# Specifications

■ General 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; <0.3 A: $^{+17\%}/_{-11\%}$ / $\geqq$ 0.3 A: $^{+10\%}/_{-11\%}$ 24 VDC$^{+10\%}/_{-20\%}$ (C200HW-PA204S only)
Operation output	SPST-NO, 1 A at 250 VAC/24 VDC (Only the C200HW-PA204R has terminal output.)
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	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 track, 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.
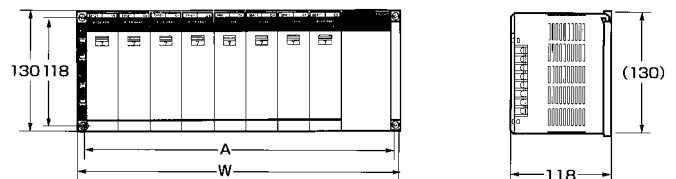
2.
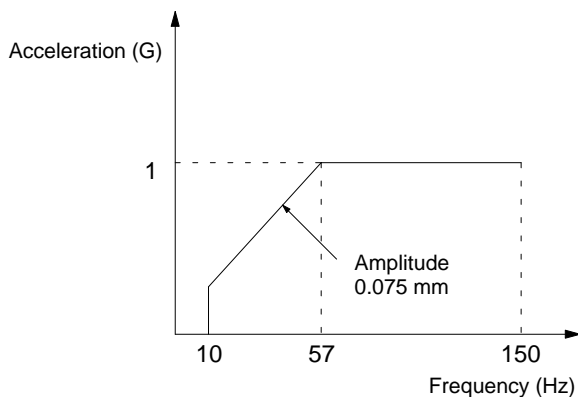
■ Dimensions
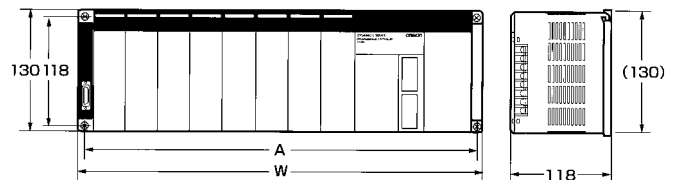
Backplane	A	W
C200HW-BC031 (3 slots)	246	260
C200HW-BC051 (5 slots)	316	330
C200HW-BC081-V1 (8 slots)	421	435
C200HW-BC101-V1 (10 slots)	491	505

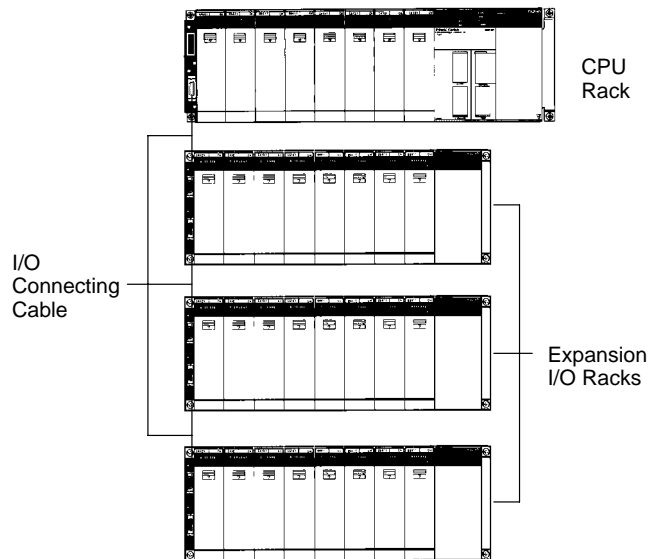| Backplane	A	W
C200HW-BI031 (3 slots)	175	189
C200HW-BI051 (5 slots)	245	259
C200HW-BI081-V1 (8 slots)	350	364
C200HW-BI101-V1 (10 slots)	420	434

Specifications

■ 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: 3.2K words max. C200HE-CPU32-(Z)E/CPU42-(Z)E: 7.2K words max. C200HG-CPU□□-(Z)E: 15.2K words max. C200HX-CPU□4-(Z)E: 31.2K words max. C200HX-CPU65-ZE/CPU85-ZE: 63.2K words max.
I/O bits	640 (00000 to 02915, 30000 to 30915)
IR bits	6,528 (03000 to 23515, 31000 to 51115)
SR bits	1,016 (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.

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.

CPU Rack

I/O Connecting Cable

Expansion I/O Racks

■ CPU Rack

The CPU Rack is configured of a Backplane, CPU Unit, Power Supply Unit, and I/O Units.

CPU Unit · Power Supply Unit

Backplane

I/O Units
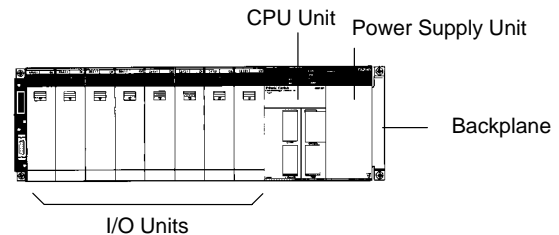
CPU Unit

The following 13 CPU Unit models are available. Refer to page 13.

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 (i.e., Group-2)	Max. no. of connecting Special I/O Units	RS-232C	Clock function	Availability of Communications Board
C200HE-CPU11-(Z)E	3.2K	4K	None	0.3 μs min.	640	2	Unavailable	10	No	No	No
-CPU32-(Z)E	7.2K	6K			880		10			Yes	Yes
-CPU42-(Z)E									Yes		
C200HG-CPU33-(Z)E	15.2K	6K	6K	0.15 μs min.	880	2	10	10	No	Yes	Yes
-CPU43-(Z)E									Yes		
-CPU53-(Z)E					1,184	3	16 (10) (see note)	16 (10) (see note)	No		
-CPU63-(Z)E									Yes		
C200HX-CPU34-(Z)E	31.2K	6K	6K x 3 banks (18K)	0.1 μs min.	880	2	10	10	No	Yes	Yes
-CPU44-(Z)E									Yes		
-CPU54-(Z)E					1,184	3	16 (8) (see note)	16 (10) (see note)	No		
-CPU64-(Z)E									Yes		
C200HX-CPU65-ZE	63.2 K	6 K	6K x 8 banks (48K)	0.1 μs min.	1,184	3	16 (8)	16 (8)	Yes	Yes	Yes
-CPU85-ZE			6K x 16 banks (96K)								

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).

CPU Backplane

I/O Units are mounted to the Backplane. The following Backplane models are available.

Model	No. of I/O slots
C200HW-BC031	3
C200HW-BC051	5
C200HW-BC081-V1	8
C200HW-BC101-V1	10

I/O Units, High-density I/O Units, and Special I/O Units can be mounted to the Backplane.

Power Supply Unit

Power is supplied to the CPU Unit from the Power Supply Unit. Refer to page 10. The following Power Supply Units are available.
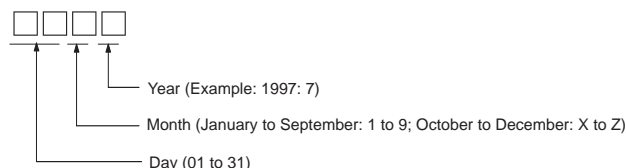
Model	Supply voltage	Comments
C200HW-PA204	100 to 120 VAC 200 to 240 VAC	---
C200HW-PA204S		With 24-VDC service power supply
C200HW-PA204R (see note)	100 to 120 VAC 200 to 240 VAC	With output contacts during operation
C200HW-PA209R (see note)	100 to 120 VAC 200 to 240 VAC	With output contacts during operation
C200HW-PD024	24 VDC	---

Note: 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.

Power Supply Unit Restrictions

The CPU Units and Backplanes that can be used in combination with the C200HW-PA204R or C200HW-PA209R Power Supply Units are shown in the tables below. Confirm using the model's serial number. This serial number indicates the data of manufacture as shown below.

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	

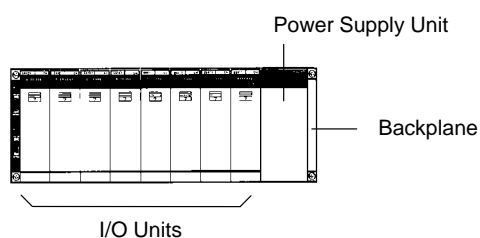**Note:** Discontinuation models are contained.

System Configuration

CPU Backplane		I/O Backplane (see *Expansion I/O Rack*)	
C200HW-BC031	Same serial numbers as for PA204R.	C200HW-BI031	Same serial numbers as for PA204R.
C200HW-BC051		C200HW-BI051	
C200HW-BC081-V1 (or later)		C200HW-BI081-V1 (or later)	
C200HW-BC101-V1 (or later)		C200HW-BI101-V1 (or later)	

Note: When using the PA209R Power Supply Unit, be sure to use only the Backplanes listed in the above table. Using a different Backplane may result in malfunction due to deterioration of the base or pattern burnout.

■ Expansion I/O Rack

Two or three Expansion I/O Racks can be connected to the CPU Rack. The Expansion I/O Rack is configured of a Backplane, Power Supply Unit, and I/O Units.

Power Supply Unit

Power is supplied to the Expansion I/O Rack from the Power Supply Unit. Refer to page 10.

Mounting Unit

I/O Units, High-density I/O Units, and Special I/O Units can be mounted to the Backplane.

I/O Backplane

I/O Units are mounted to the Backplane for the Expansion I/O Rack. Refer to page 10. The following Backplane models are available for Expansion I/O.

Model	No. of I/O slots
C200HW-BI031	3
C200HW-BI051	5
C200HW-BI081-V1	8
C200HW-BI101-V1	10

I/O Connecting Cable

The I/O Connecting Cable connects a CPU Rack to an Expansion I/O Rack or an Expansion I/O Rack to another Expansion I/O Rack. The following five types of I/O Connecting Cables are available. The total length of the I/O Connecting Cables used in a network must be 12 m maximum.

Model	Cable length (cm)
C200H-CN311	30
C200H-CN711	70
C200H-CN221	200
C200H-CN521	500
C200H-CN131	1,000

CPU Unit Components

■ CPU Unit

Nomenclature

Indicators

Memory Cassette

DIP switch

Peripheral port

RS-232C port
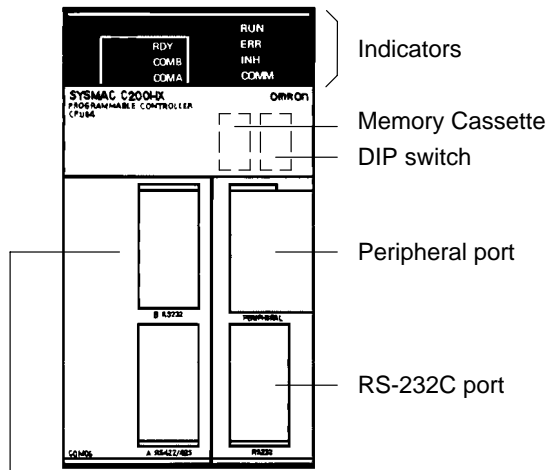
Communications Board (The C200HW-COM06-EV1 is mounted to this CPU Unit.)

Indicators

Refer to the following table for the functions of the indicators.

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

Memory Cassette

The CPU Unit has a compartment to connect the Memory Cassette to the CPU Unit. The Memory Cassette works as a RAM together with the built-in RAM of the CPU Unit.

Peripheral Port

A peripheral device can be connected to the peripheral port.

RS-232C Port

The CPU Unit has a built-in RS-232C port.

Communications Board

The CPU Unit has a compartment to connect the Communications Board to the CPU Unit.

DIP Switch

The PLC operates according to the DIP switch settings of the CPU Unit. The DIP switch of the CPU Unit for the C200HX, C200HG, and C200HE has six pins. For the function of each of the pins, refer to the following table. (These pins are set to OFF before shipping.)
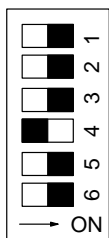

Pin no.	Setting	Function
1	ON	Data cannot be written to the UM area.
	OFF	Data can be written to the UM area.
2	ON	Data of the Memory Cassette can be read automatically when the PLC is turned on.
	OFF	Data of the Memory Cassette cannot be read automatically when the PLC is turned on.
3	ON	Programming Console displays messages in English.
	OFF	Programming Console to displays messages in Japanese.
4	ON	The expansion instructions can be set.
	OFF	The expansion instructions cannot be set (default setting).
5	ON	Sets the communications port to the following conditions for RS-232C. No. of start bits: 1 Data length: 7 bits Parity: Even No. of stop bits: 1 Baud rate: 9,600 bps
	OFF	Cancels the above settings.
6	ON	Programming Console is in expansion terminal mode (AR 0712 is turned ON).
	OFF	Programming Console is in normal mode (AR 0712 is turned OFF).

Memory Cassette

■ Memory Cassette

The CPU has a compartment to connect the Memory Cassette to the CPU. The Memory Cassette works as a RAM together with the built-in RAM of the CPU. EEPROM and EPROM Memory Cassettes are available.
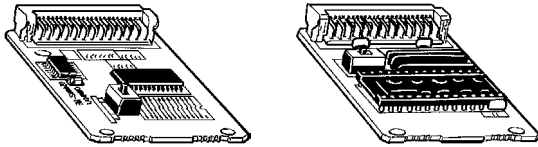
EEPROM Memory Cassette   EPROM Memory Cassette

EEPROM Memory Cassette

Model	Capacity
C200HW-ME04K	4K words
C200HW-ME08K	8K words
C200HW-ME16K	16K words
C200HW-ME32K	32K words
C200HW-ME64K	64K words

Note: The C200HW-ME64K can only be used with the C200HX-CPU65-ZE/CPU85-ZE CPU Units only. It cannot be used with the other CPU Units.

The EEPROM Memory Cassette can be installed in the C200HX, C200HG, and C200HE CPUs to write and read programs and I/O data to the CPU. The EEPROM Memory Cassette does not require any backup power supply. The EEPROM Memory Cassette will retain its data even after it is disconnected from the CPU.

EPROM Memory Cassette (See Note)

Model	Capacity
C200HS-MP16K	16K words/32K words

EPROM	Equivalent to 27256	ROM-JD-B
	Equivalent to 27512	ROM-KD-B

Use a standard PROM writer to write a program to the EPROM Memory Cassette. Connect an EPROM to the EPROM Memory Cassette before installing the EPROM Memory Cassette to the CPU. The EPROM Memory Cassette will lose its data if it is dismounted from the CPU.

■ Memory Cassette Settings

EEPROM Memory Cassette

The EEPROM Memory Cassette has a memory protect switch (SW1). Refer to the following to set this switch.

ON: The data in the EEPROM Memory Cassette will be protected.

OFF: Data can be written to the EEPROM Memory Cassette. SW1 is set to OFF before shipping.

EPROM Memory Cassette

The EPROM Memory Cassette has a switch (SW1) to select the type of EPROM for the EPROM Memory Cassette. Refer to the following table for details.

| SW1	Type	Model	Capacity	Access time
OFF	Equivalent to 27256	ROM-JD-B	16K words	150 ns
ON	Equivalent to 27512	ROM-KD-B	32K words	

Communications Board

■ Communications Board

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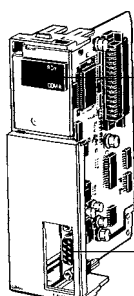
Models Available

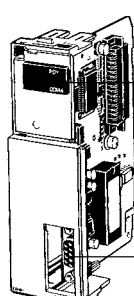The following Communications Board models are available.
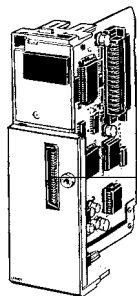
C200HW-COM01 — Bus connector

C200HW-COM02-V1 — Indicators, Port A (RS-232C)

C200HW-COM03-V1 — Indicators, Port A (RS-422/485)
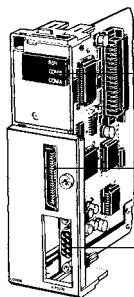
C200HW-COM04-EV1 — Indicators, Bus connector, Port A (RS-232C)
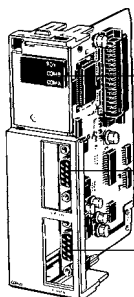
C200HW-COM05-EV1 — Indicators, Port B (RS-232C), Port A (RS-232C)
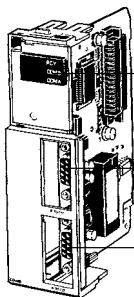
C200HW-COM06-EV1 — Indicators, Port B (RS-232C), Port A (RS-422/485)

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

Indicators

Refer to the following table for the functions of the Communications Board indicators.

