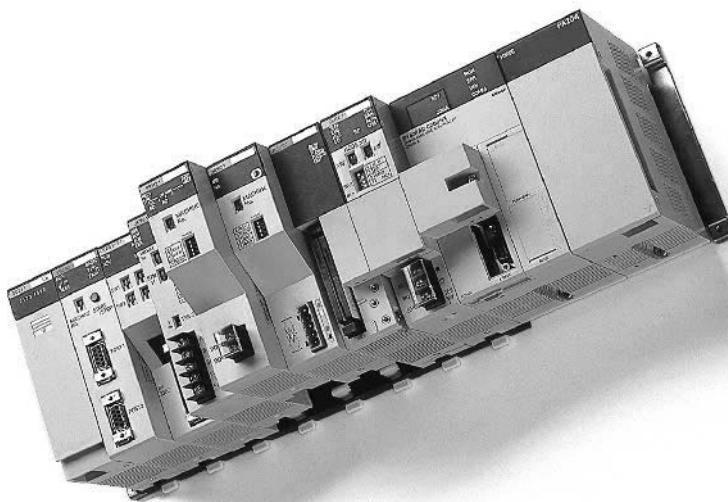
C200H□-CPU□□-E

# C200H-series CPU units

SYSMAC HX/HG/HE PLCs with Information Control Functions for More “Intelligent” Production Lines

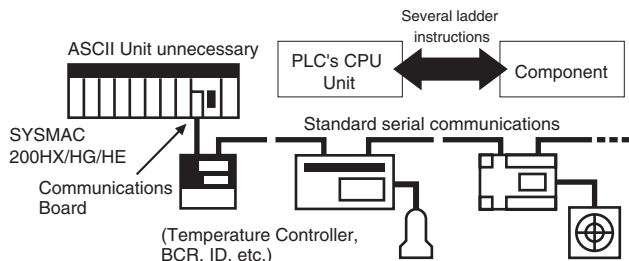


- Simple serial connections for Higher Development Efficiency
  - Built-in protocol macro function
- Special I/O Units
  - 2- or 4-axis Motion Control Unit, Controller Link Unit, CompoBus/S Unit, DeviceNet Unit, PROFIBUS-DP Units, Eight-point Analog I/O Unit, etc.
- SYSMAC C200HX/HG/HE-ZE with Increased Memory Capacity and Instructions Added to the Line-up.
  - Memory capacity up to 63.2 kWords (C200HX-CPU65/85-ZE).
  - EM Area up to 16 banks of 6 kWords each (C200HX-CPU85-ZE).
  - More than 70 types of symbolized compare and arithmetic instructions added.
  - Direct designation possible for one bank of the EM Area.



### A Built-in Protocol Macro Function

The SYSMAC C200HX/HG/HE PLCs are equipped with the Protocol Macro function that incorporates communications programs into the ladder program using only a few ladder instructions. This function allows data communications with measurement devices and peripheral devices. A variety of workplace data can be processed in real time improving product quality and reducing total product cost. System development time can be reduced substantially.



**Note:** An optional Communications Board (C200HW-COM04-E/05-E/06-EV1) is required to use the Protocol Macro function.

### Windows-based Protocol Support Software

Protocol macro instructions can be customized with the CX-Protocol Protocol Support Software. This makes it easy to modify standard-equipped protocols and register them for use anytime.



### Improved Special I/O Units

The number of Special I/O Units that can be mounted on the CPU Unit has been increased from 10 max. to 16 max. to take further advantage of the capabilities of the C200HX/HG PLCs. The controlled system can be managed easily with the right combination of Special I/O Units. The INTELLIGENT I/O READ and INTELLIGENT I/O WRITE instructions can be executed to transfer more than one word of data. All of the Special I/O Units compatible with the C200HS can be used as they are. In addition, a PC Card Unit, Motion Control Unit, and Eight-point Analog I/O Unit have been added. The SYSMAC C200HX/HG/HE PLCs are becoming increasingly powerful and user-friendly.



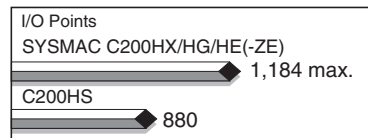
**Note:** There are restrictions on the Units that can be used.

### Additional Basic PLC Functions

The SYSMAC C200HX/HG/HE PLCs offer improved basic functions and performance such as memory capacity and processing speed. This reinforces their use as machine controllers, and also lets you respond more flexibly to advanced information applications on the production floor.

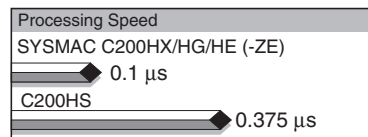
### A Large Increase in I/O Points

The number of I/O points has been increased from 640 to 1,184. This is a maximum of 1.4 times as many I/O points as the SYSMAC C200HS, and gives you an extra margin of control.



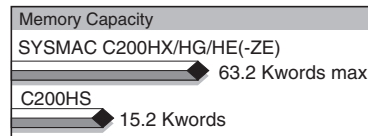
### Faster Processing

Basic instructions are processed in 0.1 μs. Compared with the SYSMAC C200HS, processing speed is a maximum of 3.75 times faster. Faster processing shortens production throughput and results in increased productivity.



