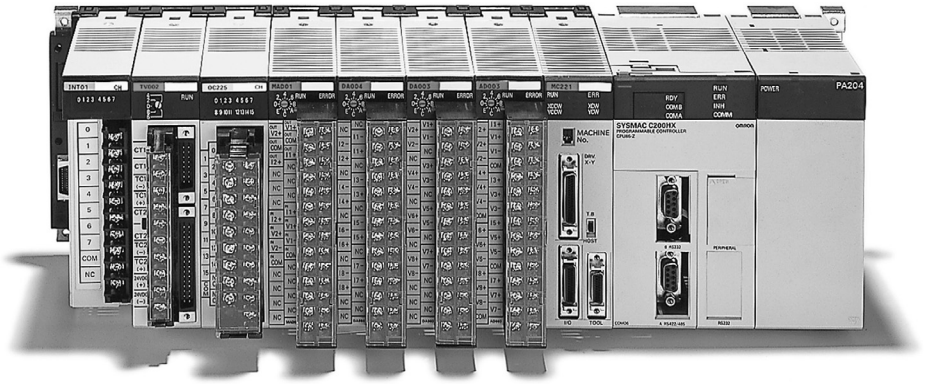
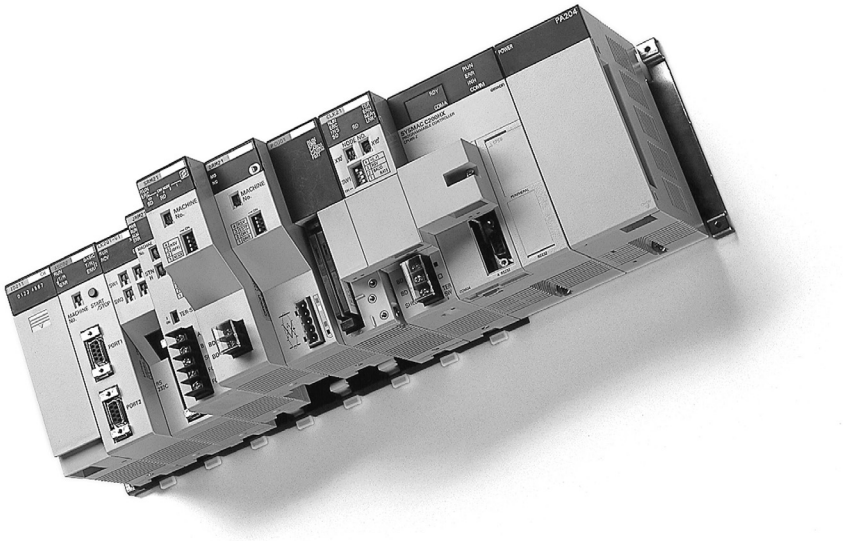
C200H□-CPU□□-E

C200H-series CPU units

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

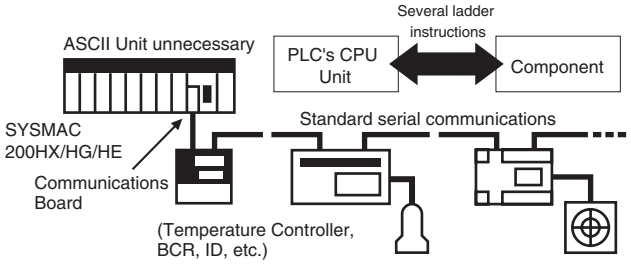


- Simple serial connections for Higher Development Efficiency
  - Built-in protocol macro function
- Special I/O Units
  - 2- or 4-axis Motion Control Unit, Controller Link Unit, CompoBus/S Unit, DeviceNet Unit, PROFIBUS-DP Units, Eight-point Analog I/O Unit, etc.
- SYSMAC C200HX/HG/HE-ZE with Increased 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 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.

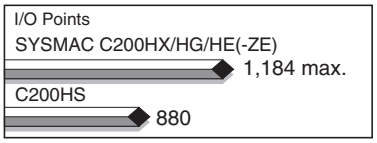
Note: There are restrictions on the Units that can be used.