Indicator	Color	Status	Meaning	Function
RDY	Green	Not lit	Cannot be used	Hardware error
		Flashes	Setting error	System setting or protocol data error
		Lit	Ready to be used	Normal operation
COMB	Orange	Flashes	Communicating	Port B is in use for communications
COMA				Port A is in use for communications

Protocol Macro

Data communications with peripheral devices using PMCR instructions.

■ 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. The Communications Boards (COM04-E, COM05-E, and COM06-E) and the Protocol Support Software are equipped with seven standard communications sequences for OMRON's peripheral devices. These communications sequences make it possible to exchange data with the peripheral devices by using ladder diagrams only.
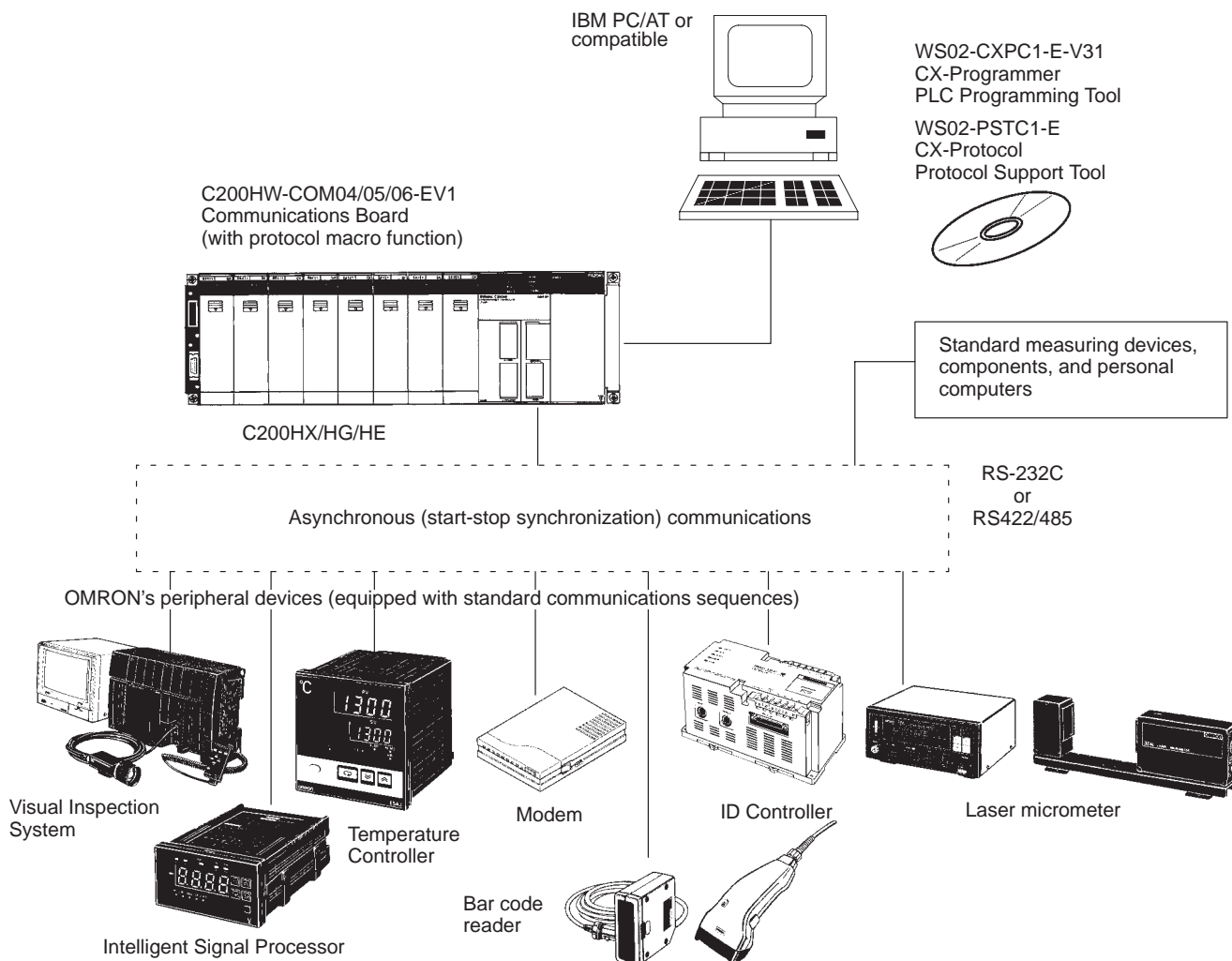
Note: Discontinuation models are contained.

■ 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 Tool (purchased separately).

1. Temperature Controller Sequence
    E5□J, E5□K, ES100□, and E5ZE

2. Intelligent Signal Processor Sequence
    K3TH, K3TR, K3TX, and K3TC

3. Bar Code Reader Sequence
    V500 and V520

4. Laser Micrometer Sequence
    3Z4L

5. Visual Inspection System Sequence
    F200, F300, and F350

6. ID Controller Sequence
    V600, V620

7. Hayes AT Command (Modem) Sequence
    ME 1414BZ, MD 24FB10V, and MD 144FB5V

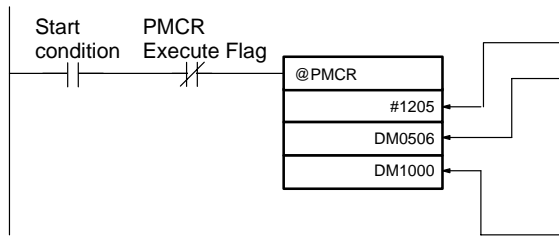20

■ E5AJ Temperature Controller Connection Example

Connections

Communications Board (with protocol macro function)
C200HW-COM06-EV1

C200HW-COM06-EV1
C200HX/HG/HE

Port A
(RS-422/485)

RS-422

#0   #1   #2   #3

E5AJ-A2H02 E5AJ-A2H02 E5AJ-A2H02 E5AJ-A2H02
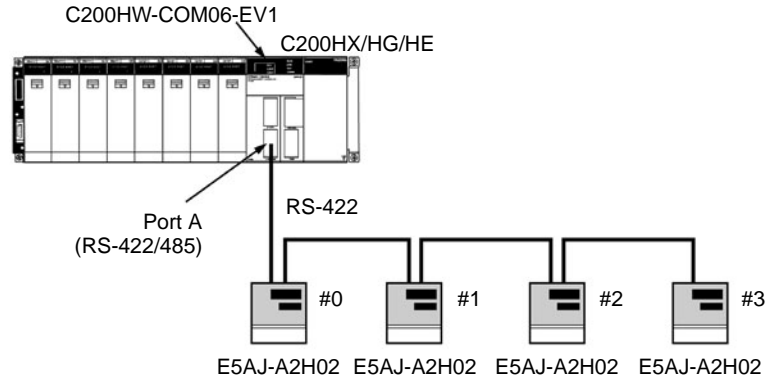
Program Example

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

Start condition   PMCR Execute Flag

@PMCR

#1205

DM0506

DM1000

Port A specification with communications sequence 205

Setting Units and Values

DM word	Set data	Meaning
DM 0506	0003	No. of words for transmission data
DM 0507	0003	Unit No.
DM 0508	0085	Target value (85°C)

End Code:
This communications sequence is set to any word because there is no reception data for the communications sequence.

■ Examples of Sequences Available

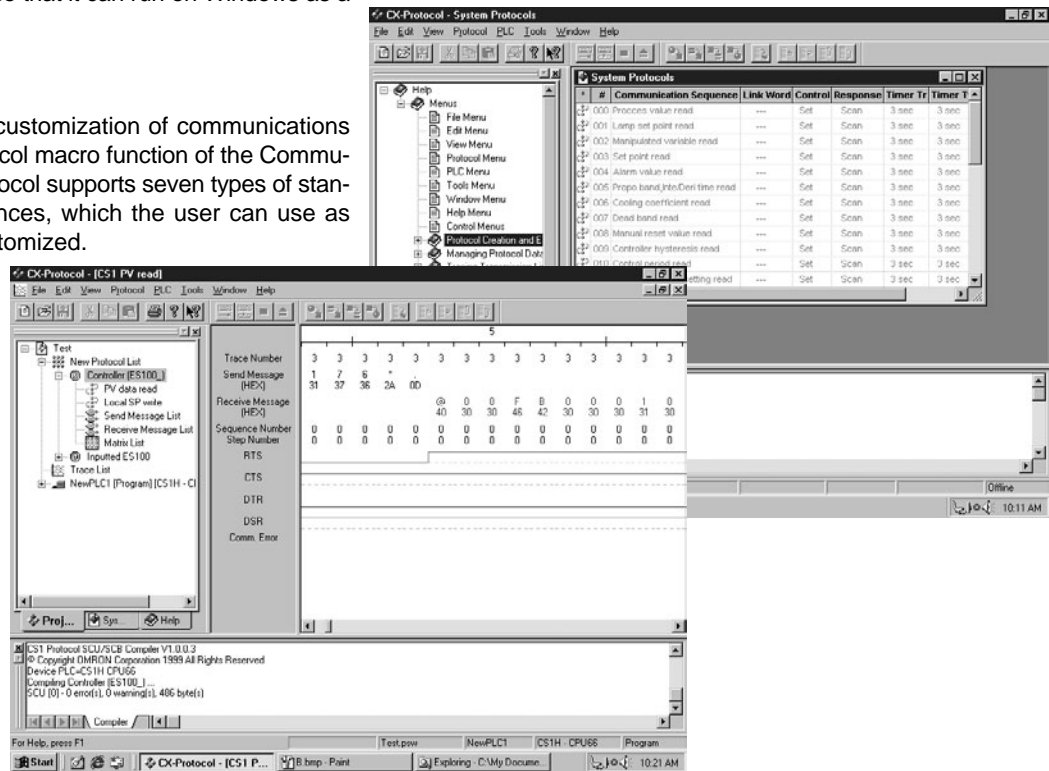| Sequence number	Communications sequence name	Function
200	Remote mode select	Sets the Unit to remote mode.
201	Local mode select	Sets the Unit to local mode.
202	Backup mode select	Changes target value write mode into backup mode.
203	RAM write mode select	Changes target value write mode into RAM write 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.

Protocol Support Tool

Protocol macro communications sequences can be customized by users.

■ Windows-version CX-Protocol Protocol Support Tool

The conventional DOS-version Protocol Support Software has been completely redesigned so that it can run on Windows as a user-friendlier interface.

■ Summary

The CX-Protocol allows the customization of communications sequences by using the protocol macro function of the Communications Board. The CX-Protocol supports seven types of standard communications sequences, which the user can use as they are or after they are customized.

■ Features

- The conversational-type menu of the CX-Protocol allows communications sequences to be registered with ease.

- Each of the registered communications sequences can include data for the transmission control parameter, link word, monitor time, and response type to be used with the registered communications sequence.

- Each of the steps can include data for the retry count, communications command, communications message, receive matrix, next process to be executed, and error process to be executed if the step has an execution error.

- Any destination address or communications data set with the CX-Protocol can include variable N, wildcard, and word call settings. Therefore, a message can be transmitted to more than one address continuously or the list data stored in any word can be transmitted continuously.

- The CX-Protocol automatically allows transmission of any communications message with an error check code, such as SUM, SUM2, LRC, CRC, or CRC-16, and data for the length of the communications message.

- The process can be defined with an END, GOTO, NEXT, or ABORT that is executed right after each step is executed with or without any error.

■ Improved Protocol Macro Function

The following new items have been added to the conventional protocol macro function. These items are, however, available to the C200HW-COM0□-V1 Communications Board only.
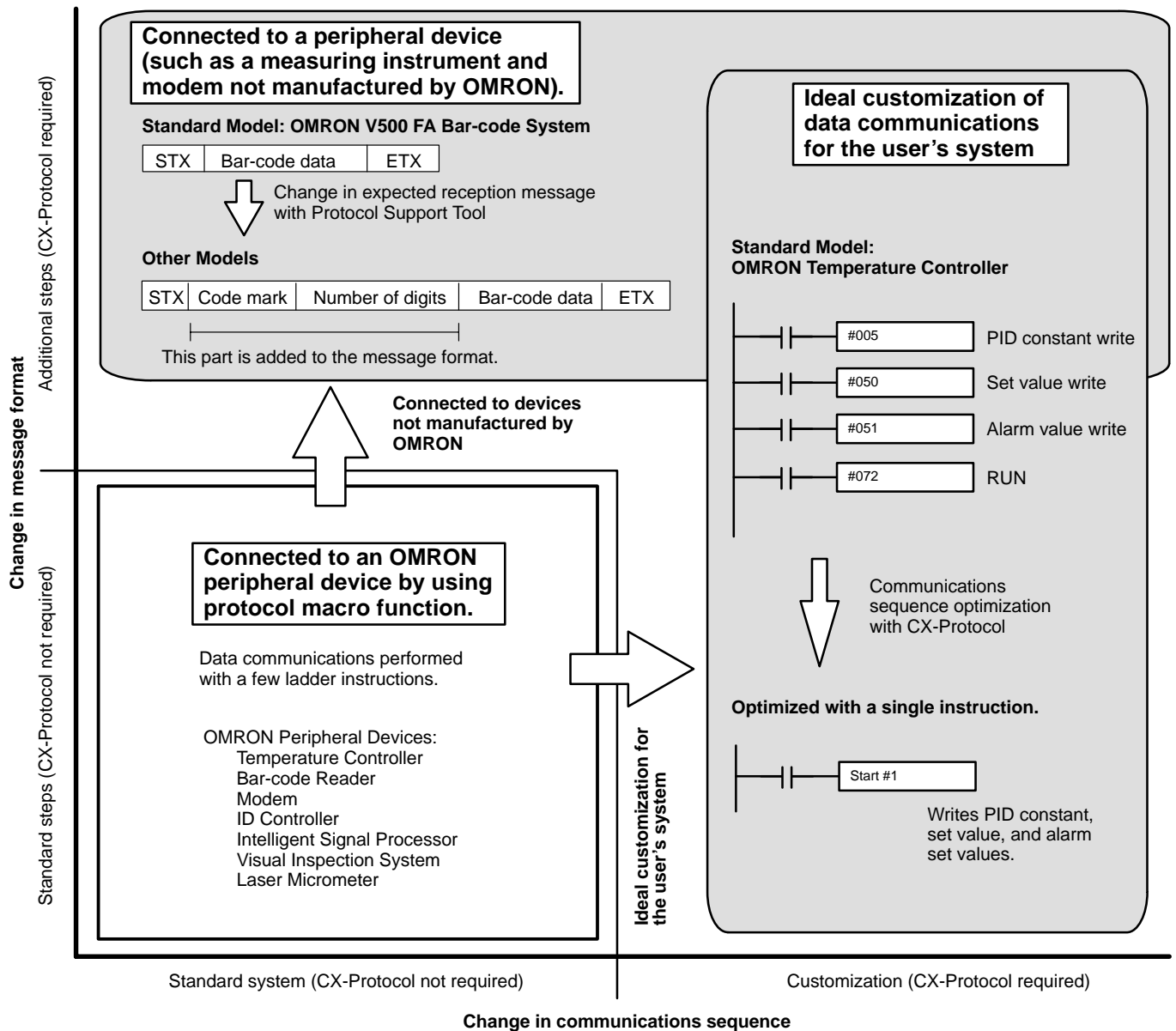
- SUM2 (2's complement of SUM) and CRC-16 are added as error check codes.