### Larger Memory Capacity

The SYSMAC C200HX/HG/HE PLCs provide 3.2 to 63.2 kWords of program memory and 4 to 24 kWords of data memory. Compared with the SYSMAC C200HS, capacity is a maximum of 2 to 4 times greater. This level of capacity makes it easy to handle even large programs.



### More Banks in the EM Area

The maximum of three banks in previous models has been increased to a maximum of 16 (using the C200HX-CPU85-ZE). In the SYSMAC C200HX/HG/HE-ZE, one of those banks can be directly designated. Combined with the conventional 6 kWords of data memory, this allows direct use of 12 kWords.

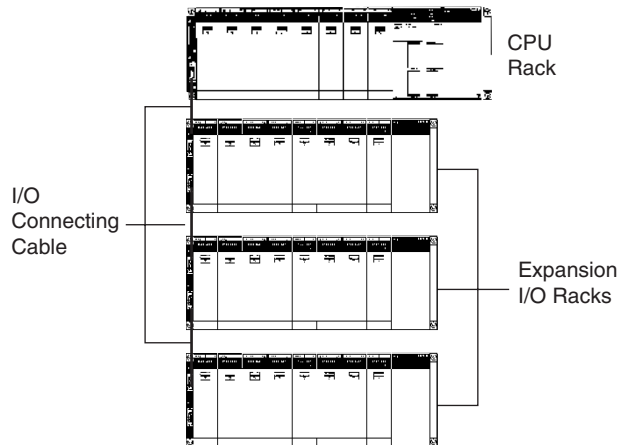
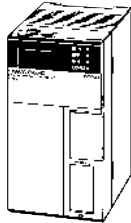


**System Configuration**

**Basic Configuration**

Two or three\* Expansion I/O Racks can be connected to the CPU Rack for the SYSMAC C200HX, C200HG, and C200HE.

**Note:** Only for the C200HG-CPU53/63(-ZE) and C200HX-CPU54/64/65/85(-ZE).



Model	Program capacity (words)	DM (words)	EM (words)	Basic instruction processing time	No of I/O points	Max. no. of connecting Expansion I/O Racks	Max. no. of connecting High-density I/O Units (Group-2)*		Max. no. of connecting Special I/O Units*		RS-232C	Clock function	Availability of Communications Board
							Units that are allocated memory for 1 Unit	Units that are allocated memory for 2 Units	Units that are allocated memory for 1 Unit	Units that are allocated memory for 2 Units			
C200HE-CPU11(-ZE)	3.2K	4K	None	0.3 μs min.	640	2	Unavailable	Unavailable	10	5	No	No	No
C200HE-CPU32(-ZE)	7.2K	6K	None	0.3 μs min.	880	2	10	5	10	5	No	Yes	Yes
C200HE-CPU42(-ZE)	7.2K	6K	None	0.3 μs min.	880	2	10	5	10	5	Yes	Yes	Yes
C200HG-CPU33(-ZE)	15.2K	6K	6K	0.15 μs min.	880	2	10	5	10	5	No	Yes	Yes
C200HG-CPU43(-ZE)	15.2K	6K	6K	0.15 μs min.	880	2	10	5	10	5	Yes	Yes	Yes
C200HG-CPU53(-ZE)	15.2K	6K	6K	0.15 μs min.	1,184	3	16	8	16	8	No	Yes	Yes
C200HG-CPU63(-ZE)	15.2K	6K	6K	0.15 μs min.	1,184	3	16	8	16	8	Yes	Yes	Yes
C200HX-CPU34(-ZE)	31.2K	6K	6K x 3 banks (18K)	0.1 μs min.	880	2	10	5	10	5	No	Yes	Yes
C200HX-CPU44(-ZE)	31.2K	6K	6K x 3 banks (18K)	0.1 μs min.	880	2	10	5	10	5	Yes	Yes	Yes
C200HX-CPU54(-ZE)	31.2K	6K	6K x 3 banks (18K)	0.1 μs min.	1,184	3	16	8	16	8	No	Yes	Yes
C200HX-CPU64(-ZE)	31.2K	6K	6K x 3 banks (18K)	0.1 μs min.	1,184	3	16	8	16	8	Yes	Yes	Yes
C200HX-CPU65-ZE	63.2K	6K	6K x 8 banks (48K)	0.1 μs min.	1,184	3	16	8	16	8	Yes	Yes	Yes
C200HX-CPU85-ZE	63.2K	6K	6K x 16 banks (96K)	0.1 μs min.	1,184	3	16	8	16	8	Yes	Yes	Yes

**Note:** There are restrictions on the number of High-density I/O Units and Special I/O Units that can be mounted per CPU Unit. When mounting, the unit number for each of the Units is set using the rotary switches on the front of the Units. When mounting 16 Units to a CPU Unit (to which 16 Units can be mounted), unit numbers are set from 0 to F. When mounting 10 Units to a CPU Unit (to which 10 Units can be mounted), unit numbers are set from 0 to 9; they cannot be set from A to F. When mounting 16 Units to a CPU Unit (to which 16 Units can be mounted), unit numbers can be set from 0 to F for the following Units:

Special I/O Units

Analog Units: C200H-AD002, C200H-AD003, C200H-DA002, C200H-DA003, and C200H-DA004

High-speed Counter Unit: C200H-CT021

Position Control Unit: C200H-NC211 (allocated memory for 2 Units)

MC Unit: MC221 (allocated memory for 2 Units)

