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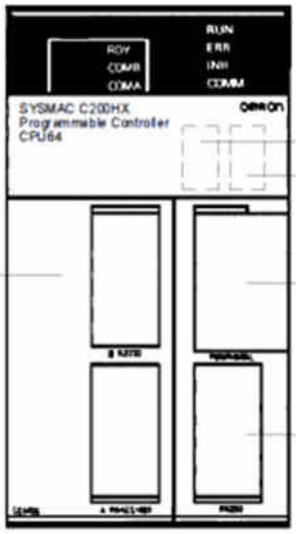
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C200HE-CPU11-E, C200HE-CPU32-E, C200HE-CPU-42-E

OMRON

SYSMAC - System C200H Alpha CPUs



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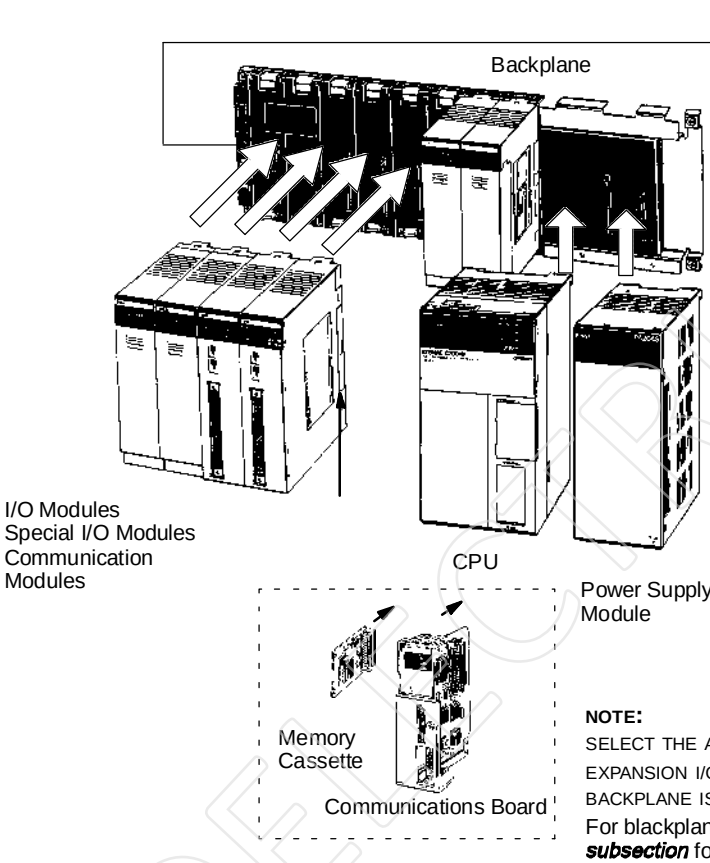
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SYSTEM OVERVIEW

BASIC CONFIGURATION – C200HX/HG/HE

CPU Rack



NOTE:

SELECT THE APPROPRIATE BACKPLANE FOR THE CPU RACK, EXPANSION I/O RACK, AND SLAVE RACK. EACH TYPE OF BACKPLANE IS A DIFFERENT MODEL.

For blackplane dimensions, refer to the ***Backplanes subsection*** found later in this section.

To order, refer to the specific information provided separately in the ***Standard Parts section*** of this catalog.

CPU Rack

The CPU Rack is the master controller rack for the control systems and contains the system communications ports. It may be expanded using Expansion Racks and Slave Racks.

A fully configured C200Hα CPU Rack includes a CPU, Backplane, Power Supply Module, I/O Modules, Special I/O Modules and Communication Modules, as appropriate for the application.

A complete system may also include connecting cables and programming software or hardware.