- 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.

■ Data Compatibility

Programs created using SYSMAC-PST or PPS (DOS version) can be imported and edited using the CX-Protocol enabling the utilization of existing resources.

22

# Protocol Support Tool

■ Customization in Detail

Connected to a peripheral device (such as a measuring instrument and modem not manufactured by OMRON).

Standard Model: OMRON V500 FA Bar-code System

STX	Bar-code data	ETX

Change in expected reception message with Protocol Support Tool

Other Models

STX	Code mark	Number of digits	Bar-code data	ETX

This part is added to the message format.

Connected to devices not manufactured by OMRON

Ideal customization of data communications for the user's system

Standard Model: OMRON Temperature Controller

	#005	PID constant write
	#050	Set value write
	#051	Alarm value write
	#072	RUN

Communications sequence optimization with CX-Protocol

Optimized with a single instruction.

	Start #1

Writes PID constant, set value, and alarm set values.

Connected to an OMRON peripheral device by using protocol macro function.

Data communications performed with a few ladder instructions.

OMRON Peripheral Devices:
    Temperature Controller
    Bar-code Reader
    Modem
    ID Controller
    Intelligent Signal Processor
    Visual Inspection System
    Laser Micrometer

Ideal customization for the user's system

Change in message format

Additional steps (CX-Protocol required)

Standard steps (CX-Protocol not required)

Standard system (CX-Protocol not required)

Customization (CX-Protocol required)

Change in communications sequence

Protocol Support Tool

■ Communications Sequences

The CX-Protocol allows up to 1,000 communications sequences to be registered, each of which consists of up to 16 steps.

System Configuration

Ladder Program   **Communications Sequence**
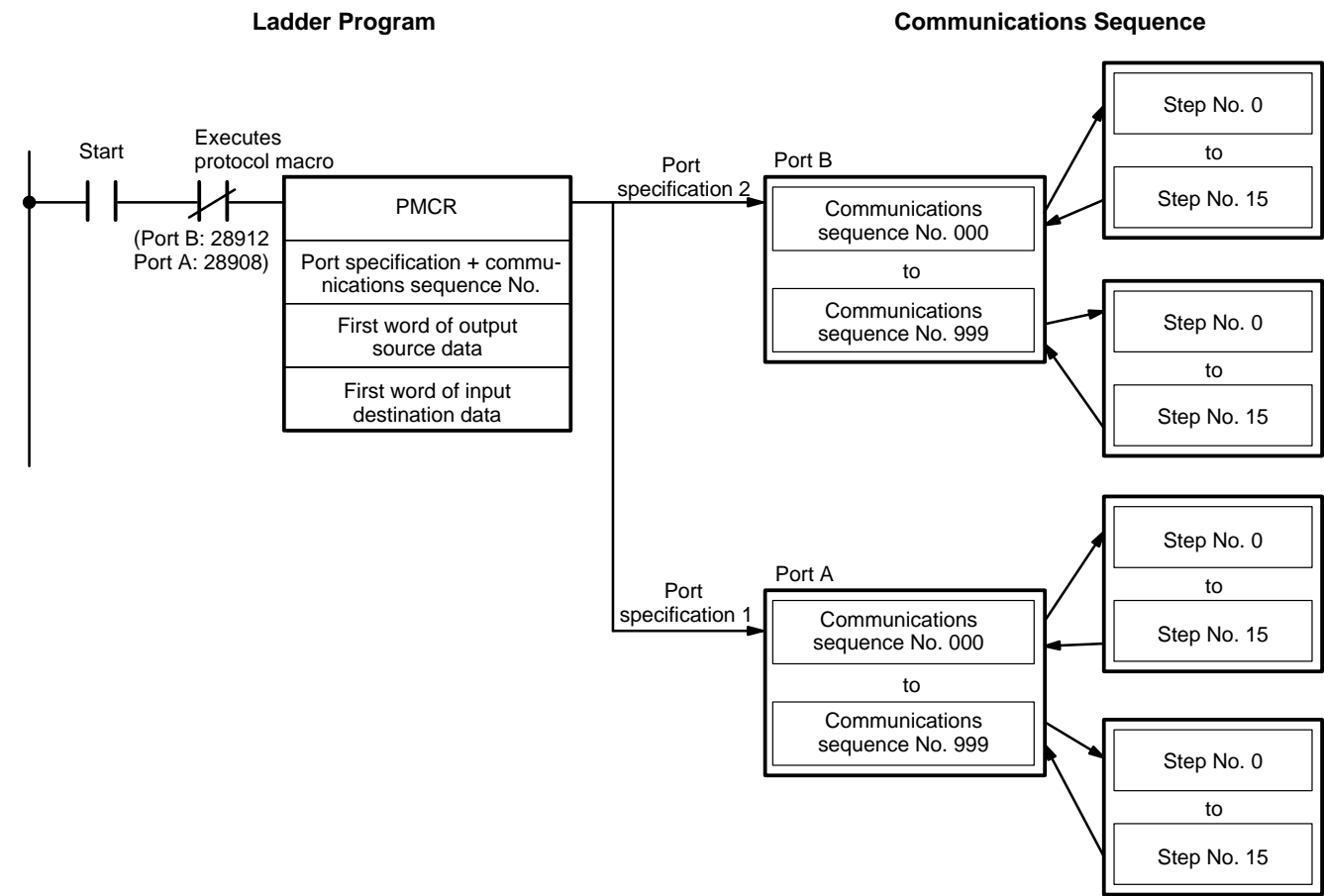
Functions

■ Comparison of Functions

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

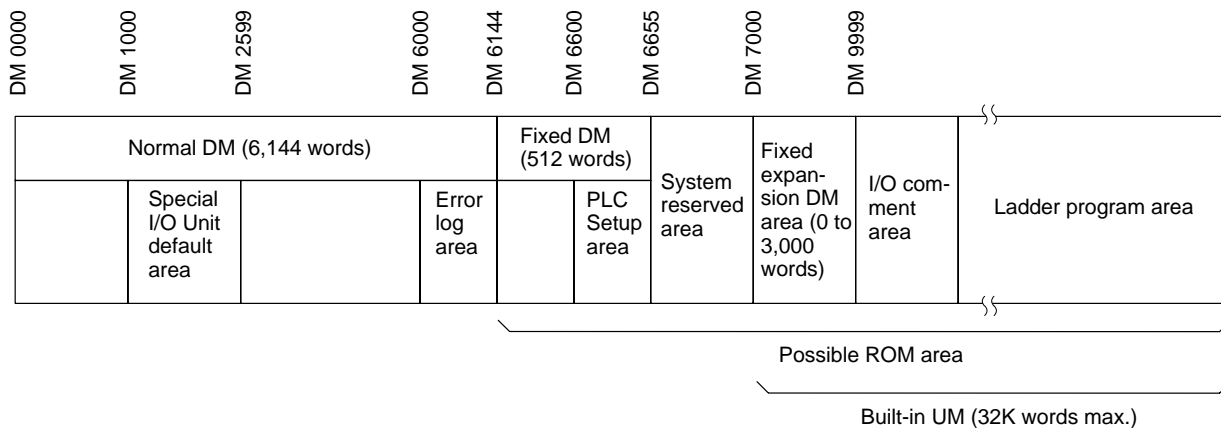|	Function	C200HX/HG/HE	C200HS	C200H
Memory	UM	3.2K words (C200HE-CPU11-(Z)E) 7.2K words (C200HE-CPU☐2-(Z)E) 15.2K words (C200HG-CPU☐3-(Z)E) 31.2K words (C200HX-CPU☐4-(Z)E) 63.2K words (C200HX-CPU65-ZE/CPU85-ZE)	15.2K words	3.2K words/7.2K words
	Normal DM	6,144 words (DM 0000 to DM 6143) (DM 4000 to DM 5999 do not exist in the C200HE-CPU11-E)	6,144 words (DM 0000 to DM 6143)	1,000 words (DM 0000 to DM 0999)
	Fixed DM	512 words (DM 6144 to DM 6655)	512 words (DM 6144 to DM 6655)	1,000 words (DM 1000 to DM 1999)
	Fixed Expansion DM	0 to 3,000 words (DM 7000 to DM 9999)	0 to 3,000 words (DM 7000 to DM 9999)	None
	EM	6,144 words (EM 0000 to EM 6143) C200HE: No EM C200HG: 6,144 words x 1 bank C200HX-CPU34/44/54/64: 6,144 words x 3 banks C200HX-CPU65-ZE: 6,144 word x 8 banks C200HX-CPU85-ZE: 6,144 words x 16 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 Units	0 to 9 and A to F Units per PLC C200HE-CPU11-E: No Group-2 Units connected C200HE-CPU☐2-E, C200HG/HX-CPU-3☐-E/CPU4☐-E: 0 to 9 Units per PLC	0 to 9 Units per PLC	0 to 9 Units per PLC
	Special I/O Units	0 to 9 and A to F Units per PLC C200HE-CPU☐☐-E, C200HG/HX-CPU-3☐-E/CPU4☐-E: 0 to 9 Units per PLC	0 to 9 Units per PLC	0 to 9 Units 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 Unit	RS-232C port	C200HX/HG/HE-CPU4☐-E/6☐-E/85(-Z)-E	C200HS-CPU2☐-E/3☐-E	None
	Clock function	All models except the C200HE-CPU11-E.	All models	Incorporated by the Memory Unit
	SYSMAC LINK, Controller Link connection	C200HW-COM01 and C200HW-COM04-EV1 Communications Boards available for connection with all models except the C200HE-CPU11-E.	C200HS-CPU3☐-E	C200H-CPU11-E/31-E
Communications Board		The Communications Board can be mounted to all CPU Units except the C200HE-CPU11-E. The following are possible with the Communications Board: Use of the SYSMAC LINK Unit expansion of up to 2 communications ports, and use of a protocol macro function (C200HW-COM04/05/06-EV1 only)	None	None
Interrupts	Interrupt Input Units	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 Unit: 10 ms	---
PT		1:1 NT Link 1:N NT Link (Up to 8 Units can be connected to a PT via RS-422/485 Convertor Units (NT-AL001) connected to the RS-232C ports.)	1:1 NT Link	None
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.	---

Note: Discontinuation models are contained.

Functions

■ UM Area

The C200HX, C200HG, and C200HE have an 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) or Programming Console. Only the SSS can, however, 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

Built-in UM (32K words max.)

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 as is the case with conventional ones.
Fixed expansion DM area	The default values of the Special I/O Unit, 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 Unit is used, DM 1000 to DM 2599 will be a Special I/O Unit 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 Unit 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.

I/O Units

◼ Input Unit Specifications

Name	Model	No. of inputs	Input voltage	Input current	Operating voltages		Input response times		Isolation	Indica-tor	External connec-tions	Inputs per com-mon	Internal current con-sump-tion
					ON	OFF	ON	OFF					
AC Input	C200H-IA121	8 pts.	100 to 120 VAC +10%/–15%	10 mA, 100 VAC	60 VAC min.	20 VAC max.	35 ms max.	55 ms max.	Photo-coupler	LED	Remove-able termi-nal blocks	8 pts.	10 mA max. (5 VDC)
	C200H-IA122(V)	16 pts.										16 pts.	
	C200H-IA221	8 pts.	200 to 240 VAC +10%/–15%	10 mA, 200 VAC	120 VAC min.	40 VAC max.		55 ms max.				8 pts.	
	C200H-IA222(V)	16 pts.										16 pts.	
DC Input	C200H-ID211	8 pts.	12 to 24 VDC +10%/–15%	10 mA, 24 VDC	10.2 VDC min.	3.0 VDC max.	1.5 ms max.	1.5 ms max.				8 pts.	
	C200H-ID212	16 pts.	24 VDC +10%/–15%	7 mA, 24 VDC	14.4 VDC min.	5.0 VDC max.						16 pts.	
AC/DC Input	C200H-IM211	8 pts.	12 to 24 VAC/DC +10%/–15%	10 mA, 24 VDC	10.2 VDC min.	3.0 VDC max.	15 ms max.	15 ms max.				8 pts.	
	C200H-IM212	16 pts.	24 VAC/DC +10%/–15%	7 mA, 24 VAC/DC	14.4 VDC min.	5.0 VDC max.						16 pts.	

Circuit Configuration

AC Input: IA121, IA122(V), IA221, IA222(V)

	R₁	C	R₂	V (AC)
IA121, IA122:	330 kΩ	0.33 µF	470 Ω	100 to 120
IA221:	680 kΩ	0.15 µF	820 Ω	200 to 240
IA222 (V):	680 kΩ	0.15 µF	680 Ω	200 to 240