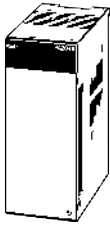
High-density I/O Units (Group-2)

32-point Units: C200H-ID216 and C200H-OD218

64-point Units: C200H-ID111, C200H-ID217, and C200H-OD219 (allocated memory for 2 Units)

With Units other than those listed above, the unit number can only be set in the range 0 to 9 and so only the memory corresponding to these unit numbers can be allocated. Even with CPU Units to which 16 Units can be mounted, the unit number cannot be set up to 16 if a Unit such as the C200H-ID215 Input Unit is used, and so if only this Unit is used, it is not possible to mount 16 Units to the CPU Unit. With Units that are allocated memory for 2 Units, 2 unit numbers are allocated per Unit (i.e., 0, 2, 4, etc.). For example, although 16 Units can normally be mounted to the C200HX-CPU64, if only MC Units are used, the maximum number of mountable Units is 8. When used in combination with 12 C200H-AD003 Analog Units, although 4 High-speed Counter Units can be mounted, only 2 MC Units can be mounted. The unit number is set for the C200-B7A@2 B7A Unit in the same way as for a High-density I/O Unit (Group-2).

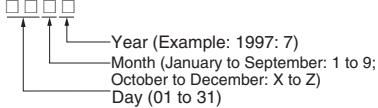
**Power Supply Unit**



Model	Supply voltage	Comments
C200HW-PA204	100 to 120 V AC 200 to 240 V AC	---
C200HW-PA204S	100 to 120 V AC 200 to 240 V AC	With 24- V DC service power supply
C200HW-PA204R*	100 to 120 V AC 200 to 240 V AC	With output contacts during operation
C200HW-PD024	24 V DC	---

\*There are restrictions on the CPU Units or Backplanes with which the C200HW-PA204R and C200HW-PA209R Power Supply Units can be used. Refer to the following tables for details.

**Model Legend**



**CPU Units that Support C200HW-PA204R**

Model	Serial number	
	Made in Japan	Made in Netherlands
C200HX-CPU64-E	Beginning with 20Z6	Beginning with 0147
C200HX-CPU54-E	Beginning with 2817	
C200HX-CPU44-E	Beginning with 19Z6	
C200HX-CPU34-E	Beginning with 2417	
C200HG-CPU63-E	Beginning with 25Z6	
C200HG-CPU53-E	Beginning with 0817	
C200HG-CPU43-E	Beginning with 19Z6	
C200HG-CPU33-E	Beginning with 1017	
C200HE-CPU42-E	Beginning with 20Z5	
C200HE-CPU32-E	Beginning with 19Z6	
C200HE-CPU11-E	Beginning with 20Z6	

**CPU Backplanes that Support C200HW-PA204R**

Model	Serial number	
	Made in Japan	Made in Netherlands
C200HW-BC031	Beginning with 0617	Beginning with 0147
C200HW-BC051	Beginning with 19Z6	
C200HW-BC081	Beginning with 24Z6	
C200HW-BC101	Beginning with 20Z6	

**CPU Backplane**



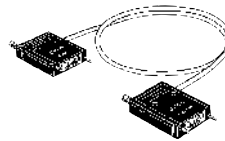
Model	No. of I/O slots
C200HW-BC031	3
C200HW-BC051	5
C200HW-BC081	8
C200HW-BC101	10

**I/O Backplane**

The I/O Backplane is used to mount Expansion I/O Racks. (See page n1p.) Four models are available, each with a different number of I/O slots.

Model	No. of I/O slots
C200HW-BI031	3
C200HW-BI051	5
C200HW-BI081	8
C200HW-BI101	10

**I/O Connecting Cable**



These cables are used to connect a CPU Unit to an Expansion I/O Rack, or to connect two Expansion I/O Racks. Select cables from among the following five types, and use them in combination when necessary. The total cable length must be within 12 m.

Model	Length
C200H-CN311	30 cm
C200H-CN711	70 cm
C200H-CN221	2 m
C200H-CN521	5 m
C200H-CN131	10 m

Communications Board

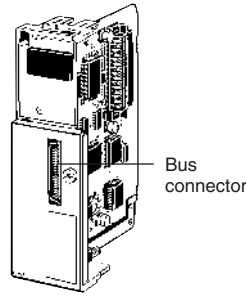
Communications Board

By mounting an appropriate type of Communications Board to an optical slot of the CPU Unit, the CPU Unit can communicate with the SYSMAC LINK Unit Programmable Terminal, Temperature Controller, personal computer, barcode reader, or any other peripheral device via RS-232C, RS-422, or RS-485.

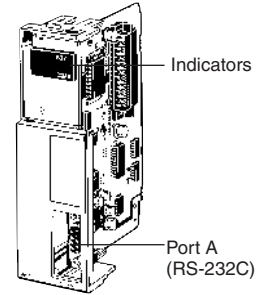
Models Available

The following Communications Board models are available.