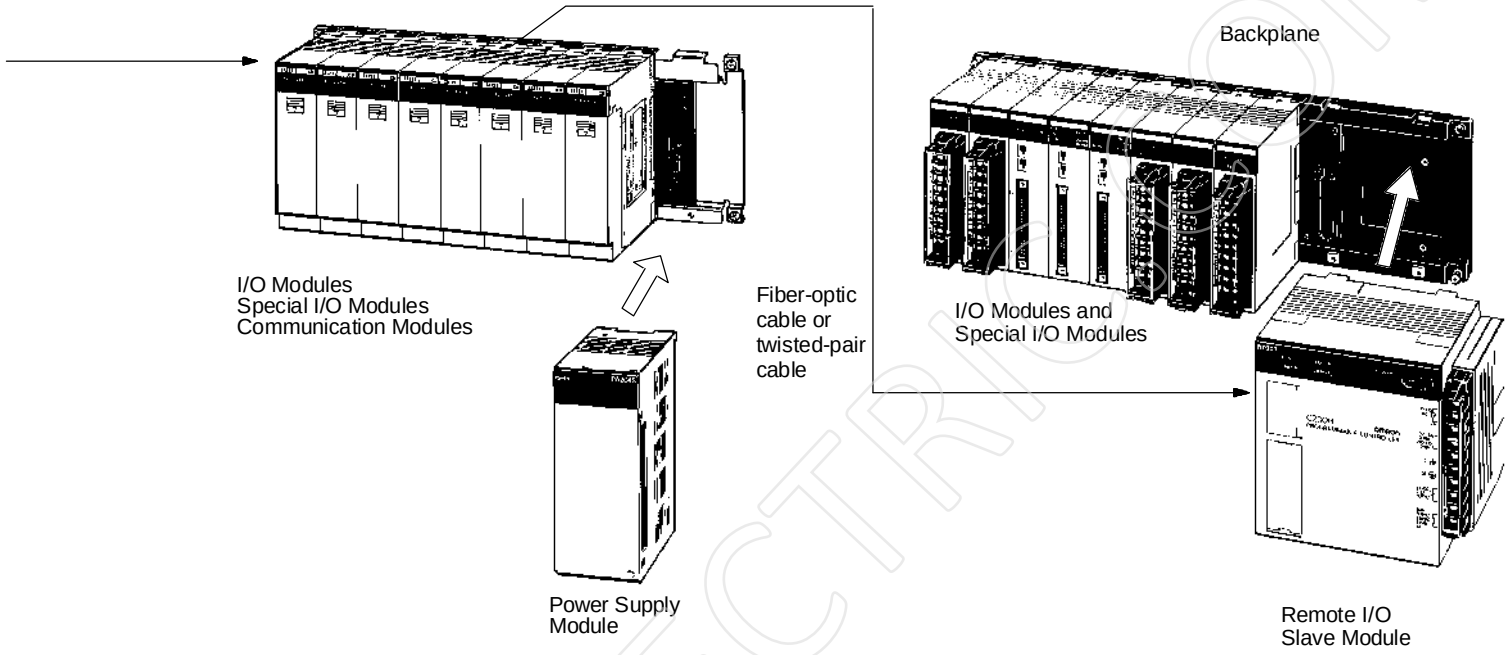
A total of two SYSMAC LINK or SYSMAC NET Link Modules can be mounted to the CPU if the C200HW-COM01 or C200HW-COM04-E Communications Board is connected to the CPU.

Only two C200HS-INT01 Interrupt Input Modules can be mounted on a CPU Rack.

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Expansion I/O Racks

Slave Racks



Local Expansion Racks

The configuration of an Expansion I/O Rack includes a Power Supply Module, an Expansion Backplane, and appropriate I/O Modules, Special I/O Modules, and Communication Modules.

The number of allowable Expansion Racks varies with CPU model.

Up to three Expansion I/O Racks can be connected to the C200HX-CPU54-E, C200HX-CPU64-E, C200HG-CPU53-E, or C200HG-CPU63-E.

Up to two Expansion I/O Racks can be connected to any other CPU for the C200HX, C200HG, and C200HE.

Different types of Backplanes are necessary for the CPU, Expansion I/O Rack, and the Slave Rack.

Slave Racks

To expand a system and minimize wiring costs, you may connect a maximum of five Slave Racks per system.

The Configuration of a Slave Rack includes a Remote I/O Slave Module, a Backplane (for the C200HX/HG/HE Slave Rack), I/O Modules, and Special I/O Modules.

To mount a High-density I/O Module to a Slave Rack, use a C200H-RM001-PV1/RM201.

Note: C200H-RM001-P Master Modules cannot be used.

Group-2 High-density I/O Modules, Communications I/O Modules, and Interrupt Input Modules cannot be mounted in Slave Racks.

You can connect a Maximum of two Expansion I/O Racks to Slave Racks using I/O Connecting Cable.

Always count the Expansion I/O Racks (connected in this way) against the maximum of five Slave Racks that can be connected.