DC Input: ID211, ID212

	R	V (DC)
ID211:	2 kΩ	12 to 24
ID212:	3 kΩ	24

AC/DC Input: IM211, IM212

	R	V
IM211:	2 kΩ	12 to 24 VAC/DC
IM212:	3 kΩ	24 VAC/DC

27
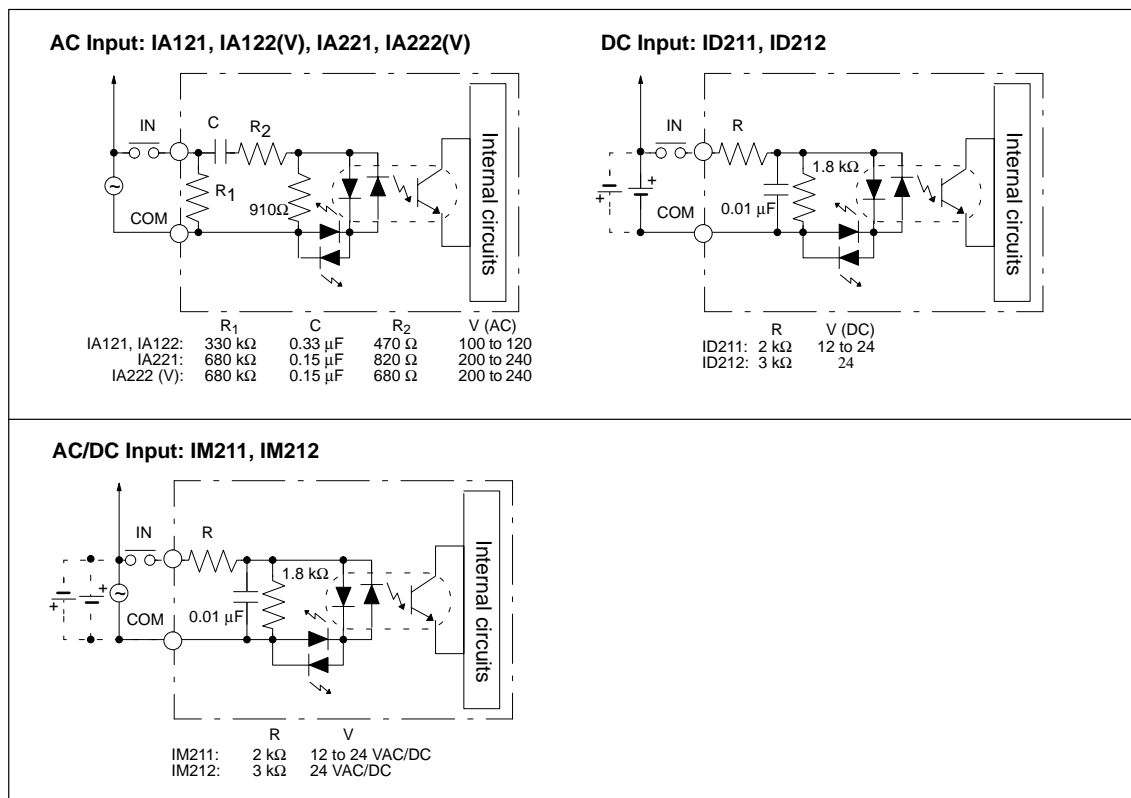
I/O Units

■ Output Unit Specifications

Name	Model	No. of outputs	Max. switching capacity	Min. switching capacity	Output response times		Indicator	External connection	Leakage current	Outputs per common	Fuse	External power supply	Internal power consumption (5 VDC)
					ON	OFF							
Relay Output	C200H-OC221	8 pts.	250 VAC/2 A (cos φ = 1) 250 VAC/2 A (cos φ = 0.4) 24 VDC/2 A (8 A/Unit)	10 mA, 5 VDC	10 ms max.	10 ms max.	LED	Removeable terminal blocks	---	8 pts.	---	---	10 mA max.
	C200H-OC222 (see note)	12 pts.								12 pts.			
	C200H-OC222N (see note)	12 pts.			15 ms max.	15 ms max.							8 mA max.
	C200H-OC225 (see note)	16 pts.			10 ms max.	10 ms max.				16 pts.			50 mA max.
	C200H-OC226N (see note)				15 ms max.	15 ms max.							30 mA max.
	C200H-OC223	5 pts.	250 VAC/2 A (cos φ = 1) 250 VAC/2 A (cos φ = 0.4) 24 VDC/2 A (10 A/Unit)		10 ms max.	10 ms max.				1 pt.			10 mA max.
	C200H-OC224	8 pts.	250 VAC/2 A (cos φ = 1) 250 VAC/2 A (cos φ = 0.4) 24 VDC/2 A (16 A/Unit)										
	C200H-OC224V				15 ms max.	15 ms max.				8 pts.			
Triac Output	C200H-OA222V	12 pts.	250 VAC, 0.3 A, 50/60 Hz (2 A/Unit)	Resistive load: 10 mA; inductive load: 40 mA (10 VAC)	1/2 of load frequency max.	1/2 of load frequency max.			3 mA max., 100 VAC; 6 mA max., 200 VAC	12 pts.	3 A		200 mA max.
	C200H-OA223	8 pts.	250 VAC, 1.2 A, 50/60 Hz (4 A/Unit)	Resistive load: 100 mA; inductive load: 50 mA (10 VAC)	1 ms max.					8 pts.	5 A		180 mA max.
	C200H-OA224	12 pts.	250 VAC, 0.5 A, 50/60 Hz (2 A/Unit)	100 mA, 10 VAC; 50 mA, 24 VAC; 10 mA, 100 VAC		1/2 + 1 ms of load frequency max.			1.5 mA max., 120 VAC; 3 mA max., 240 VAC	12 pts.	3.15 A		270 mA max.
Transistor Output	C200H-OD411	8 pts.	12 to 48 VDC +10%/–15%, 1 A (3 A/Unit), 24 VDC +10%/–15%	Residual voltage: 1.4 V max.	0.2 ms max.	0.3 ms max.			0.1 mA max.	8 pts.	5 A	30 mA, 12 to 48 VDC min.	140 mA max.
	C200H-OD213		2.1 A (5.2 A/Unit), 24 VDC +10%/–15%								8 A	30 mA, 24 VDC min.	
	C200H-OD214		0.8 A (2.4 A/Unit)	Residual voltage: 1.5 V max.	1 ms max.	1 ms max.			1 mA max.		None	150 mA, 24 VDC min.	
	C200H-OD216		5 to 24 VDC, 0.3 A	10 mA, 5 VDC	1.5 ms max.	2 ms max.			0.1 mA max.			5 to 24 VDC	10 mA max.
	C200H-OD211	12 pts.	24 VDC +10%/–15%, 0.3 A (2 A/Unit)	Residual voltage: 1.4 V max.	0.2 ms max.	0.3 ms max.				12 pts.	5 A	25 mA, 24 VDC min.	160 mA max.
	C200H-OD212	16 pts.	24 VDC +10%/–15%, 0.3 A (4.8 A/Unit)							16 pts.	8 A	35 mA, 24 VDC min.	180 mA max.
	C200H-OD217	12 pts.	5 to 24 VDC, 0.3 A	10 mA, 5 VDC	1.5 ms max.	2 ms max.				12 pts.	None	5 to 24 VDC	10 mA max.
	C200H-OD21A	16 pts.	24 VDC +10%/–15%, 1.0 A (4 A/Unit)	Residual voltage: 0.8 V max.	0.1 ms max.	0.3 ms max.				16 pts.		35 mA, 24 VDC min.	160 mA max.

Note: 1. Do not exceed the load current of 8 A per common. No more than 8 outputs can be turned ON simultaneously.
2. Discontinuation models are contained.

28

Circuit Configuration

**Relay Output:
OC221, OC222, OC225**
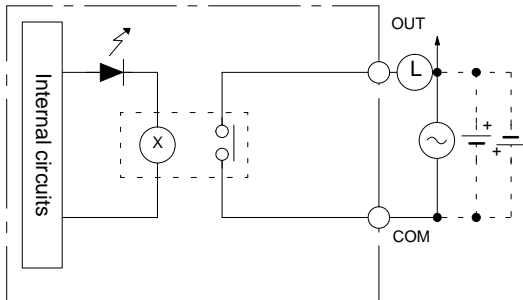
Use either + or – VDC

Triac Output: OA222V
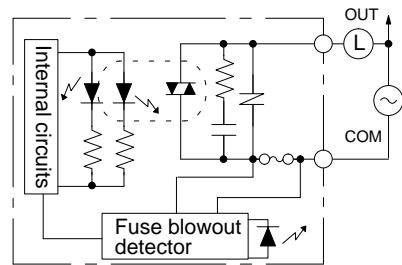
OA222V: no fuse blowout detector

Triac Output: OA223, OA224
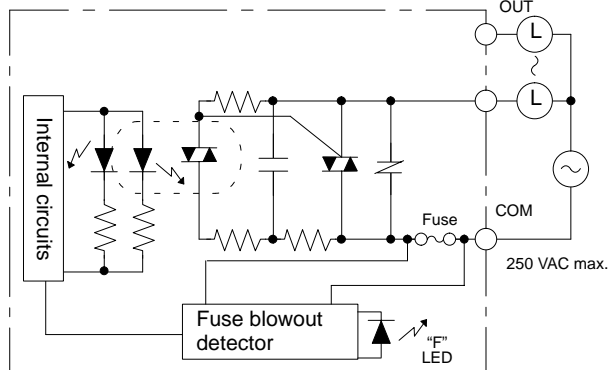
OA224: no fuse blowout detector

Transistor Output: OD411, OD211, OD212, OD213
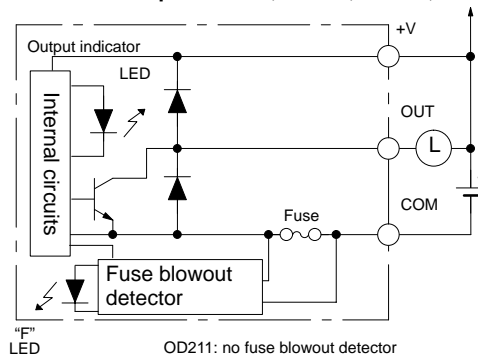
OD211: no fuse blowout detector

Transistor Output (Source Type): OD214
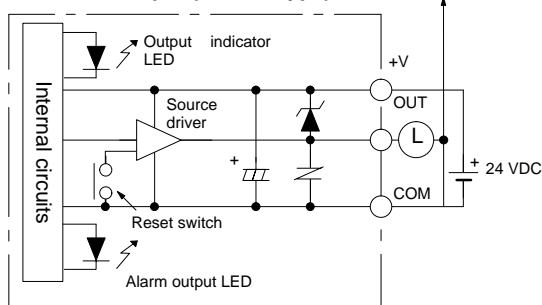
**Transistor Output (Protective Circuit for Load
Short-circuit): OD216, OD217**
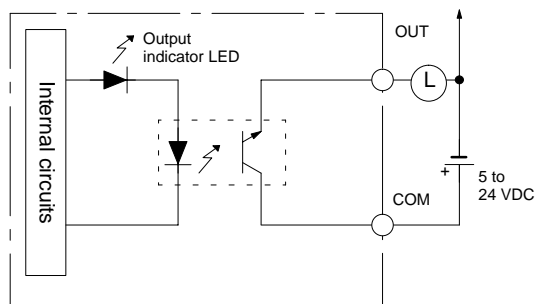
**Transistor Output (Source Type with Protective
Circuit for Load Short-circuit): OD21A**
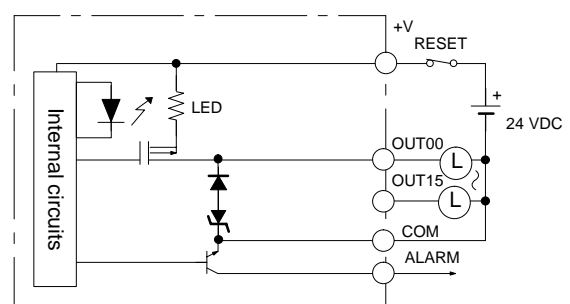
I/O Units

**Relay Independent Output:
OC223, OC224, OC224N**

Internal circuits

Output indicator LED

OUT

COM
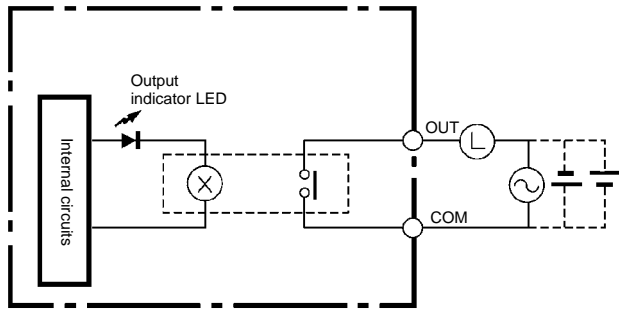
Relay Output: OC222N, OC226N

Internal circuits

Output indicator LED

OUT

OUT

COM
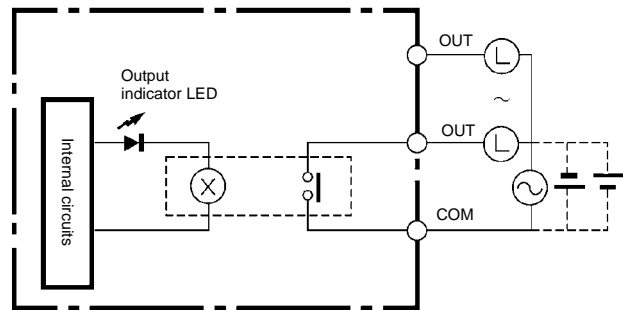
Note: Fuse blowout detection circuit:
The F indicator is lit and the 08 bit turns ON. The 08 to 15 bits cannot be used as ordinary IR bits.

■ High-density Input Unit Specifications (Special I/O Units)

Name	Model	No. of inputs	Input voltage	Input current	Operating voltages		Input response times		Isolation	Indicator	External connections	Inputs per common	Internal current consumption
					ON	OFF	ON	OFF					
DC Input	C200H-ID215	32 pts.	24 VDC+10%/–15%	4.1 mA, 24 VDC	14.4 VDC min.	5.0 VDC max.	2.5/15 ms (selectable)	2.5/15 ms (selectable)	Photo-coupler	LED	Connector	8 pts. (4 circuits)	130 mA max. (5 VDC)
TTL Input	C200H-ID501		5 VDC ±10%	3.5 mA, 5 VDC	3.0 VDC min.	1.0 VDC max.							

Note: 1. High-density I/O Units are equipped with quick-response functions and are treated as Special I/O Units. When mounting these models to a SYSMAC BUS Slave, the Remote I/O Master must be the C200H-RM001-PV1 or C200H-RM201.
2. Discontinuation models are contained.

Circuit Configuration
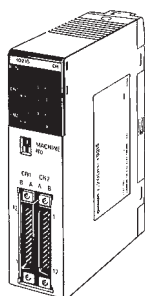
C200H-ID215
(DC input)
C200H-ID501
(TTL input)

DC Input: ID215

TTL Input: ID501

Connect to either + or – terminal on DC power supply.
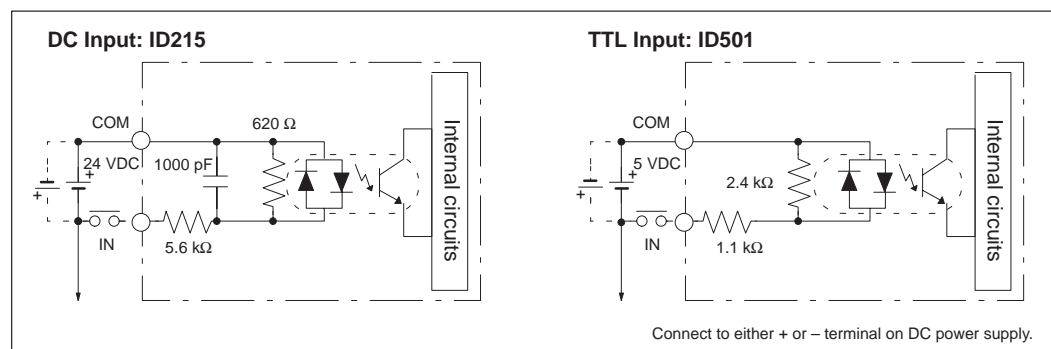
■ Quick-response Inputs: C200H-ID215/ID501/MD501/MD215/MD115

The quick-response input function allows High-density I/O Units and Mixed I/O Units to dependably read short-pulse input signals, such as those from photomicrosensors.

Photomicroswitch or other input device with short input pulse

C200HX/HG/HE
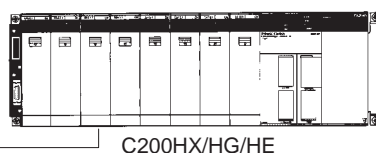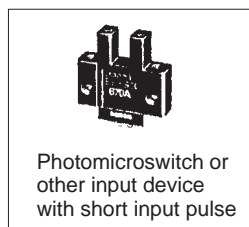
The quick-response input function is available on input points number 08 to 15 on CN2.
The C200H-MD215, C200H-MD501, and C200H-MD115 must be in the static mode setting to use the quick-response input function.

Quick-response Input Operation and Timing

With standard I/O Units, an input must be ON during the I/O refresh period for it to be read into the PLC. Input signals shorter than the cycle time can thus be missed unless they happen to occur during the I/O refresh. With the High-density and Mixed I/O Units listed above, however, a quick-response input buffer is used to hold input signals as short as 1 ms or 4 ms (selectable) so that they can be read into the IR area during the next I/O refresh. Any pulse that is equal to or longer than the minimum time setting thus affects the program during the next program execution.

I/O Refresh Instruction

The I/O REFRESH instruction, IORF(97), can be used with the quick-response input function to read the input status held in the quick-response input buffer whenever needed in a program.

When 00000 is ON, all words from St to E will be refreshed.

St and E would be 101 for Unit #0, making bits IR 10108 to IR 10115 quick-response input bits.

Machine Number Setting and Input Bit No.

When set to machine No. n (0 to 9), words [100+10n+1] can be used as input bits. Input bits 08 to 15 of word 1n1 can be used as quick-response inputs.