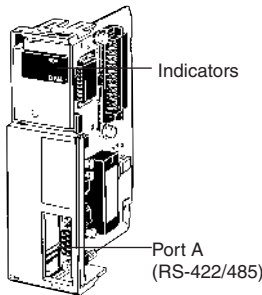
Model	Specifications
C200HW-COM01	Communications port for Controller Link, SYSMAC LINK Units
C200HW-COM02-V1	One RS-232C port
C200HW-COM03-V1	One RS-422/485 port
C200HW-COM04-EV1	Communications port for the Controller Link, SYSMAC LINK Units, one RS-232C port, and a protocol macro function
C200HW-COM05-EV1	Two RS-232C ports and a protocol macro function
C200HW-COM06-EV1	One RS-422/485 port, one RS-232C port, and a protocol macro function



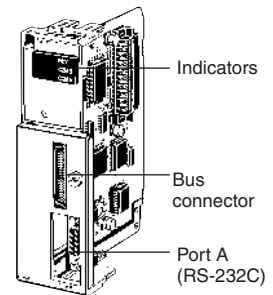
C200HW-COM01



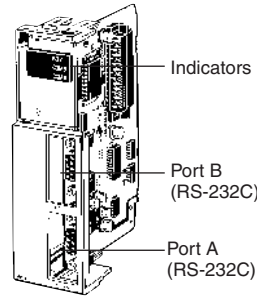
C200HW-COM02-V1



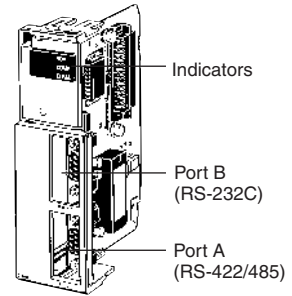
C200HW-COM03-V1



C200HW-COM04-EV1



C200HW-COM05-EV1



C200HW-COM06-EV1

PMCR Ladder Instructions Let You Easily Exchange Data between Peripheral Devices

Protocol Macro Function

Summary

The protocol macro consists of PMCR ladder instructions for communications sequences used to exchange data with a variety of peripheral devices connected to the RS-232C or RS-422/485 port.

Supported Communications Sequences

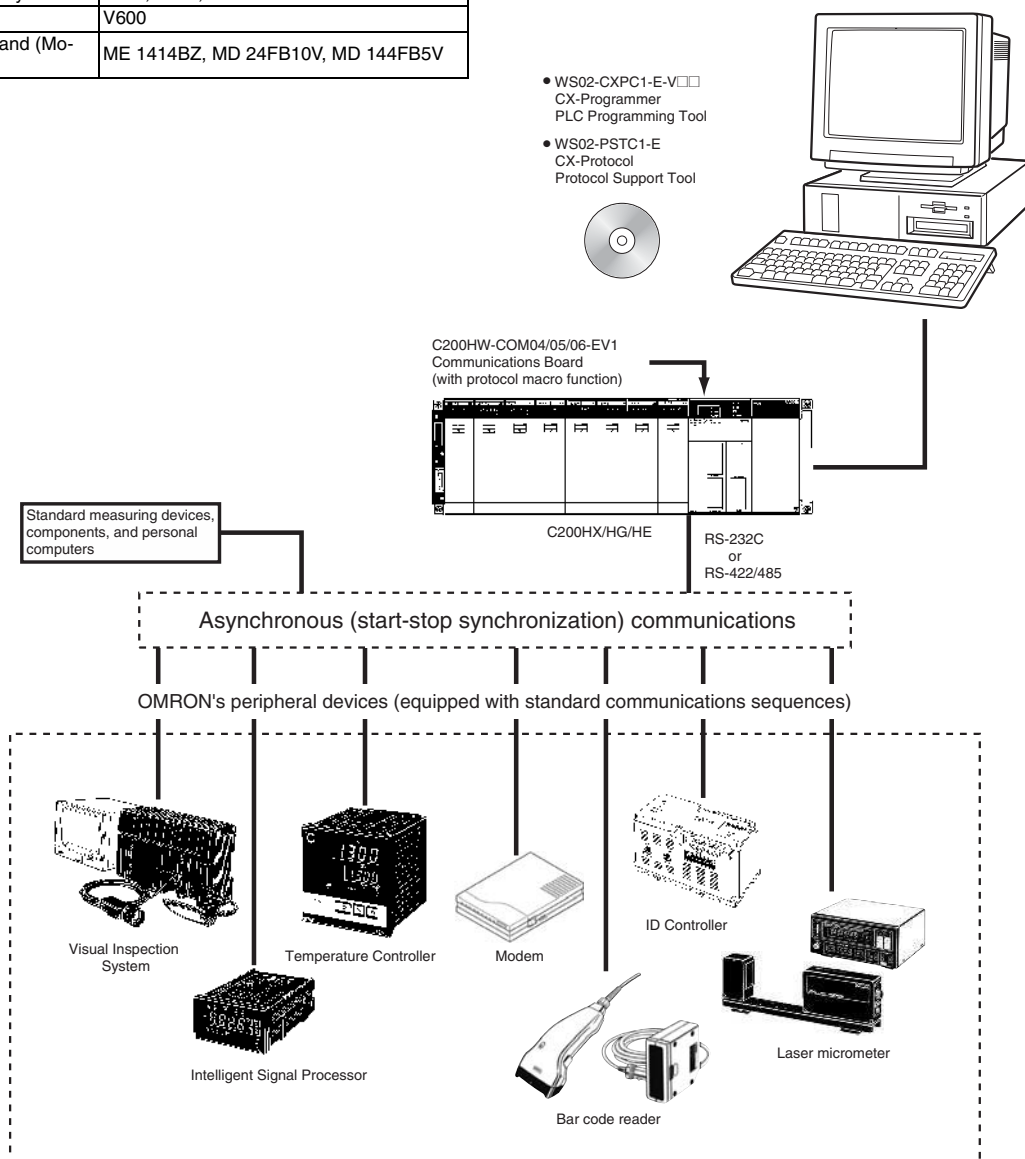
The Protocol Support Software and Communications Boards (i.e., the C200HW-COM04-EV1, C200HW-COM05-EV1, and C200HW-COM06-EV1) support the following seven types of standard communications sequences. Communications sequences other than those listed below can be created using the Windows-based CX-Protocol Protocol Support Software (purchased separately).