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.

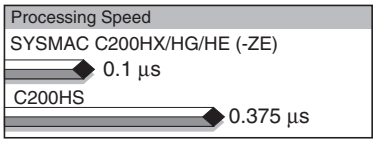
A Large Increase in I/O Points

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.



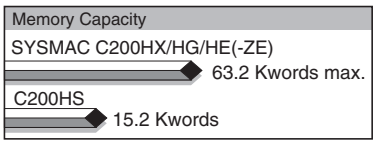
Faster Processing

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

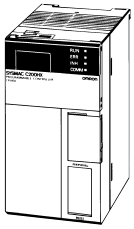
The maximum of three banks in previous models has been increased to a maximum of 16 (using the C200HX-CPU85-ZE). In the SYSMAC C200HX/HG/HE-ZE, one of those banks can be directly designated. Combined with the conventional 6 kWords of data memory, this allows direct use of 12 kWords.

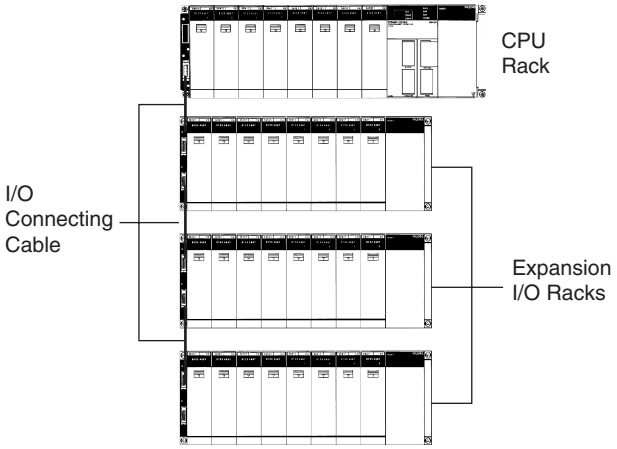
System Configuration

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(-Z)E	3.2K	4K	None	0.3 s min.	640	2	Unavailable	Unavailable	10	5	No	No	No
C200HE-CPU32(-Z)E	7.2K	6K	None	0.3 s min.	880	2	10	5	10	5	No	Yes	Yes
C200HE-CPU42(-Z)E	7.2K	6K	None	0.3 s min.	880	2	10	5	10	5	Yes	Yes	Yes
C200HG-CPU33(-Z)E	15.2K	6K	6K	0.15 s min.	880	2	10	5	10	5	No	Yes	Yes
C200HG-CPU43(-Z)E	15.2K	6K	6K	0.15 s min.	880	2	10	5	10	5	Yes	Yes	Yes
C200HG-CPU53(-Z)E	15.2K	6K	6K	0.15 s min.	1,184	3	16	8	16	8	No	Yes	Yes
C200HG-CPU63(-Z)E	15.2K	6K	6K	0.15 s min.	1,184	3	16	8	16	8	Yes	Yes	Yes
C200HX-CPU34(-Z)E	31.2K	6K	6K x 3 banks (18K)	0.1 s min.	880	2	10	5	10	5	No	Yes	Yes
C200HX-CPU44(-Z)E	31.2K	6K	6K x 3 banks (18K)	0.1 s min.	880	2	10	5	10	5	Yes	Yes	Yes
C200HX-CPU54(-Z)E	31.2K	6K	6K x 3 banks (18K)	0.1 s min.	1,184	3	16	8	16	8	No	Yes	Yes
C200HX-CPU64(-Z)E	31.2K	6K	6K x 3 banks (18K)	0.1 s min.	1,184	3	16	8	16	8	Yes	Yes	Yes
C200HX-CPU65-ZE	63.2K	6K	6K x 8 banks (48K)	0.1 s min.	1,184	3	16	8	16	8	Yes	Yes	Yes
C200HX-CPU85-ZE	63.2K	6K	6K x 16 banks (96K)	0.1 s min.	1,184	3	16	8	16	8	Yes	Yes	Yes