Example: When set to 8, input bits 18108 to 18115 become quick-response inputs.

Machine No. setting switch

I/O Units

■ High-density Output Unit Specifications (Special I/O Units)

Name	Model	No. of out-puts	Rated load voltage	Max. load current	Output response times		Indi-ca-tor	External connec-tion	Residual voltage	Leak-age current	Out-puts per com-mon	Fuse	External power supply	Internal power con-sump-tion
					ON	OFF								(5 VDC)
Tran-sistor Output	C200H-OD215	32 pts.	5 to 24 VDC +10%/−15%	16 mA at 4.5 V to 100 mA at 26.4 V/pt. 800 mA/8 pts. 3.2 A/32 pts.	0.2 ms max.	0.6 ms max.	LED	Connector	0.7 V max.	0.1 mA max.	8 pts.	Replace-ment not required.	90 mA, 5 to 24 VDC min.	220 mA max.
TTL Output	C200H-OD501		5 VDC ±10%	35 mA/pt. 280 mA/8 pts. 1.12 A/32 pts.		0.3 ms max.			0.4 V max.				39 mA, 5 VDC min.	

Note: 1. These High-density I/O Units are treated as Special I/O Units. They can also be used as 128-point (64 points in 2 circuits) Dynamic Output Units. When mounting these models to a Slave Rack, the Remote I/O Master must be the C200H-RM001-PV1 or C200H-RM201.
2. Discontinuation models are contained.
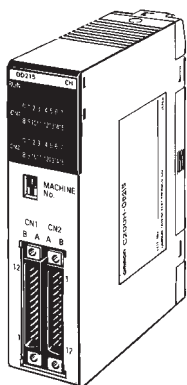
C200H-OD215
(32 transistor output pts.)

C200H-OD501
(32 TTL output pts.)

Circuit Configuration

Transistor Output: OD215/TTL Output: OD501

	R1	V
OD501:	4.7 kΩ	5 VDC
OD215:	None	5 to 24 VDC
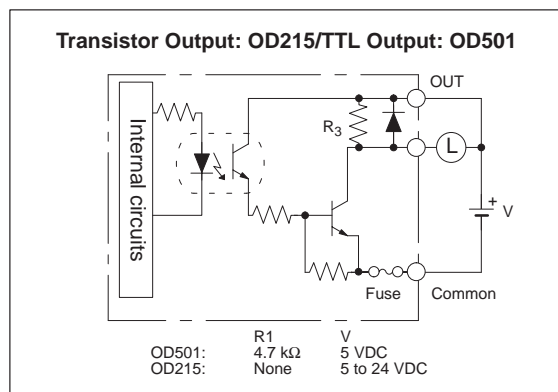
■ Dynamic Output Mode

The High-density I/O Units shown can be used for 128-point dynamic output, greatly reducing wiring requirements to multidigit output devices.
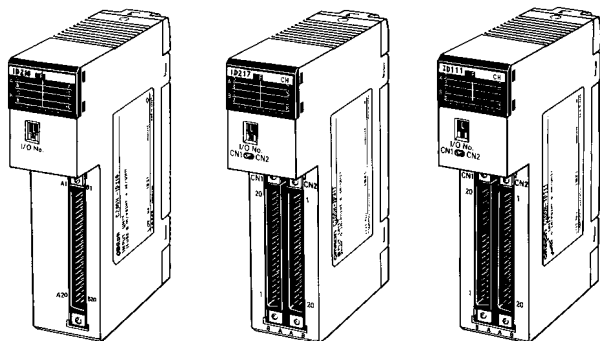
Dynamic Output Mode Operation and Timing

With dynamic outputs, data signals DATA0 to DATA15 are combined with strobe signals STB0 to STB15 to reduce wiring and greatly increase output capacity. The output device must be able to receive dynamic signals.

Position Control Unit
C200H-NC111/NC112

G79-□C
Connecting Cable
(1-to-1)

C200HX/HG/HE

Servodriver   Servomotor

M7F
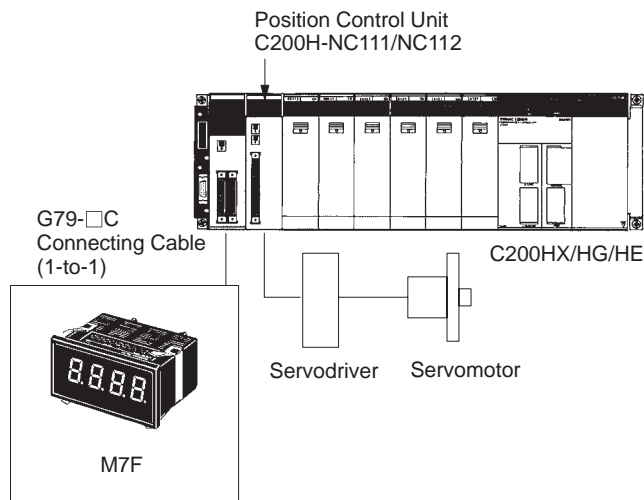
■ Mixed I/O Unit Specifications (Special I/O Unit Group)

Name		TTL Input/Output Unit	DC Input/Transistor Output Unit	
Model		C200H-MD501	C200H-MD215	C200H-MD115
Inputs	No. of inputs	16 pts		
	Input voltage and current	5 VDC ±10%, 3.5 mA (5 VDC)	24 VDC +10%–15%, 4.1 mA (24 VDC)	12 VDC +10%–15%, 4.1 mA typical (12 VDC)
	Operating voltages	ON: 3.0 V min., OFF: 1.0 V max.	ON: 14.4 V min., OFF: 5.0 V max.	ON: 8.0 V min., OFF: 3.0 V max.
	Input response times	ON/OFF: 2.5 ms/15 ms (selectable)		
	Isolations	Photocoupler		
	Inputs per common	8 pts		
Outputs	No. of outputs	16 pts		
	Max. switching capacity	5 VDC±10%, 35 mA, output resistance 4.7 kΩ 280 mA/common, 560 mA/Unit	16 mA/4.5 V to 100 mA/26.4 V 800 mA/common, 1.6 A/Unit	12 VDC +10%/–15%/50 mA 400 mA/common, 0.8 A/Unit
	Min. switching capacity	---	---	---
	Residual voltage	0.4 V max.	0.7 V max.	
	Output response times	ON: 0.2 ms max., OFF: 0.3 ms max.	ON: 0.2 ms max., OFF: 0.6 ms max.	
	Leakage current	0.1 mA max.		
	Outputs per common	8 pts		
	Fuse	One per circuit, two in total (replacement not possible)		
External connection		Connector		
Internal current consumption (5 VDC)		180 mA max.		

Note: 1. These Mixed I/O Units are treated as Special I/O Units. They can also be used as 128-point (64 points in each of 2 circuits) Dynamic Input Units.

2. When mounting any of the above models to a Slave Rack, the Remote I/O Master must be the C200H-RM001-PV1 or C200H-RM201.

3. Discontinuation models are contained.
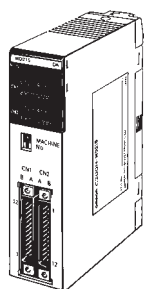
C200H-MD215/MD115
(16 DC input/16 transistor output pts.)

C200H-MD501
(16 TTL input/16 TTL output pts.)

Circuit Configuration

MD501/MD215/MD115

	R₁	R₂	R₃	C	V₁	V₂
MD501	4.7 kΩ	1.1 kΩ	2.4 kΩ	None	5 VDC	5 VDC
MD215	None	5.6 kΩ	620 Ω	1000 pF	5 to 24 VDC	24 VDC
MD115	None	2.7 kΩ	620 Ω	1000 pF	5 to 24 VDC	12 VDC
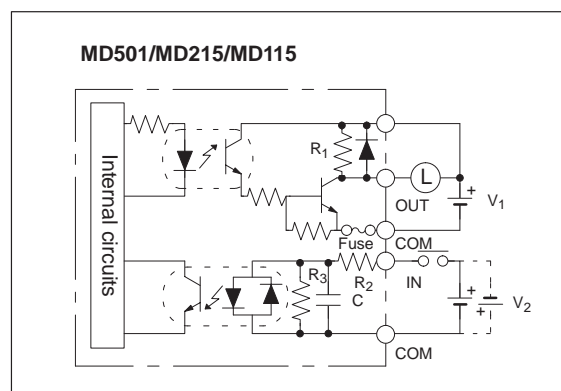
■ Dynamic Input Mode

The Mixed I/O Units shown can be used for 128-point dynamic input. Wiring input signals for up to 32 digits means that inputs to the PLC are possible from keyboards, from multidigit digital switches, etc.

Keyboard

Thumbwheel switch

C200HX/HG/HE

I/O Units

Dynamic Input Mode Operation and Timing

With dynamic inputs, data signals DATA0 to DATA15 are combined with strobe signals STB0 to STB15 to reduce wiring and greatly increase input capacity. For example, when STB0 is ON, as shown to the right, data would be read from DATA0 to DATA3, and the status of switches A through D would be reflected in bits 00 through 03 of word 1n0, where n is the Special I/O Unit's unit number.

STB0
(CN1 A1)

D   C   B   A

DATA0 (CN2 A1)
DATA1 (CN2 A2)
DATA2 (CN2 A3)
DATA3 (CN2 A4)

	15 14 13 12 11 10 09 08	07 06 05 04 03 02 01 00
Wd 1n0		D C B A
Wd 1n1		
Wd 1n2		
to		
Wd 1n7		
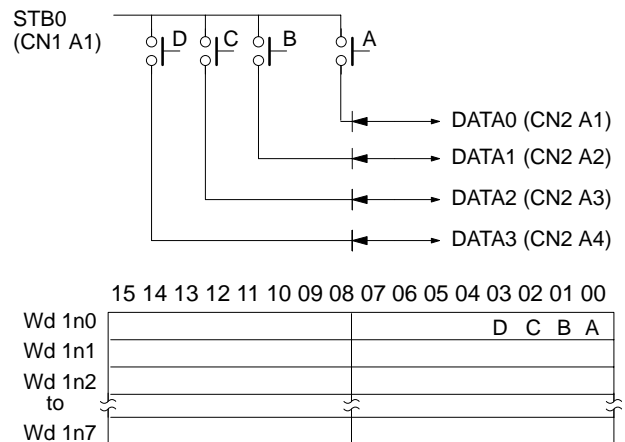
■ High-density Input Unit Specifications (Group-2)

C200H-ID216/218
(32 DC input pts.)

C200H-ID217/219
(64 DC input pts.)

C200H-ID111
(64 DC input pts.)

The C200H-ID216/217/218/219 High-density Input Unit reduces wiring by connecting I/O Terminals.

Item	C200H-ID216	C200H-ID218	C200H-ID217	C200H-ID219	C200H-ID111
Number of inputs	32 points		64 points		
Rated input voltage	24 VDC $^{+10\%}/_{-15\%}$				12 VDC $^{+10\%}/_{-15\%}$
Input current	4.1 mA typical at 24 VDC	6 mA typical at 24 VDC	4.1 mA typical at 24 VDC	6 mA typical at 24 VDC	4.1 mA typical at 12 VDC
Input impedance	5.6 kΩ	3.9 kΩ	5.6 kΩ	3.9 kΩ	2.7 kΩ
ON voltage	14.4 VDC min.	15.4 VDC min.	14.4 VDC min.	15.4 VDC min.	8.0 VDC min.
OFF voltage	5.0 VDC max.				3.0 VDC max.
Input ON delay	1.0 ms max.				
Input OFF delay	1.0 ms max.				
Isolation	Photocoupler				
Input indicator	LED				
External connections	Connector				
Number of circuits (see note)	32 points with one common		64 points with two commons		
Internal power consumption	100 mA max. at 5 VDC		120 mA max. at 5 VDC		
Weight	180 g max.		250 g max.		

Note: The ambient temperature affects the number of points that can be ON simultaneously. The C200H-ID111 is not affected.

I/O Units

Circuit Configuration

ID216
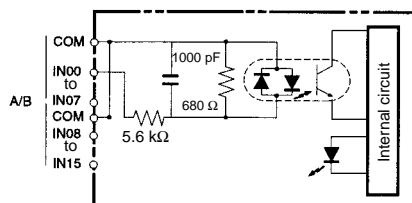
ID217
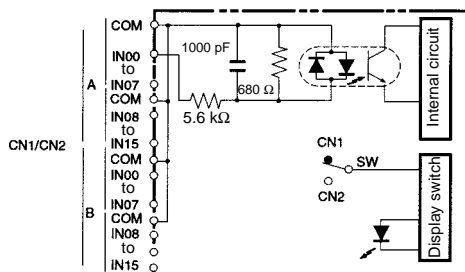
ID218
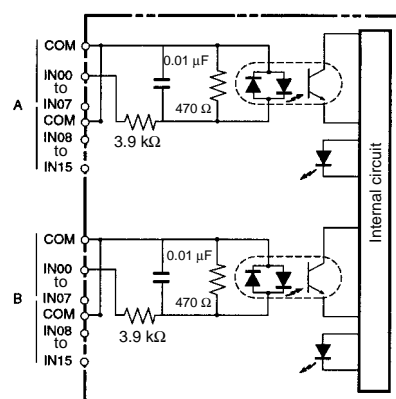
ID111
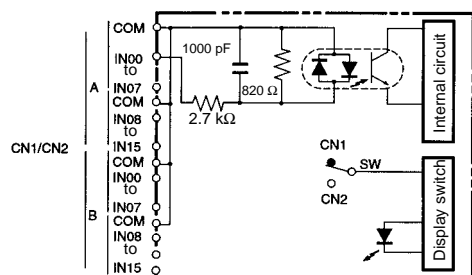
ID219
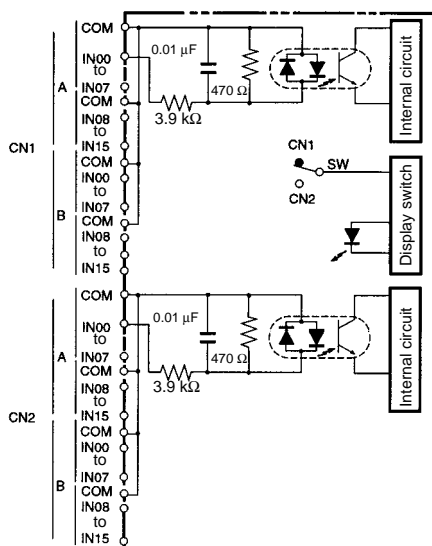
Note: 1. The polarity of the input power supply source can be positive or negative provided that the polarity of each common is the same.

2. Although each COM is internally connected, wire them all.

3. The mountable number of High-density I/O Units varies with the CPU Unit. No High-density I/O Unit can be mounted to the Slave Rack.

■ High-density Output Unit Specifications (Group 2)
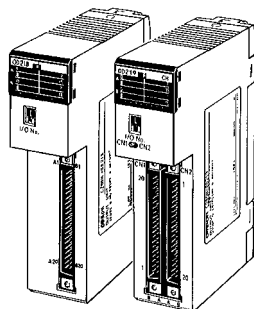
C200H-OD218/21B
(32 DC output pts.)

C200H-OD219
(64 DC output pts.)

The C200H-OD218/219/21B High-density Output Unit reduces wiring by connecting I/O Terminals.