Sequence	Model No.
1 Temperature Controller	E5□J, E5□K, ES100□, E5ZE
2 Intelligent Signal Processor	K3TH, K3TR, K3TX, K3TC
3 Bar Code Reader	V500, V520
4 Laser Micrometer	3Z4L
5 Visual Inspection System	F200, F300, F350
6 ID Controller	V600
7 Hayes AT Command (Modem)	ME 1414BZ, MD 24FB10V, MD 144FB5V

Improved Communications Board Functions (-V1 Models)

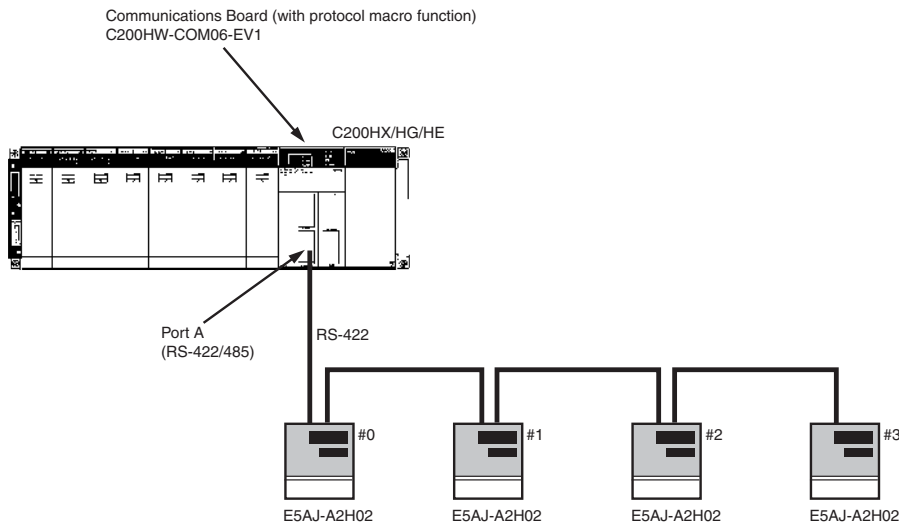
The following functions have been added to C200HW-COM0□V1 Communications Boards.

- SUM2 (2's complement of SUM) and CRC-16 are added as error check codes.
- Repeat counter N's current value, Sequence End Completion Flag, and Sequence Abort Completion Flag are added to the Auxiliary Area.
- A check code can be located after the terminator as an additional message item.
- Possible to swap between the leftmost and rightmost bytes of error check codes.



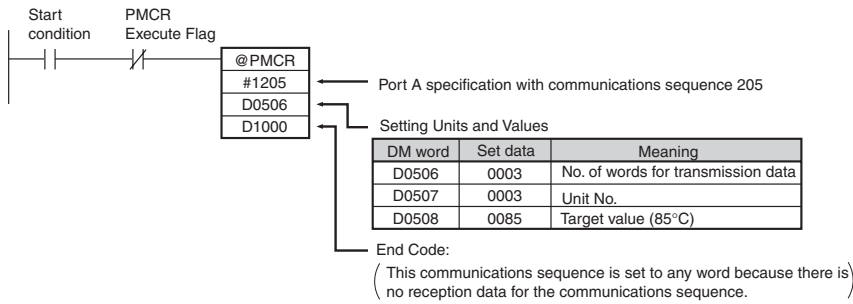
E5AJ Temperature Controller Connection Example

Connections



Program Example

In this example, the E5AJ is set to a target value.



Examples of Sequences Available

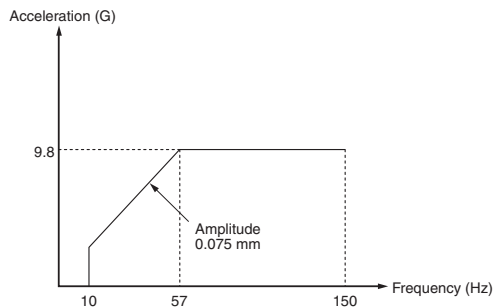
Sequence number	Communications sequence name	Function
200	Remote mode select	Sets the Unit to remote mode.
201	Local mode select	Sets the Unit to local mode.
202	Backup mode select	Changes target value write mode into backup mode.
203	RAM write mode select	Changes target value write mode into RAM write mode.
204	Target value save	Saves the target value.
205	Set value write 1	Writes the target value, alarm value 1, alarm value 2, and heater burnout alarm value all together.
206	Set value write 2	Writes the proportional band, integral time, and derivative time all together.
207	Input compensation value write	Writes the input compensation value.
208	Set value read 1	Reads the target value, alarm value 1, alarm value 2, and heater burnout alarm value all together.
209	Set value read 2	Reads the proportional band, integral time, and derivative time all together.
210	Input compensation value read	Reads the input compensation value in the IOM.
211	Output read	Reads and saves the output in the IOM.
212	Process value read	Reads and saves the process value in the IOM.
213	Target value limit read	Reads and saves the target value limit in the IOM.
214	Heater current read	Reads and saves the heater current in the IOM.
215	Initial status read	Reads and saves the initial status in the IOM.
216	General-purpose write	Writes the designated set value by setting the header code.
217	General-purpose read	Reads the designated set value by setting the header code.