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SYSTEM OVERVIEW

C200HX/HG/HE SPECIFICATIONS

C200Hα PLC – System Specifications

ITEM	SPECIFICATIONS
Supply voltage	AC power supply: 100 to 120/200 to 240 VAC selectable 50/60 Hz DC power supply: 24 VDC
Operating voltage range	AC power supply: 85 to 132/170 to 264 VAC DC power supply: 19.2 to 28.8 VDC
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 VDC; 0.6 A, 26 VDC; 0.8 A, 24 VDC $^{+10\%}/_{-20\%}$ (C200HW-PA204S only)
Insulation resistance	20 MΩ between AC terminals and the GR terminal at 500 VDC (see note 1)
Dielectric strength	2,300 VAC at 50/60 Hz for 1 minute between AC terminals and housing; 1,000 VAC at 50/60 Hz for 1 minute between DC terminals and housing. Leakage current: 10 mA max. (see note 1)
Noise immunity	1,500 Vp-p, pulse width: 100 ns to 1 μs, rise time: 1 ns pulse (by noise simulator)
Vibration	10 to 57 Hz; 0.075 mm amplitude, 57 to 150 Hz; acceleration: 1 G, in X, Y, and Z directions, for 80 minutes each (sweep time 8 min x 10 sweeps = 80 min); (When mounted on DIN track, 2 to 55 Hz, 0.3 G, in X, Y, and Z directions for 20 minutes each)
Shock	15G (147 m/s^2) in X, Y, and Z directions, 3 times each
Ambient temperature	Operating: 0 to 55°C (32°to 131.0°F) Storage: −20 to 75°C (-4.0 to 167.0°F) 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: 315 g max., Power Supply Module: 510 g max., Backplane: 445 g to 1040 g)

Note: 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.

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CPU

YOUR INTRODUCTION TO THE C200HX/HG/HE CPU

Features

Select from Eleven C200Hα CPUs within Alpha's Three Basic Model Types

Each model has different program capacities, processing speeds, I/O capabilities, communications connections and features. (The ***C200Hα CPU Selection Table*** is provided later in this section.)

Optional Back-up Memory Cassettes

For program back-up or rewrite option, each CPU has a special Memory Cassette compartment.

Multifunctional Peripheral Port

Directly connect to programming peripherals or communicate to Omron's Operator Interface Terminals and other third party devices using an optional CIF Convertor Cable.

Built-in RS-232C Port

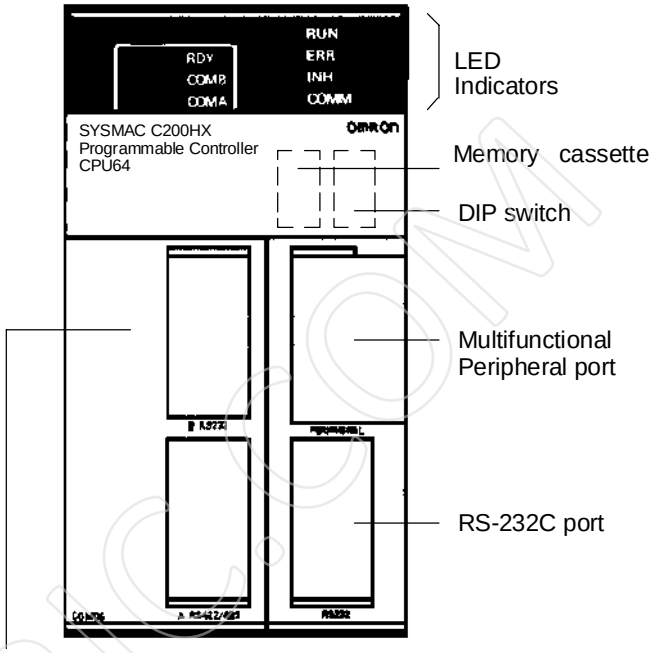
Direct Host Link communications to the CPU or interface with other devices through serial communications. Available on selected models only.

Versatile Communications

Install one of six C200Hα Communications Boards to have additional communications ports. The boards fit into the communications slot in the CPU and enable communication with SYSMAC LINK or SYSMAC NET modules, a PC card module or a variety of serial devices – including Operator Interfaces. Order the Communications Board and Memory Cassette separately (not provided with the CPU).