Item	C200H-OD218	C200H-OD21B	C200H-OD219
Number of outputs	32 points		64 points
Max. switching capacity	16 mA at 4.5 V to 100 mA at 26.4 V	0.5 A (5A/Unit) at 24 VDC +10% −15%	16 mA at 4.5 V to 100 mA at 26.4 V
Leakage current	0.1 mA max.		
Residual voltage	0.8 V max.		
Input ON delay	0.1 ms max.		
Input OFF delay	0.4 ms max.	0.3 ms max.	0.4 ms max.
Output indicator	LED		
External connections	Connector		
Number of circuits	32 points with one common		64 points with two commons
Fuse (see note)	3.5 A (one/common)	7 A (one/common)	3.5 A (one/common)
External power supply	110 mA (3.4 mA per ON pt) min. at 5 to 24 VDC ±10%	160 mA (5 mA per ON pt) min. at 24 VDC +10% −15%	220 mA (3.4 mA per ON pt) min. at 5 to 24 VDC ±10%
Internal power consumption	180 mA max. at 5 VDC		270 mA max. at 5 VDC
Weight	180 g max.		250 g max.

Note: The fuse is not user replaceable.

I/O Units

Circuit Configuration

OD218

Products manufactured on or before January 28, 2000
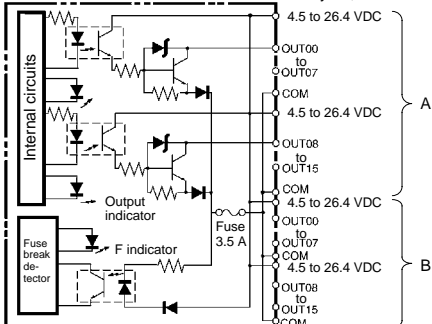
Products manufactured on or after January 31, 2000
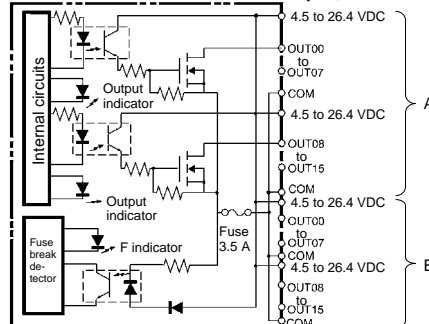
OD219

Products manufactured on or before January 28, 2000
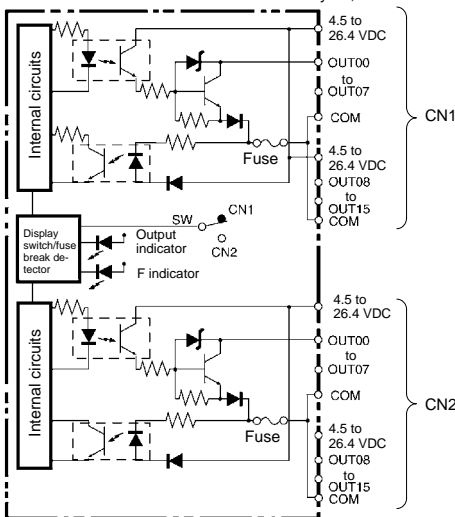
Products manufactured on or after January 31, 2000
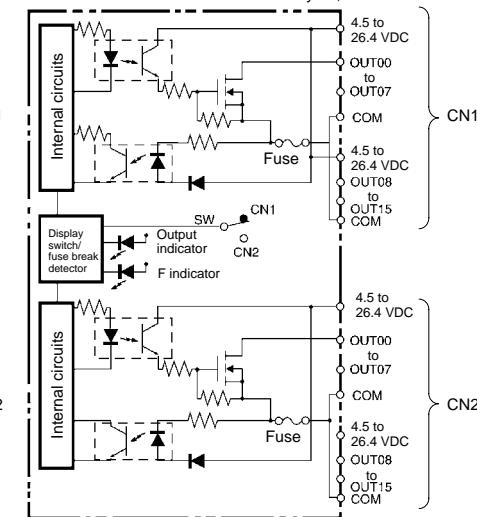
OD21B
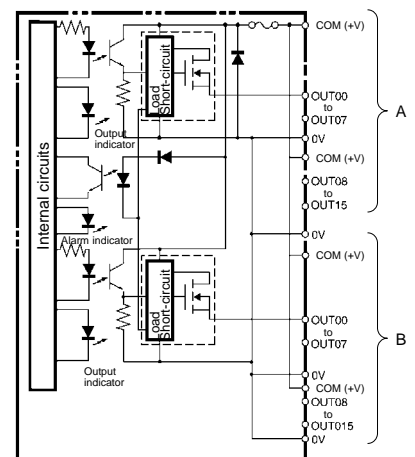
Note:
1. The number of Group-2 High-density I/O Units that can be used is limited by the CPU Unit model. They cannot be used on a Slave Rack.

2. If the output current at an output exceeds the detection current, the output will be turned OFF. At the same time, the "F" lamp will light, and the bit in AR0205 to AR0214 that corresponds to the output will turn ON.

3. When an alarm occurs, after the cause of the detection current being exceeded is removed, the alarm will be cleared when the internal temperature of the element drops.

4. Refer to page 15 for details on how to obtain the date of manufacture from the serial number.

Analog Timer Unit

Slight changes in the timer preset value can be easily made by operating the adjustments.
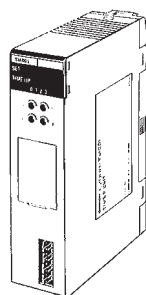
C200H-TM001

- This Unit provides four timers easily adjusted onsite via front-panel adjustments or external variable resistors.

System Configuration

C200HX/HG/HE

C4K-CN223
(2 m)

External adjustments mounted as required by application.
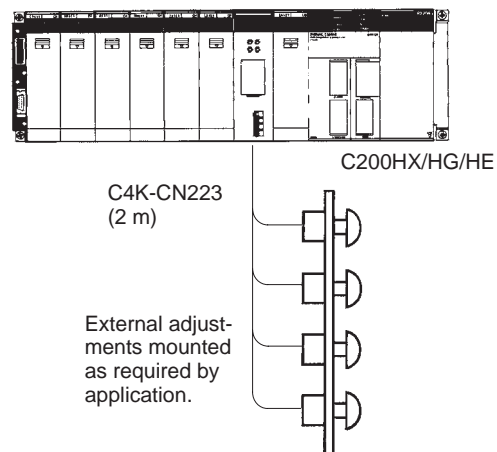
Specifications

Item	Specification
Timing method	CR oscillator
No. of timers	4
Setting ranges	0.1 to 1.0 s, 1 to 10 s, 10 to 60 s, 1 to 10 min
Operation	Controllable from PLC program. Usable as accumulating timer.
External adjustment	Via C4K-CN223 (2 m) connector to 20-kΩ resistor

Note: Discontinuation models are contained.

I/O Units

Interrupt Input Unit

The Interrupt Input Unit temporarily interrupts the main program by means of inputs, and executes interrupt subroutines.

C200HS-INT01
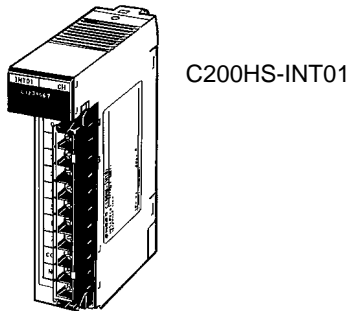
Interrupt Input Operation

C200HX/HG/HE

Word IR 004

Input	
IR 00400 →	SBN 000
IR 00401 →	SBN 001
IR 00402 →	SBN 002
IR 00407 →	SBN 007
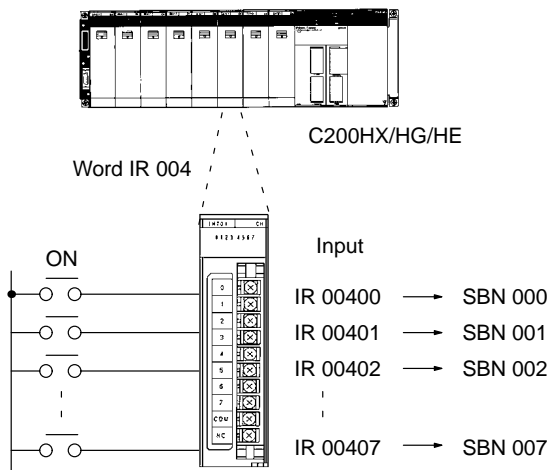
The above application shows input bits IR 00400 through IR 00407 assigned to subroutines 00 to 07. For example, when the input for IR 00400 goes ON, normal program execution is interrupted and the subroutine between SBN 000 and RET is executed. If required, outputs can be refreshed immediately by programming the I/O RE-FRESH instruction within the subroutine.

```
                          Normal
  END(01)                 program
                          area

  SBN(92) 00

  IORF(97)
              003         Interrupt
              003         subroutine
                          program
                          area

  RET(93)
```
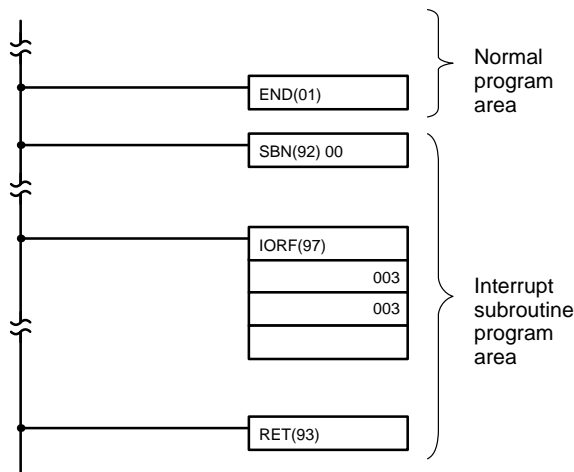
Only the word 003 output processed in the interrupt subroutine program is immediately refreshed.

High-speed I/O responses of 1 ms are achieved.

- When an interrupt input is received, the normal program in temporarily interrupted and the designated subroutine is executed.

- Eight points per Unit can be used for interrupt inputs.

- The Interrupt Input Unit must be mounted on the CPU Rack. Only two Interrupt Input Unit can be mounted.

- Interrupt Input Unit relay numbers are determined by the CPU Rack slot in which the Unit is mounted.

Note: If the Interrupt Input Unit is mounted on an Expansion I/O Rack, the interrupt function cannot be used and the Interrupt Input Unit will be treated as an ordinary 8-point Input Unit. Moreover, Interrupt Input Units cannot be used on Slave Racks.

Specifications

Rated Input Voltage	12 to 24 VDC $+^{10\%}/_{-15\%}$
Input Impedance	2 KΩ
Input Current	10 mA typical (24 VDC)
ON Voltage	10.2 VDC min.
OFF Voltage	3.0 VDC max.
ON Response Time	0.2 ms max.
OFF Response Time	0.5 ms max.
No. of Circuits	1 (8 points/common)
Internal Current Consumption	20 mA, 5 VDC max.
Weight	200 g max.

Circuit Configuration

Input indicator

The polarity of the input power supply source can be positive or negative provided that the polarity of each common is the same.
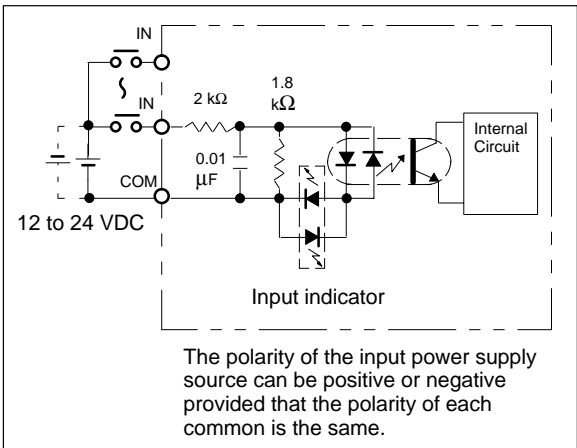
B7A Interface Units

This wiring-saving Unit allows I/O data to be sent or received through only two signal lines thus allowing up to 16 points per word.
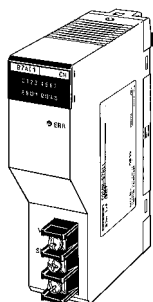
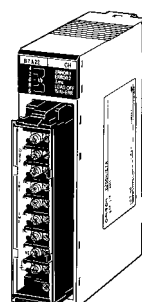C200H-B7AI1 (16 Input Points)
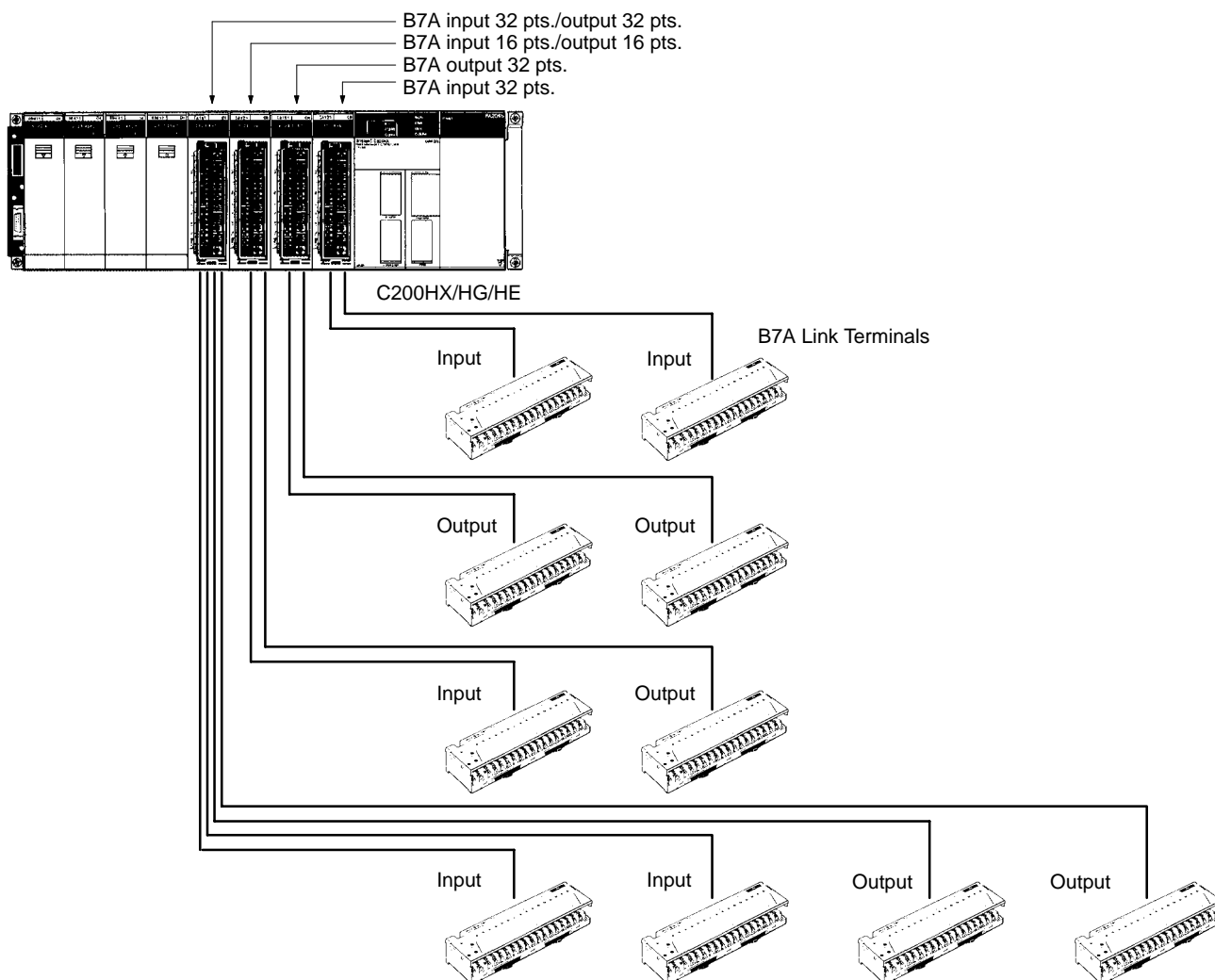C200H-B7AO1 (16 Output Points)
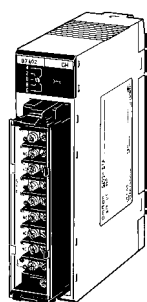
C200H-B7A02
(32 Output Points)
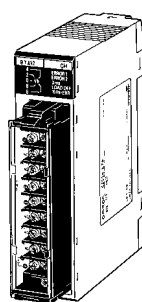
C200H-B7A12
(32 Input Points)
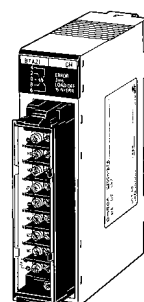
C200H-B7A21 (16 Input and 16 Output Points)
C200H-B7A22 (32 Input and 32 Output Points)

System Configuration

B7A input 32 pts./output 32 pts.
B7A input 16 pts./output 16 pts.
B7A output 32 pts.
B7A input 32 pts.