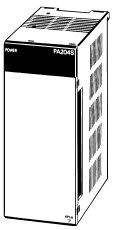
Note: There are restrictions on the number of High-density I/O Units and Special I/O Units that can be mounted per CPU Unit. When mounting, the unit number for each of the Units is set using the rotary switches on the front of the Units. When mounting 16 Units to a CPU Unit (to which 16 Units can be 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

□□□□

Year (Example: 1997: 7)
Month (January to September: 1 to 9; October to December: X to Z)
Day (01 to 31)

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

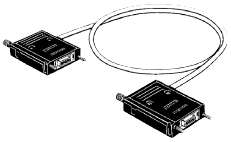
Model	No. of I/O slots
C200HW-BC031	3
C200HW-BC051	5
C200HW-BC081	8
C200HW-BC101	10

I/O Backplane

The I/O Backplane is used to mount Expansion I/O Racks. (See page ntlp.) 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

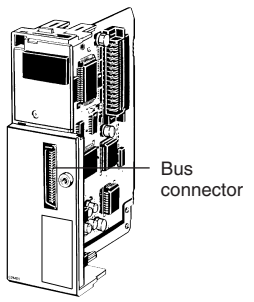
Communications Board

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.

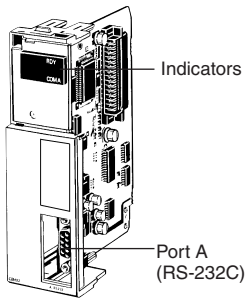
Model	Specifications
C200HW-COM01	Communications port for Controller Link, SYSMAC LINK Units
C200HW-COM02-V1	One RS-232C port
C200HW-COM03-V1	One RS-422/485 port
C200HW-COM04-EV1	Communications port for the Controller Link, SYSMAC LINK Units, one RS-232C port, and a protocol macro function
C200HW-COM05-EV1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

Models Available

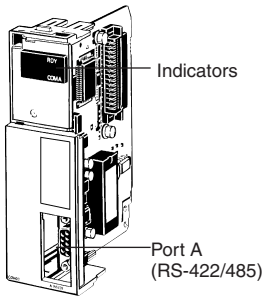
The following Communications Board models are available.