Protocol Macro

Three C200Hα Communications Boards offer the Protocol Macro Instruction that controls data transfer with various communications devices and components equipped with RS-232C or RS-422/-485 ports. With the Protocol Macro Function built into the C200HW-COM04, C200HW-COM05-E and C200HW-COM06-E Communications Boards, communications sequences (data transfer procedures) may be modified with Omron's Protocol Support Software.
Although seven Omron Communications sequences are built-in, you can use the Protocol Support Software to create other communications sequences. For more details, refer to the ***Communication Board section*** that follows.



Communications Board (C200HW-COM06-E shown here)

Indicators

INDICATOR ON THE CPU	FUNCTION
RUN (green)	Lit when the PLC is operating normally.
ERR (red)	Flashes if the PLC in operation detects any non-fatal error. (The PLC will continue operating.) Lit if the PLC in operation detects any fatal error. (The PLC will stop operating.) After the PLC stops operating, the RUN indicator will be off, and all output signals of the Output Modules will be interrupted.
INH (orange)	Lit when the Load OFF flag (AR bit) is ON. (All output signals of the Output Modules will be interrupted.)
COMM (orange)	Flashes when the CPU is communicating with the device connected to the peripheral port or RS-232C port.

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CPU

C200HX/HG/HE CPU SELECTION GUIDE

Consider these Application Needs when Selecting the C200Hα CPU

1. What is the required program capacity?
2. Determine total standard I/O (with expansion rack) and Special I/O requirements.
3. What communications interfaces are required?

C200Hα CPU Selection Table

PROGRAM CAPACITY (WORDS)	DM (WORDS)	EM (WORDS)	BASIC INSTRUCTION PROCESSING TIME	NO. I/O PTS.	MAX. NO. EXPANSION I/O RACKS)	MAX. NO. HIGH-DENSITY I/O MODULES (GROUP 2) *NO. BELOW = TOTAL NO. OF MODULES*	MAX. NO. OF SPECIAL I/O MODULES (GROUP 1) *NO. = TOTAL NO. OF MODULES*	RS-232C	CLOCK FUNCTION	COMMUNICA-TIONS BOARD AVAILABLE	PART NUMBER
3.2K	4K	None	0.3 μs min.	640	2	Unavailable	10	No	No	No	**C200HE-CPU11-E**
7.2K	6K			880		10			Yes	Yes	**C200HE-CPU32-E**
								Yes			**C200HE-CPU42-E**
15.2K	6K	6K	0.15 μs min.	880	2	10	10	No	Yes	Yes	**C200HG-CPU33-E**
								Yes			**C200HG-CPU43-E**
				1,184	3	16 (10) *See Note*	16 (10) *See Note*	No			**C200HG-CPU53-E**
								Yes			**C200HG-CPU63-E**
31.2K	6K	6K x 3 (18K)	0.1 μs min.	880	2	10	10	No	Yes	Yes	**C200HX-CPU34-E**
								Yes			**C200HX-CPU44-E**
				1,184	3	16 (10) *See Note*	16 (10) *See Note*	No			**C200HX-CPU54-E**
								Yes			**C200HX-CPU64-E**

Note: When the table indicates a selection total of 16 High-density I/O Modules or Special I/O Modules – the total of 16 is applicable only if you select from the Modules in this list:

- High-density I/O Modules: C200H-ID216 (32 inputs) and C200H-OD218 (32 outputs).
- Special I/O Modules: C200H-AD002, C200H-DA002, C200H-NC211, and C200H-CT021

If your selections are not in the list above: you may be limited to only 10 modules – as indicated in the table.
An exception: A total of only 8 can be used if you select C200H-OD219, C200H-ID217, or C200H-ID111 High-density I/O Modules.

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C200Hα CPU 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
Execution time	Basic instructions: e.g., LD C200HE-CPU□□-E:0.3 μs C200HG-CPU□□-E:0.15 μs C200HX-CPU□□-E:0.1 μs Special instructions: e.g., MOV(21) C200HE-CPU□□-E:1.2 μs C200HG-CPU□□-E:0.6 μs C200HX-CPU□□-E:0.4 μs
Program capacity	C200HE-CPU11-E: 3.2K words max. C200HE-CPU32-E/CPU42-E: 7.2K words max. C200HG-CPU□□-E: 15.2K words max. C200HX-CPU□□-E: 31.2K words max.
I/O bits	640 (00000 to 02915, 30000 to 30915)
IR bits	6,464 (03000 to 23115, 31000 to 51115)
SR bits	1,080 (23200 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□□-E: None C200HG-CPU□□-E: 6,144 (EM 0000 to EM 6143) C200HX-CPU□□-E: 6,144 × 3 banks (EM 0000 to EM 6143)
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 (77°F). 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 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.