C200HX/HG/HE

B7A Link Terminals

Input   Input

Output   Output

Input   Output

Input   Input   Output   Output

Note: Refer to the *B7A Link Terminals Datasheet (Q101)* for more details.

I/O Units

Performance Specifications

Item	B7A Interface Units		Group-2 B7A Interface Units			
	C200H-B7AI1	**C200H-B7AO1**	**C200H-B7A12**	**C200H-B7A02**	**C200H-B7A21**	**C200H-B7A22**
I/O points	16 points or 15 points and 1 error input	16 output points	32 input points or 30 input points and 2 error inputs	32 output points	16 output points and 16 input points or 15 input points + 1 error input	32 output points and 32 input points or 30 input points + 2 error inputs
Transmission distance	500 m max. if power is supplied to the Interface Unit and B7A Link Terminal separately. 100 m max. if power is supplied to the Interface Unit and B7A Link Terminal from a single power supply.		Standard transmission delay: 500 m max. using separate power supplies. 100 m max. using a common power supply. High-speed transmission delay: 100 m max. using separate power supplies. 50 m max. using a common power supply. If shielded cable is not used, the maximum transmission distance is 10 m regardless of whether a common or separate power supplies are used.			
Transmission delay	19.2 ms typical, 31 ms max.		Standard: 19.2 ms typical, 31 ms max. High-speed: 3 ms typical, 5 ms max. (see note 1)			
Internal current consumption	5 VDC, 100 mA max.					
External power supply (see note 2)	12 to 24 VDC ±10%					
	0.01 A min.	0.03 A min.	0.05 A min.	0.06 A min.	0.05 A min.	0.08 A min.
Weight	200 g max.		300 g max.			
Word allocations	Same as I/O Units (in order mounted).		The words allocated to Group-2 B7A Interface Units are determined by I/O number set on the Units. Words 030 to 049 allocated according to I/O number setting. Units with 32 I/O points are allocated two words; Units with 64 I/O points are allocated four words.			

Note: 1. The transmission delay is changed by using the DIP switch.

2. The value of the external power supply does not include the value required by the B7A Link Terminal.

Connectable B7A Link Terminals

Input Terminals

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

Output Terminals

| Type	Model	Transmission delay
Screw terminals	B7A-R6□□1	Standard (19.2 ms)
	B7AS-R6□□1	
	B7A-R6□□6	High-speed (3 ms)
	B7AS-R6□□6	
Modular	B7A-R6A52	Standard (19.2 ms)
	B7A-R6A57	High-speed (3 ms)
PLC connectors	B7A-R□A□3	Standard (19.2 ms)
	B7A-R□A□8	High-speed (3 ms)

Special I/O Units

Analog I/O Units

The C200H-AD001/AD002/AD003 Analog Input Unit is used to convert analog signals, such as voltages or currents, to binary data for input into the PLC, and the C200H-DA001/DA002/DA003/DA004 Analog Output Unit is used to convert digital signals to analog signals for output to external devices.

Analog Input Units
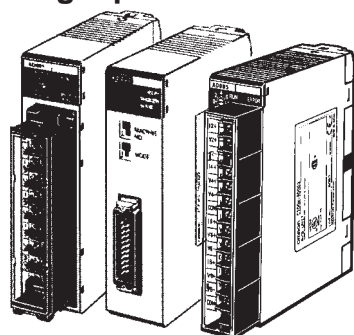
C200H-AD001
C200H-AD002
C200H-AD003

System Configuration

C200HX/HG/HE
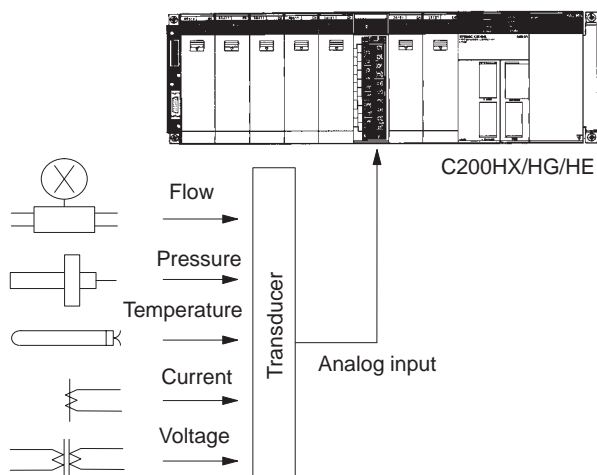
Features of C200H-AD003

- A conversion speed of 1 ms max./pt
- Analog signals such as voltages and currents are received from various sensors through a maximum of eight inputs and converts them into 16-bit binary data.
- External input signal range can be freely set to satisfy diverse needs.
- Other built-in functions, such as the scaling function, mean function, peak-hold function, and wire burnout function, are available.

Specifications

Item		Specifications		
		C200H-AD001	C200H-AD002	C200H-AD003
Input points		4	8	8
Voltage input		1 to 5V or 0 to 10 V	1 to 5 V, 0 to 10 V, or –10 to 10 V	
	Current input	4 to 20 mA		
External input impedance	Voltage input	1 MΩ min.		
	Current input	250 Ω		
Resolution	Voltage	1/4,000 FS		
	Current			
Accuracy	25°C	±0.5% FS	Voltage: ±0.25% FS Current: ±0.4% FS	Voltage: ±0.2% FS Current: ±0.4% FS
	0° to 55°C	±1.0% FS	Voltage: ±0.6% FS Current: ±0.8% FS	Voltage: ±0.4% FS Current: ±0.6% FS
Conversion speed		2.5 ms max./pt		1 ms max./pt
Converted data		12-bit binary	12-bit binary or 4-digit BCD code (selectable)	16-bit binary
Maximum input signals	Voltage input	±15 V max.		±15 V
	Current input	±30 mA max.		±30 mA
I/O words required		10 (Special I/O area)		
External connections		Terminal block	Connector	28-point removable terminal block (M3-screw size)
Current consumption		550 mA max., 5 VDC	450 mA max., 5 VDC	100 mA max., 5 VDC/ 100 mA max. 26 VDC
Weight		450 g max.	290 g max.	450 g max.

Note: Discontinuation models are contained.

Special I/O Units

Analog Output Units
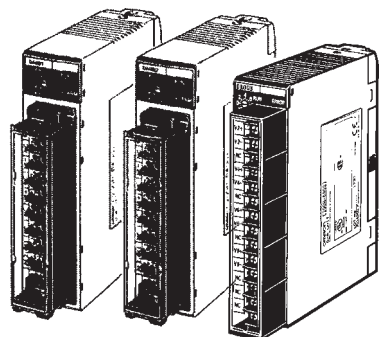
C200H-DA001
C200H-DA002
C200H-DA003
C200H-DA004

System Configuration
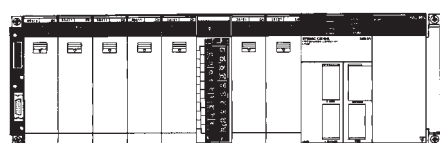
C200HX/HG/HE

Analog output

Servomotor driver

Inverter

M

Recorder
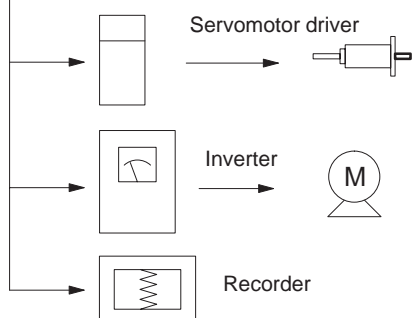
Features of C200H-DA003/DA004

- A conversion speed of 1 ms max./pt
- 16-bit binary data is converted into analog output (voltage/current) and is output externally.
- Output signal range can be freely set to satisfy diverse needs.
- Other built-in functions, such as the peak-hold function, and scaling function, are available.

Specifications

Item		Specifications			
		C200H-DA001	C200H-DA002	C200H-DA003	C200H-DA004
Output points		2	4	8	
Voltage output		1 to 5V or 0 to 10 V	−10 to 10 V	1 to 5V or 10 to 10 V or −10 to 10 V	---
	Current output	4 to 20 mA	---	---	4 to 20 mA
Resolution	Voltage	1/4,095 FS	1/8,190 FS	1/4,000	
	Current	1/4,095 FS			
Accuracy	25°C	±0.5% FS	Voltage: ±0.3% FS Current: ±0.5% FS	±0.3% FS	±0.5% FS
	0° to 55°C	±1.0% FS	Voltage: ±0.5% FS Current: ±1.0% FS	±0.5% FS	±0.8% FS
Conversion speed		2.5 ms max./pt		1 ms max./pt	
External output impedance		0.5 Ω min.			---
Maximum external output current	Voltage output	15 mA	10 mA	12 mA	---
	Current output	---	---	---	---
Allowable load resistance of external output	Voltage output	---		1 kΩ	---
	Current output	400 Ω	350 Ω	---	600 Ω
Converted data		12-bit binary	Voltage code bit + 12-bit binary Current code bit + 12-bit binary	16-bit binary	
I/O words required		10 (Special I/O area)			
External connections		Terminal block	Connector	Terminal block	Terminal block
Current consumption		650 mA max., 5 VDC	600 mA max., 5 VDC	100 mA max., 5 VDC 200 mA max., 26 VDC	100 mA max., 5 VDC 250 mA max., 26 VDC
Weight		450 g max.	320 g max.	450 g max.	

Note: Discontinuation models are contained.

Analog I/O Units
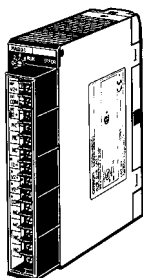
C200H-MAD01

System Configuration

C200HX/HG/HE

Transducers

Flow — K3TX
Pressure — K3TS
Temperature — K3TH
Current — K3TH
Voltage — K3TR
Power, etc.

Analog input / Analog output

Inverter

Recorder
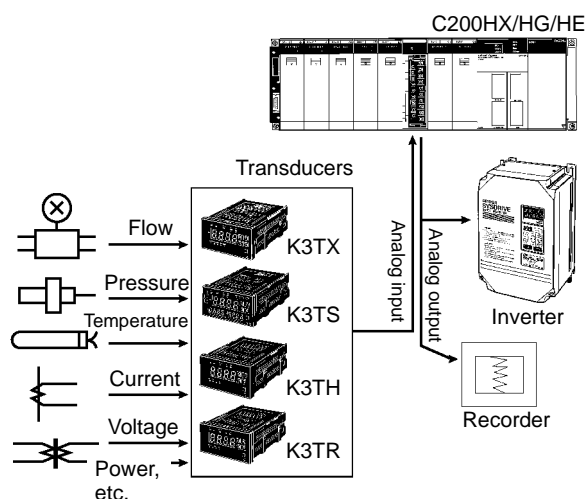
- A single Unit handles two analog input points and two analog output points.
- A conversion speed of 1 ms max./pt
- Incorporates a ratio conversion function that makes single loop control possible.
- Other versatile built-in functions, such as the mean function, peak-hold function, wire burnout function, and scaling function, are available.

Specifications

Item		Specifications	
		Voltage	**Current**
A/D converter	External input points	2	
	External input signal range	1 to 5 V or 0 to 10 V or −10 to 10 V	4 to 20 mA
	Conversion speed	1 ms max./pt.	
	External input impedance	1 MΩ	250 Ω
	Resolution	1/4,000	
	Accuracy 23°±2°C	±0.2% FS	±0.4% FS
	0° to 55°C	±0.4% FS	±0.6% FS
	A/D converted output data	16-bit binary data −10 to 10V: F768 to 898 Voltage ranges other than the above: FF38 to 1068	
D/A converter	External output points	2	
	External output signal range	1 to 5 V or 0 to 10 V or −10 to 10 V	4 to 20 mA max.
	Allowable load resistance of external output	1 kΩ min.	600 Ω max.
	Maximum external output current	12 mA	---
	Resolution	1/4,000	
	Accuracy 23°±2°C	±0.3% FS	±0.5% FS
	0° to 55°C	±0.6% FS	±0.8% FS
	Conversion speed	1 ms max./pt.	
	External output impedance	0.5 Ω max.	---
	D/A output set data	16-bit binary data −10 to 10V: F768 to 898 Voltage ranges other than the above: FF38 to 1068	
Common	External connection method	28-point quick-disconnect terminal block (M3 screw)	
	Internal current consumption 5 VDC	0.1 A max.	
	26 VDC	0.2 A max.	
	Weight	450 g max.	

Special I/O Units

Temperature Sensor Units

Temperature Sensor Units convert temperature inputs from up to four thermocouples or platinum resistance thermometers into 4-digit BCD for direct input into the PLC.
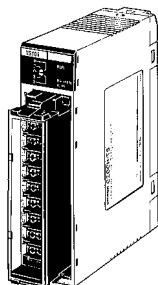
C200H-TS001
C200H-TS002
C200H-TS101
C200H-TS102

System Configuration

Temperature Sensor Units
C200H-TS001/TS002/TS101/TS102

High-density Output Unit

C200HX/HG/HE

G79-□C Connecting Cable (1-to-1)

M7F
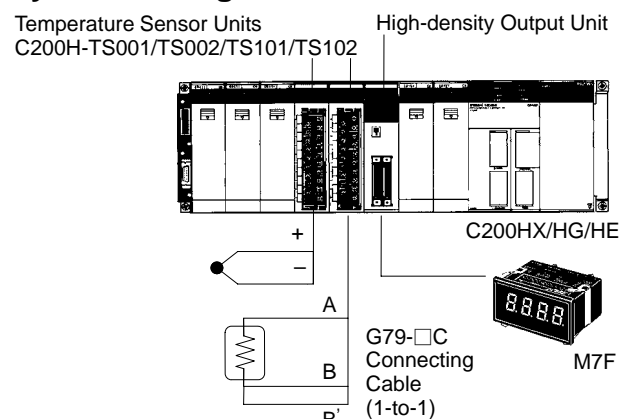
Specifications

Item	Thermocouple		Platinum resistance thermometer	
	C200H-TS001	**C200H-TS002**	**C200H-TS101**	**C200H-TS102**
Temperature sensor	Thermocouples: K (CA), J (IC) (selectable)	Thermocouples: K (CA)/ L (Fe-CuNi) (DIN) (selectable)	RTD (JPt 100 Ω)	RTD (Pt 100 Ω) (DIN/1989 JIS)
Input points	4 points/Unit max. (1, 2, or 4 points can be selected)			
Converted data	$\pm$(1% FS + 1°C) max.			
Total precision	4.8 s max. when 4 points/Unit is set 2.4 s max. when 2 points/Unit is set 1.2 s max. when 1 points/Unit is set			
PLC fetch time	Conversion cycle + PLC1 cycle time (5 s max.)			
Insulation	Between points: Not insulated			
	Between input terminal and PLC signal: Insulated with a photocoupler			
I/O words required	10 (Special I/O area)			
Current consumption	450 mA max., 5 VDC			
Weight	400 g max.			