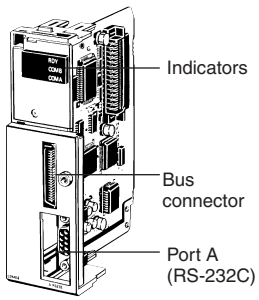
C200HW-COM01



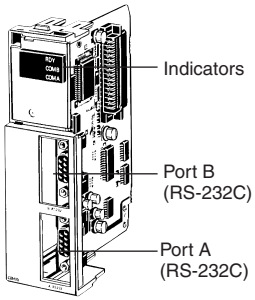
C200HW-COM02-V1



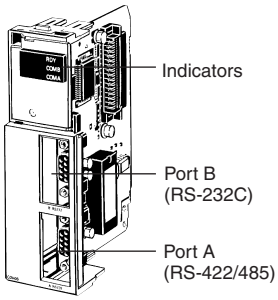
C200HW-COM03-V1



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

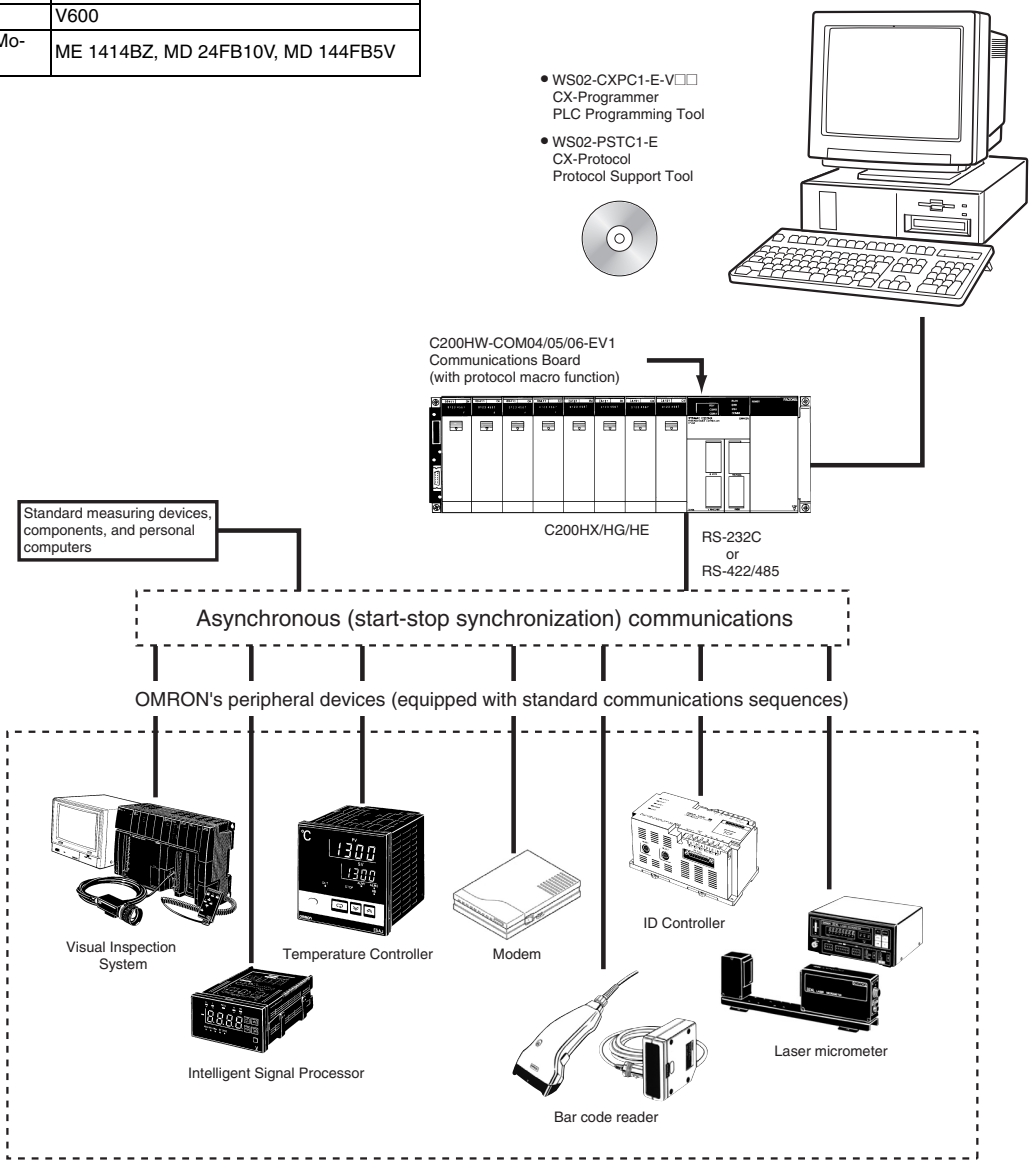
The Protocol Support Software and Communications Boards (i.e., the C200HW-COM04-EV1, C200HW-COM05-EV1, and C200HW-COM06-EV1) support the following seven types of standard communications sequences. Communications sequences other than those listed below can be created using the Windows-based CX-Protocol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

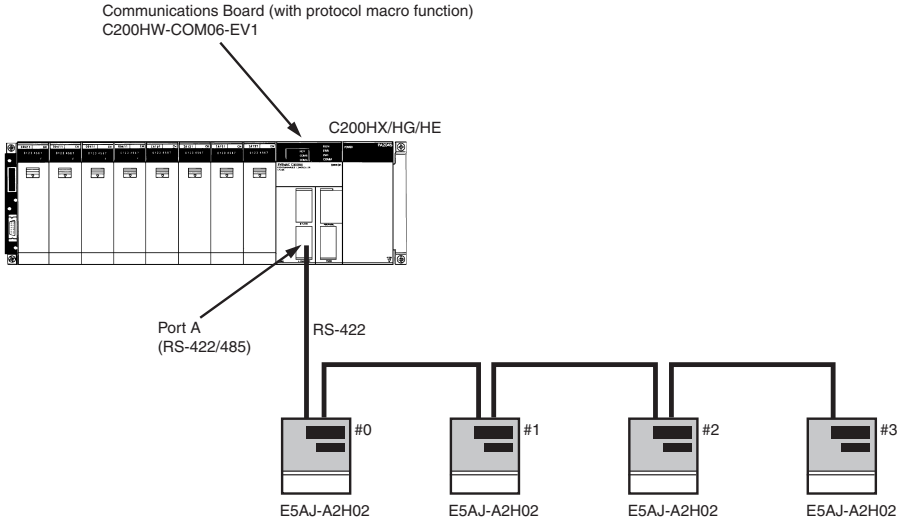
The following functions have been added to C200HW-COM0□V1 Communications Boards.