**General Specifications**

Item	Specifications
Supply voltage	AC power supply:100 to 120/200 to 240 V AC selectable 50/60 Hz DC power supply:24 V DC
Operating voltage range	AC power supply:85 to 132/170 to 264 V AC DC power supply:19.2 to 28.8 V DC
Power consumption	AC power supply:120 VA max. DC power supply:50 W max.
Surge current	30 A max.
Output capacity	4.6 A, 5 V DC; 0.6 A, 26 V DC; <0.3 A: $+17\%/_{-11\%}$ / $\geq 0.3$ A: $+10\%/_{-11\%}$ 24 V DC $+10\%/_{-20\%}$ (C200HW-PA204S only)
Operation output	SPST-NO, 1 A at 250 V AC/24 V DC (Only the C200HW-PA204R has terminal output.)
Insulation resistance	20 M $\Omega$ between AC terminals and the GR terminal at 500 V DC (see note 1)
Dielectric strength	2,300 V AC at 50/60 Hz for 1 minute between AC terminals and housing; 1,000 V AC at 50/60 Hz for 1 minute between DC terminals and housing. Leakage current: 10 mA max. (see note 1)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration	10 to 57 Hz; 0.075 mm amplitude, 57 to 150 Hz (see note 2); acceleration: 9.8 m/s <sup>2</sup> , in X, Y, and Z directions, for 80 minutes each (sweep time 8 min x 10 sweeps = 80 min); (When mounted on DIN rail, 2 to 55 Hz, 2.9 m/s <sup>2</sup> , in X, Y, and Z directions for 20 minutes each)
Shock	147 m/s <sup>2</sup> in X, Y, and Z directions, 3 times each
Ambient temperature	Operating: 0 to 55°C Storage: -20 to 75°C (without battery)
Humidity	10% to 90% (without condensation)
Atmosphere	Must be free of corrosive gases
Grounding	Less than 100 $\Omega$
Enclosure rating	IEC IP30 (mounted in a panel)
Weight	6 kg max. (CPU Unit: 315 g max., Power Supply Unit: 510 g max., Backplane: 445 g to 1040 g)

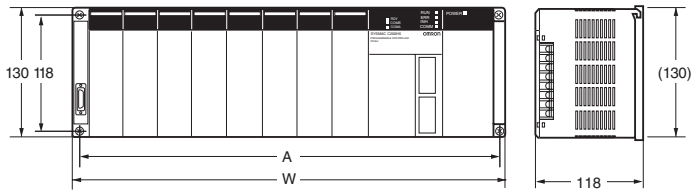
**Note: 1.** Be sure to disconnect the LG and GR terminals when conducting insulation resistance tests or dielectric strength tests. Internal components might be damaged if insulation resistance tests are repeated many times with the LG and GR terminals connected.

**2.**



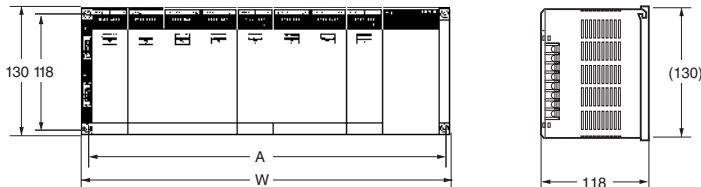
## Dimensions

### CPU Rack



Backplane	A	W
C200HW-BC031 (3 slots)	246	260
C200HW-BC051 (5 slots)	316	330
C200HW-BC081-V1 (8 slots)	421	435
C200HW-BC101-V1 (10 slots)	491	505