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CPU

SPECIFICATIONS, CHARACTERISTICS

Comparing C200Hα CPU Specifications

Use the following table to compare the functions of the C200HX, C200HG, and C200HE with those of the C200HS and C200H.

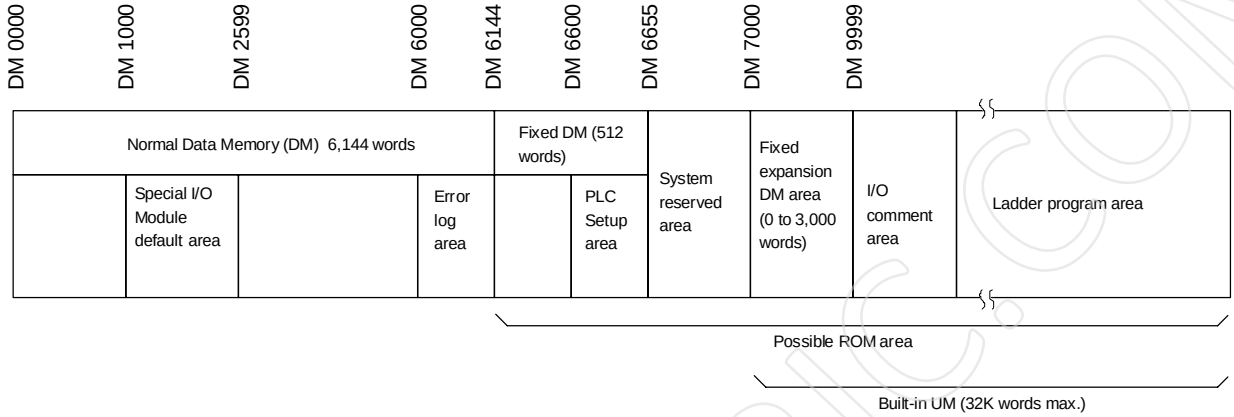
FUNCTION		C200HX/HG/HE	C200HS	C200H
Memory	User Memory (UM)	3.2K words (C200HE-CPU11-E) 7.2K words (C200HE-CPU□2-E) 15.2K words (C200HG-CPU□3-E) 31.2K words (C200HX-CPU□4-E)	15.2K words	3.2K words/7.2K words
	Normal Data Memory (DM)	C200HX/G: 6,144 words (DM 0000 to DM 6143) (DM 4000 to DM 5999 do not exist in the C200HE-CPU11-E) C200HE-CPU16: 4000 words (DM0000-3999)	6,144 words (DM 0000 to DM 6143)	1,000 words (DM 0000 to DM 0999)
	Fixed Data Memory	512 words (DM 6144 to DM 6655)	512 words (DM 6144 to DM 6655)	1,000 words (DM 1000 to DM 1999)
	Fixed Expansion Data Memory	0 to 3,000 words (DM 7000 to DM 9999)	0 to 3,000 words (DM 7000 to DM 9999)	None
	Extended Data Memory (EM)	C200HE: No EM C200HG: 6,144 words x 1 bank C200HX: 6,144 words x 3 banks	None	None
I/O	Expansion Racks	3 max. (2 max. for C200HE-CPU□□-E and C200HG/HX-CPU-3□-E/4□-E)	2 max.	2 max.
	Group-2 High-density I/O Modules	0 to 9 and A to F Modules per PLC C200HE-CPU11-E: No Group-2 Modules connected C200HE-CPU□2-E, C200HG/HX-CPU-3□-E/CPU4□-E: 0 to 9 Units per PLC	0 to 9 Modules per PLC	0 to 9 Modules per PLC
	Special I/O Modules	0 to 9 and A to F Modules per PLC C200HE-CPU□□-E, C200HG/HX-CPU-3□-E/CPU4□-E: 0 to 9 Modules per PLC	0 to 9 Modules per PLC	0 to 9 Modules per PLC
Execution time	Basic instructions (LD)	0.1 μs (C200HX) 0.15 μs (C200HG) 0.3 μs (C200HE)	0.375 μs	0.75 μs
	Special instructions (MOV)	0.4 μs (C200HX) 0.6 μs (C200HG) 1.2 μs (C200HE)	19 μs	88 μs
	Other special instructions	C200HX and C200HG: Approx. 1/3 to 2/3 of the time required by the C200HS. C200HE: Approx. 3/4 to 4/5 of the time required by the C200HS.	---	--
	END processing time	0.7 ms (C200HX/HE-CPU□2-E) 2.1 ms (C200HE-CPU11-E)	0.7 ms	2.8 to 3.5 ms
CPU	RS-232C port	C200HX/HG/HE-CPU2□-E/4□-E/6□-E	C200HS-CPU2□-E/3□-E	None
	Clock function	All models except the C200HE-CPU11-E.	All models	Incorporated by the Memory Module
	SYSMAC LINK Module and SYSMAC NET Link Module connection	C200HW-COM01 and C200HW-COM04-E Communications Boards available for connection except the C200HE-CPU11-E.	C200HS-CPU3□-E	C200H-CPU11-E/31-E
Communications Board		The Communications Board can be mounted to all CPUs except the C200HE-CPU11-E. The following are possible with the Communications Board: Use of the SYSMAC LINK Module and SYSMAC NET Link Module expansion of up to 2 communications ports, and use of a protocol macro function	None	None
Interrupts	Interrupt Input Modules	2 (16 points)	1 (8 points)	None
	Interruption with Communications Board	Possible	---	--
	Response time	Same as the C200HS. 1 ms if the C200HW-SLK□□ is used.	C200H-compatible mode: 10 ms C200H mode: 1 ms The C200HS in any mode connected to the SYSMAC LINK Module or SYSMAC NET Link Module 10 ms	--
SYSMAC LINK	Service time	3.5 ms max. (1 system)	10.8 ms max. (1 system)	11.5 ms max. (1 system)
	Remote programming	Via the peripheral port, RS-232C port, and Communications Board	Via the peripheral port only	--
	Influence on interrupt response performance	None	10 ms is required by the C200HS in any mode.	--