- 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.



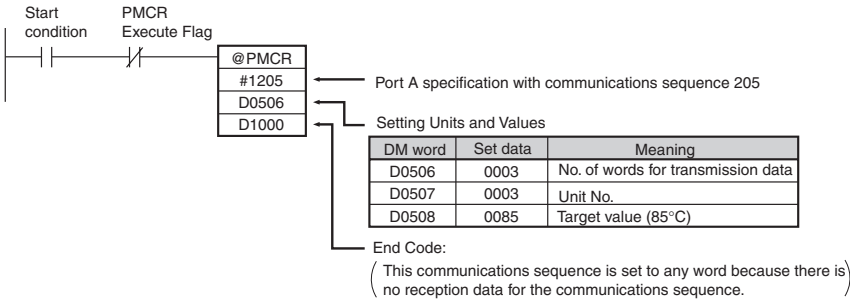
E5AJ Temperature Controller Connection Example

Connections



Program Example

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



DM word	Set data	Meaning
D0506	0003	No. of words for transmission data
D0507	0003	Unit No.
D0508	0085	Target value (85°C)

Examples of Sequences Available

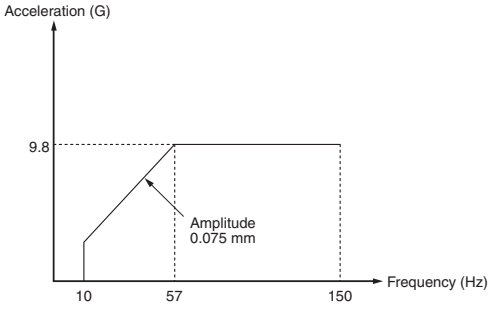
Sequence number	Communications sequence name	Function
200	Remote mode select	Sets the Unit to remote mode.
201	Local mode select	Sets the Unit to local mode.
202	Backup mode select	Changes target value write mode into backup mode.
203	RAM write mode select	Changes target value write mode into RAM write 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: $^{+17\%}/_{-11\%}$/≥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 MΩ 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^2, 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^2, in X, Y, and Z directions for 20 minutes each)
Shock	147 m/s^2 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 Ω
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)

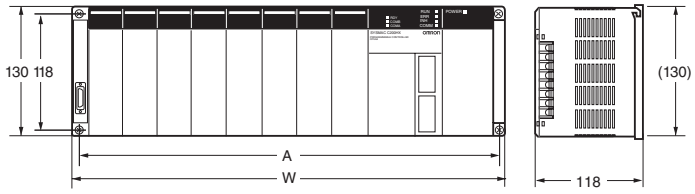
Note: 1. Be sure to disconnect the LG and GR terminals when conducting insulation resistance tests or dielectric strength tests.Internal components might be damaged if insulation resistance tests are repeated many times with the LG and GR terminals connected.

2.



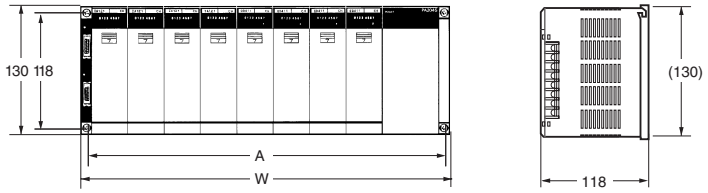
Dimensions

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.