### Expansion I/O Rack



Backplane	A	W
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

## Characteristics

Item	Specifications
Control method	Stored program
I/O control method	Cyclic scan with direct output and immediate interrupt processing are both possible.
Programming method	Ladder diagram
Instruction length	1 address/instruction, 1 to 4 words/instruction
Number of instructions	14 basic instructions, 231 special instructions (281 special instructions for CPU□□-ZE CPU Units.)
Execution time	Basic instructions: e.g., LD C200HE-CPU□□-(Z)E:0.3 μs C200HG-CPU□□-(Z)E:0.15 μs C200HX-CPU□□-(Z)E:0.1 μs Special instructions: e.g., MOV(21)C200HE-CPU□□-(Z)E:1.2 μs C200HG-CPU□□-(Z)E:0.6 μs C200HX-CPU□□-(Z)E:0.4 μs
Program capacity	C200HE-CPU11-(Z)E:3.2 kWords max. C200HE-CPU32-(Z)E/CPU42-(Z)E:7.2 kWords max. C200HG-CPU□□-(Z)E:15.2 kWords max. C200HX-CPU□4-(Z)E:31.2 kWords max. C200HX-CPU65-ZE/CPU85-ZE:63.2 kWords max.
I/O bits	640 (00000 to 02915, 30000 to 30915)
IR bits	6,528 (03000 to 23515, 31000 to 51115)
SR bits	1,080 (23600 to 25507, 25600 to 29915)
TR bits	8 (TR 0 to 7)
HR bits	1,600 (HR 0000 to 9915)
AR bits	448 (AR 0000 to 2715)
LR bits	1,024 (LR 0000 to 6315)
Timers/Counters	512 (TIM/CNT 000 to 511)
DM words	Read/Write: 6,144 (DM 0000 to 6143) Read-only: 512 (DM 6144 to 6655) Expansion: Up to 3,000 words max. (DM 7000 to 9999)
EM words	Read/Write: C200HE-CPU□□-(Z)E: None C200HG-CPU□□-(Z)E: 6,144 (EM 0000 to EM 6143) C200HX-CPU□□-(Z)E: 6,144 (EM 0000 to EM 6143) ×3 banks C200HX-CPU65-ZE: 6,144 (EM 0000 to EM 6143) ×8 banks C200HX-CPU85-ZE: 6,144 (EM 0000 to EM 6143) ×16 banks
Power failure backup function	Holds HR, AR, CNT, DM, and EM and clock (RTC) contents.
Memory backup time	The battery service life is five years at 25°C. The service life will be shortened if the battery is used at higher temperatures. Replace the battery within one week after the battery alarm indicator starts flashing. When replacing the battery, install the new battery within five minutes after removing the old one.
Self-diagnostic function	CPU Unit errors (watchdog timer), I/O verification errors, host link errors, memory errors, battery errors, I/O bus errors, remote I/O errors, etc.
Program check function	Checks the program from the time the program starts running and checks the omission of the END instruction or any other improper instruction. This function allows three-level checking of programs through the Programming Console.

# CS1/C200H Unit Descriptions

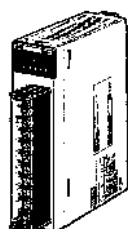
Unit		Classification	Model	Page
I/O Units	Input Units	CS1 Basic I/O Unit	CS1W-ID2□□	290
		C200H Basic I/O Unit	CS1W-IA□□11	291
			C200H-ID□□11	290
			C200H-IA□□11	291
		C200H-IM21□	291	
		C200H Special I/O Unit	C200H-ID501	290
	Output Units	CS1 Basic I/O Unit	CS1W-OA2□	291
			CS1W-OC□□□□	291
			CS1W-OD2□□	291
		C200H Basic I/O Unit	C200H-OA22□(□)	291
			C200H-OC22□(□)	291
			C200H-OD□□□□	291
	C200H Group-2 High Density Units	C200H-OD2□□	291	
		C200H Special I/O Unit	C200H-OD501	291
I/O Units	CS1 Basic I/O Unit	CS1W-MD□□□□	292	
	C200H Special I/O Unit	C200H-MD□□□□	292	
High-speed Input Unit		CS1 Basic I/O Unit	CS1W-IDP01	292
Interrupt Input Unit		CS1 Basic I/O Unit	CS1W-INT01	293
		C200H Basic I/O Unit	C200H-INT01	293
Analog Timer Unit		C200H Special I/O Unit	C200H-TM001	294
B7A Interface Units	Input Units	C200H Basic I/O Unit	C200H-B7A11/12	295
	Output Units	C200H Basic I/O Unit	C200H-B7AO1/02	295
	I/O Units	C200H Basic I/O Unit	C200H-B7A21/22	295
Safety Relay Unit		CS1 Basic I/O Unit	CS1W-SF200	297
Analog I/O Units	Input Units	CS1 Special I/O Unit	CS1W-AD0□1-V1	299
		C200H Special I/O Unit	C200H-AD003	299
	Output Units	CS1 Special I/O Unit	CS1W-DA041/08V/08C	300
		C200H Special I/O Unit	C200H-DA00□	300
	Analog I/O Units	CS1 Basic I/O Unit	CS1W-MAD44	301
C200H Special I/O Unit	C200H-MAD01	301		
Loop Control Unit		CS1 CPU Bus Unit	CS1W-LC001	302
			CS1D-LCB0□	302
			CS1D-LCB05D	302
Process I/O Units		CS1 Special I/O Unit	CS1W-P□□0□	305
Temperature Sensor Units		CS1 Special I/O Unit	CS1W-PTS□□	307
		C200H Special I/O Unit	C200H-TS□□□	307
Temperature Control Units		C200H Special I/O Unit	C200H-TC□□□	308
Heat/Cool Control Units		C200H Special I/O Unit	C200H-TV□□□	309
PID Control Units		C200H Special I/O Unit	C200H-PID0□	310
Cam Positioner Unit		C200H Special I/O Unit	C200H-CP114	311
Position Control Units		CS1 Special I/O Unit	CS1W-NC□□3	312
		C200H Special I/O Unit	C200HW-NC□□3	312
Motion Control Unit		CS1 Special I/O Unit	CS1W-MC□□21	313
		C200H Special I/O Unit	C200HW-MC402-E	315
		CS1 CPU Bus Unit	CS1W-MCH71	317
High-speed Counter Units		CS1 Special I/O Unit	CS1W-CT0□1	319
			CS1W-CTS21	321
		C200H Special I/O Unit	C200H-CT021	319
Customizable Counter Units		CS1 Special I/O Unit	CS1W-HC□/-HIO01	323
ID Sensor Units		CS1 Special I/O Unit	CS1W-V600C1□	325
		C200H Special I/O Unit	C200H-IDS01-V1	325
ASCII Units		C200H Special I/O Unit	C200H-ASC□1	327
Serial Communications Boards/Unit	Serial Communications Boards	Inner Board	CS1W-SCB□1-V1	328
	Serial Communications Unit	CS1 CPU Bus Unit	CS1W-SCU21-V1	328
RS-232C/RS-422 Conversion Unit		---	NT-AL001	330
GP-IB Interface Unit		---	CS1W-GPI01	331
Ethernet Unit		CS1 CPU Bus Unit	CS1W-ETN□1	333
Controller Link Boards/Unit	Controller Link Unit	CS1 CPU Bus Unit	CS1W-CLK□□-V1	334
	Controller Link Boards	Personal computer ISA board	3F8F7-CLK□□-V1	334
PROFIBUS-DP Units	PROFIBUS-DP Master Unit	CS1 CPU Bus Unit	CS1W-PRM21	335
		C200H Special I/O Unit	C200HW-PRM21	336
	PROFIBUS-DP I/O Link Unit	C200H Special I/O Unit	C200HW-PRT21	338
DeviceNet and CompoBus/S Units	DeviceNet Unit	CS1 CPU Bus Unit	CS1W-DRM21-V1	339
	Master Unit	C200H Special I/O Unit	C200HW-DRM21-V1	341
	I/O Link Unit	C200H Special I/O Unit	C200HW-DRT21	342
	CompoBus/S Master Unit	C200H Special I/O Unit	C200HW-SRM21-V1	345
CANopen/User-defined CAN Unit		C200H Special I/O Unit	C200HW-CORT21-V1	343