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User Memory Area

The C200HX, C200HG, and C200HE have a User Memory (UM) area allocation function. This function allows the use of the ladder program area of the UM as a fixed expansion DM area and I/O comment area. The function is enabled with the SYSMAC Support Software (SSS), SYSWIN, or the Programming Console. Only SSS can be used to designate any part of the ladder program area as an I/O comment area (i.e., the Programming Console cannot be used to designate any part of the ladder program area as an I/O comment area.

C200HX/HG/HE Memory Area Structure



Ladder program area	A user program is stored in the ladder program area. If part of the UM is used as a fixed expansion DM area or I/O comment area, the capacity of the ladder program area storing the user program will be reduced accordingly.
I/O comment area	I/O comments are stored in the I/O comment area. The I/O comments can be stored with a program. The I/O comments can be monitored ***without*** loading the comment, just as with conventional comments.
Fixed expansion DM area	The default values of the Special I/O Module, Programmable Terminal, the character string of the Programmable Terminal, and operation data are stored in the fixed expansion DM area. By changing the I/O monitor present value of the Programming Console or using the DM edit transfer operation of the Ladder Support Software, the default values can be written to DM 7000 to DM 9999.
System reserved area	The system reserved area is used by the system only.
PLC Setup area	The settings required for the operation of the PLC are stored in the PLC Setup area.
Normal DM area	The user can freely use the normal DM as a data area for arithmetic operations. If the Special I/O Module is used, DM 1000 to DM 2599 will be a Special I/O Module default area.

- DM 1000 to DM 2599 can be used as a normal DM if DM 7000 to DM 8599 are set as a Special I/O Module default area with the PLC Setup. DM 6000 to DM 6030 are used exclusively as an error log area.
- Unlike the normal DM area, nothing can be written to the fixed expansion DM area using ladder programming.
- The capacity of a ladder program will decrease if the size of the fixed expansion DM area and the total capacity of the I/O comments increase.
- The C200HX, C200HG, and C200HE do not have a fixed expansion DM area or I/O comment area before shipping. The user must allocate these areas in the UM according to the application.

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