CS1 and C200H-series

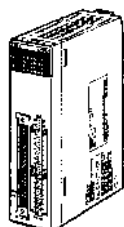
# Basic I/O Units

I/O Units



Input Unit  
CS1W-ID211  
16 points

Output Units  
CS1W-OD21□  
16 points



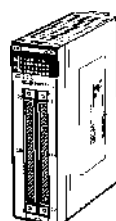
Input Unit  
CS1W-ID231  
32 points

Output Units  
CS1W-OD23□  
32 points



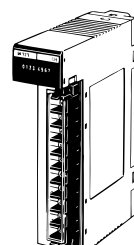
Input Unit  
CS1W-ID261  
64 points

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



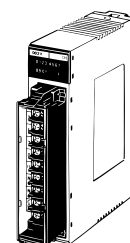
Input Unit  
CS1W-ID291  
96 points

Output Units  
CS1W-OD29□  
96 points  
I/O Units  
CS1W-MD29□  
48/48 points



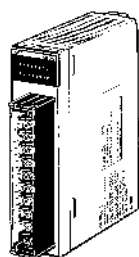
Input Unit  
C200H-ID□□□□  
8 points

Output Units  
C200H-O□□□□□  
5/8 points

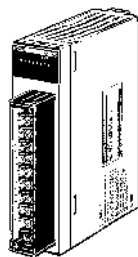


Input Unit  
C200H-ID□□□□  
16 points

Output Units  
C200H-O□□□□□  
16 points

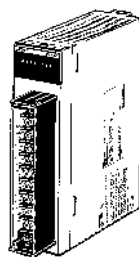


AC Input Units  
CS1W-IA□□11  
16 points



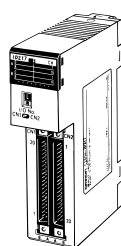
Triac Output Unit  
CS1W-OA201  
8 points

Triac Output Unit  
CS1W-OA211  
16 points



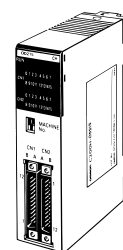
Relay Output Unit  
CS1W-OC201  
8 independent

Relay Output Unit  
CS1W-OC211  
16 points



Input Unit  
C200H-ID□□□□  
32/64 points

Output Units  
C200H-OD□□□□□  
32/64 points



Input Unit  
C200H-ID□□□□  
32 points

Output Units  
C200H-OD□□□□□  
32 points

I/O Units  
C200H-MD□□□□□  
16/16 points

DC Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
CS1 Basic I/O Unit	24 V DC	16 pts	Removable terminal block	CS1W-ID211	Input current: 7 mA
	24 V DC	32 pts	Connector	CS1W-ID231	Input current: 6 mA
	24 V DC	64 pts		CS1W-ID261	
	24 V DC	96 pts		CS1W-ID291	Input current: approx. 5 mA
C200H Basic I/O Unit	12 to 24 V DC	8 pts	Removable terminal block	C200H-ID211	Input current: 10 mA
	24 V DC	16 pts	Removable terminal block	C200H-ID212	Input current: 7 mA
C200H Group-2 I/O Units	24 V DC	32 pts	Connector	C200H-ID216	Input current: 4.1 mA
	24 V DC	64 pts		C200H-ID217	
	24 V DC	32 pts		C200H-ID218	Input current: 6 mA
	24 V DC	64 pts		C200H-ID219	
	12 V DC	64 pts		C200H-ID111	
C200H Special I/O Unit	24 V DC	32 pts		C200H-ID215	Input current: 4 mA

TTL Input Units

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

**AC Input Units (and 100 V DC)**

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

**AC/DC Input Units**

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

**Relay Output Units**

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

**Transistor Output Units**

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

**TTL Output Unit**

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

**Triac Output Units**

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