External Connections

C200H-TS001/TS002 Thermocouple Input

Input 1
Input 2
Input 3
Input 4
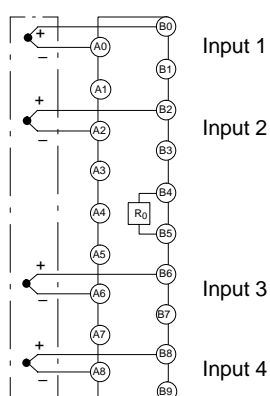
C200H-TS101/TS102 Platinum Resistance Thermometer Input

Input 1
Input 2
Input 3
Input 4
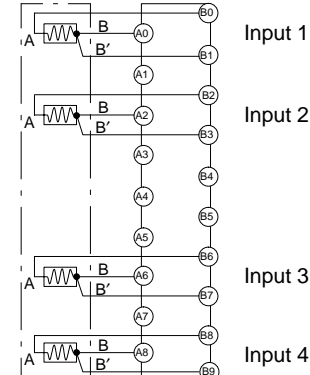
Note: A cold junction compensating circuit, whose precision is adjusted together with the Unit, is provided between the B4 and B5 terminals of the C200H-TS001/TS002 (for thermocouple).

Temperature Ranges

Measuring element	Thermocouple			
	K (CA) Chromel/Alumel		J (IC) Iron/Constantan	
Unit	°C	°F	°C	
Measurement ranges	1,600 1,000 800 600 500 400 300 200 150 100 80 50 0			
Temp, spec code (2-digit BCD)	00 01 02 05 06 07 08	03 04 09 10	11 12 13 14	

C200H-TS001/TS002

Measuring element	Platinum Resistance thermometer	
	Pt 100 Ω	
Unit	°C	°F
Measurement ranges	500 400 300 200 150 100 80 50 0 −20 −50	
Temp, spec code (2-digit BCD)	15 16 17 18 21 22 23	19 20 24 25

C200H-TS101/TS102

Note: Use the IR bit for setting the temperature range. (Common settings for 4 inputs.)

Temperature Control Units

The Temperature Control Unit measures the temperature of an object with a connected temperature sensor (thermocouple or platinum resistance thermometer) and controls the temperature according to a preset control mode.

C200H-TC□□□

C200H-DSC01
Data Setting Console

System Configuration

C200H-TC□□□
Temperature Control Unit

C200HX/HG/HE

Loop 1
Temperature sensor
CT

Loop 2
Temperature sensor
CT

C200H-DSC01 Data Setting Console

Relay box for heater control
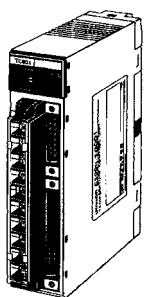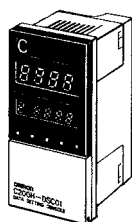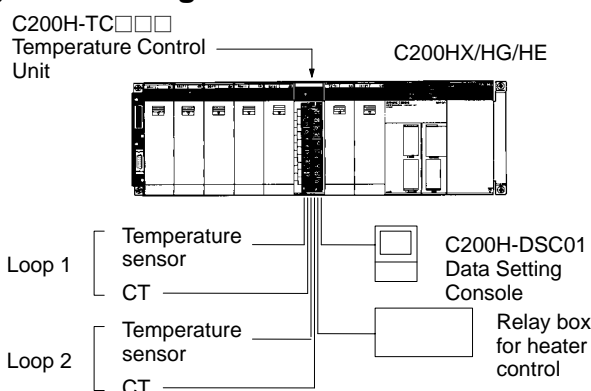
- The temperature sensor can be connected to a thermocouple or platinum resistance thermometer. Ten types of thermocouples and two types of platinum resistance thermometers are selectable using the internal switch.

- Transistor, voltage, or current output can be selected as the control output.

- High speed and high accuracy temperature control is performed at a sampling period of 500 ms and with an indication accuracy of ±0.5%.

- Eight data values such as main set value, alarm set value, and input shift range can be preset in one data bank and a maximum of eight data banks can be preset with each bank preset for a different purpose. It is possible to change the banks during operation.

- Alarm outputs can be selected out of ten modes such as an upper limit, lower limit, and upper/lower limit.

- The heater current is monitored by the high-precision current transformer (CT) that is capable of detecting in 0.1 A units. Through the use of heater burnout detection, heater burnout can be quickly detected.

- Data input and process value monitoring can be easily performed by using the Data Setting Console.

Model	Sensor	Control output
C200H-TC001	Thermocouple: R, S, K(CA), J(IC), T(CC), E(CRC), B, N, L(IC), U(CC)	Transistor output
C200H-TC002		Voltage output
C200H-TC003		Current output
C200H-TC101	Platinum resistance thermometer: JPt100, Pt100	Transistor output
C200H-TC102		Voltage output
C200H-TC103		Current output

Specifications

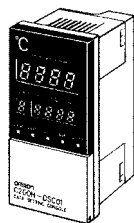| Item	C200H-TC00□	C200H-TC10□
Current transformer detection current	0.1 to 49.9 A (with a heater burnout detecting current difference of 2.5 A min.), indication accuracy: ±0.5% FS, ±1 digit max.	
Input points (no. of loops)	Two points (two loops, each of which consists of a temperature sensor and CT)	
Temperature control mode	PID, ON/OFF (selectable with a switch on the rear panel) (advanced PID with auto-tuning)	
Preset memory bank items (8 max.)	Main set value, alarm set value, input shift range, proportional band, integral time, derivative time, sensitivity adjustment, etc.	
Setting/Indication accuracy	±0.5% of set (designated) value or ±2°C whichever larger, ±1 digit max.	±0.5% of set (designated) value or ±1°C whichever larger, ±1 digit max.
Proportional band	0.0° to 999.9°C/°F (in units of 0.1°C/°F)	
Integral (reset) time	0 to 9,999 s (in units of 1 s)	
Derivative (rate) time	0 to 9,999 s (in units of 1 s)	
Control period	1 to 99 s (in units of 1 s)	
Sampling period	500 ms	
Input shift range	−99.9° to 999.9°C/°F (in units of 0.1°C/°F)	
Alarm output mode	Selectable from no alarm function, upper alarm, lower alarm, upper/lower alarm, upper-/lower-range alarm, upper/lower alarm with standby sequence, upper alarm with standby sequence, lower alarm with standby sequence, absolute-value upper alarm, or absolute-value lower alarm.	
No. of banks	8 banks	
Internal current consumption	5 VDC, 0.33 A max. (supplied from the Backplane)	
External supply voltage	24 VDC $+10\%/_{-15\%}$, 200 mA min.	
Weight	360 g max.	

Special I/O Units

Heat/Cool Temperature Control Units

The Heat/Cool Temperature Control Unit measures the temperature of an object with a connected temperature sensor (thermocouple or platinum resistance thermometer), and heats and cools according to a preset control mode.
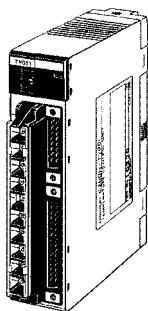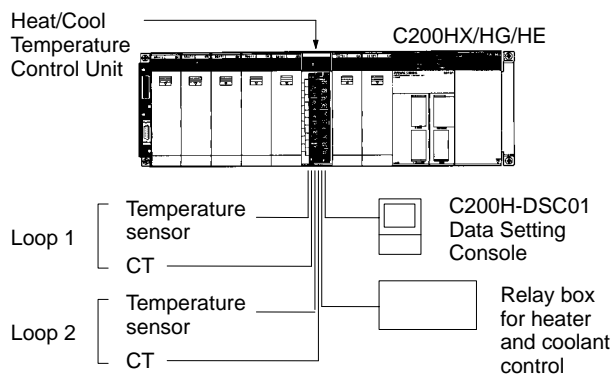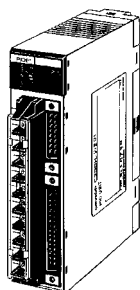
C200H-TV□□□

C200H-DSC01
Data Setting Console

System Configuration

Heat/Cool
Temperature
Control Unit

C200HX/HG/HE

Loop 1
- Temperature sensor
- CT

Loop 2
- Temperature sensor
- CT

C200H-DSC01
Data Setting
Console

Relay box
for heater
and coolant
control

- **Dedicated Unit Available for Each Temperature Sensor**
  Two types of Temperature Control Unit are available, according to the thermocouple or platinum resistance thermometer temperature sensor used.

- **Comprehensive Output Specifications**
  Three types of output specification versions are available: C200H-TV□□1 for transistor output, C200H-TV□□2 for voltage output, and C200H-TV□□3 for current output.

- **Advanced PID**
  Stable temperature control is achieved using advanced PID and an auto-tuning feature. ON/OFF control can also be selected.

- **Two Heat/Cool Control Loops with a Single Unit**

- **Heater Burnout Detection**
  Heater burnout can be quickly detected with a minimum current difference of 2.5 A and a heater burnout detection setting range of 0.1 to 49.9 A, and allows for the rapid correction of problems.

- **Eight Banks of Data Settings**
  Eight data values such as set point (SP) and alarm set values can be preset in eight data banks for easy selection.

- **Data Input and Display**
  The C200H-DSC01 Data Setting Console (sold separately) is used to input data and display process values (PV) and set values (SV). The easy-to-read display can be panel-mounted.

- **Data Reading/Writing Using the User Program**
  The user program of the C200HX/HG/HE allows reading or writing of various data.

Model	Sensor	Control output
C200H-TV001	Thermocouple: R, S, K, J, T, E, B, N, L, U	Transistor output
C200H-TV002		Voltage output (transistor output used for cooling outputs)
C200H-TV003		Current output (transistor output used for cooling outputs)
C200H-TV101	Platinum resistance thermometer: JPt100, Pt100	Transistor output
C200H-TV102		Voltage output (transistor output used for cooling outputs)
C200H-TV103		Current output (transistor output used for cooling outputs)

Special I/O Units

Specifications

Item	C200H-TV00☐	C200H-TV10☐
Current transformer detection current	0.1 to 49.9 A (with a heater burnout detecting current difference of 2.5 A min.), indication accuracy: ±0.5% FS, ±1 digit max.	
Input points (no. of loops)	Two points (two loops, each of which consists of a temperature sensor and CT)	
Temperature control mode	PID, ON/OFF (selectable with a switch on the rear panel) (advanced PID with auto-tuning)	
No. of banks	8 banks	
Setting/Indication accuracy (see note)	±0.5% of set (designated) value or ±2°C whichever larger, ±1 digit max.	±0.5% of set (designated) value or ±1°C whichever larger, ±1 digit max.
Hysteresis	0.0° to 999.9°C/°F (in units of 0.1°C/°F)	
Proportional band	0.0° to 999.9°C/°F (in units of 0.1°C/°F)	
Integral (reset) time	0 to 9,999 s (in units of 1 s)	
Derivative (rate) time	0 to 9,999 s (in units of 1 s)	
Control period	1 to 99 s (in units of 1 s)	
Sampling period	500 ms	
Input shift range	−99.9° to 999.9°C/°F (in units of 0.1°C/°F)	
Internal current consumption	5 VDC, 0.33 A max. (supplied from the Backplane)	
External supply voltage	24 VDC $^{+10\%}_{-15\%}$, 200 mA min.	
Weight	360 g max.	

Note: The indication accuracy of thermocouples R and S at a temperature of 200°C max., that of thermocouples K and T at a temperature of −100°C max., and that of thermocouple U are all ±4°C, ±1 digit max. The indication accuracy of thermocouple B at temperature of 400°C or below is not guaranteed.

Special I/O Units

PID Control Units

The PID Control Unit scales inputs from connected sensors and then carries out PID control according to preset control mode.

C200H-PID0□

C200H-DSC01
Data Setting Console

System Configuration

PID Control Unit

C200HX/HG/HE

Loop 1
- Flow sensor
- CT

Loop 2
- Flow sensor
- CT

C200H-DSC01
Data Setting
Console

Relay box for
valve control
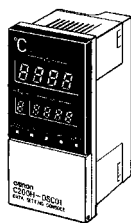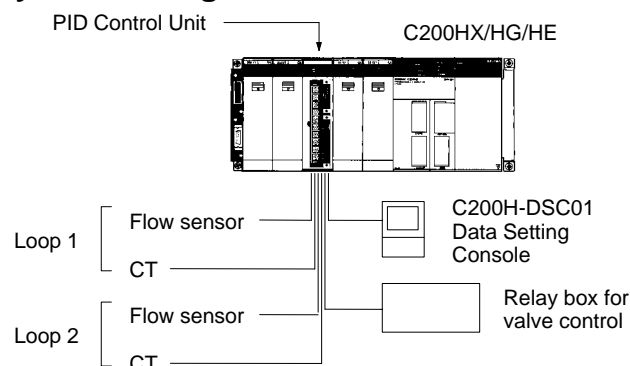
- **Advanced PID**
  Stable PID control is achieved using advanced PID and an auto-tuning feature. ON/OFF control can also be selected.

- **High-speed Sampling Period of 100 ms**
  A sampling period of 100 ms is achieved with two loops, enabling high-speed PID control.

- **Input Noise Reduction with Digital Filter**
  Mitigation of sudden input fluctuations makes the PID Control Unit effective in quick-response systems.

- **Comprehensive Output Specifications**
  Three types of output specification versions are available: C200H-PID01 for transistor output, C200H-PID02 for voltage output, and C200H-PID03 for current output.

- **Eight Banks of Data Settings**
  Eight data values such as set point (SP) and alarm set values can be preset in eight data banks for easy selection.

- **Data Input and Display**
  The Data Setting Console is used to input data and display process values (PV) and set values (SV). The easy-to-read display can be panel-mounted.

- **Data Reading/Writing Using the User Program**
  The user program of the C200HX/HG/HE allows reading or writing of various data.

Model	Output
C200H-PID01	Transistor output (open collector)
C200H-PID02	Voltage output
C200H-PID03	Current output

Specifications

Item	Specifications
Input signal range	4 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V
Input points (no. of loops)	Two points (two loops, each of which consists of a voltage and a current)
Control mode	PID, ON/OFF (selectable with a switch on the rear panel) (advanced PID control with auto-tuning)
No. of banks	8 banks
Setting/Indication accuracy	±0.5% FS ±1 digit max. The SV and displayed value match. There is no relative error.
Hysteresis	0.0 to 100.0% FS (in units of 0.1% FS)
Proportional band	0.0 to 999.9 (in units of 0.1)
Integral (reset) time	0 to 9,999 s (in units of 1 s)
Derivative (rate) time	0 to 9,999 s (in units of 1 s)
Control period	1 to 99 s (in units of 1 s)
Sampling period	100 ms
Input shift range	−999 to 9,999 (decimal point position is designated by a parameter setting)
Internal current consumption	5 VDC, 0.33 A max. (supplied from the Backplane)
External supply voltage	24 VDC $^{+10\%}/_{-15\%}$, 200 mA min.
Weight	360 g max.

Fuzzy Logic Unit

This advanced form of control allows the C200HX/HG/HE to perform operations that previous had to be left to experienced technicians.
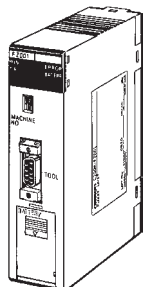
C200H-FZ001

- Contains a high-performance fuzzy logic processor for high-speed fuzzy processing.
- The C200HX/HG/HE can handle jobs that used to be performed by using the experience of skilled operators.

System Configuration
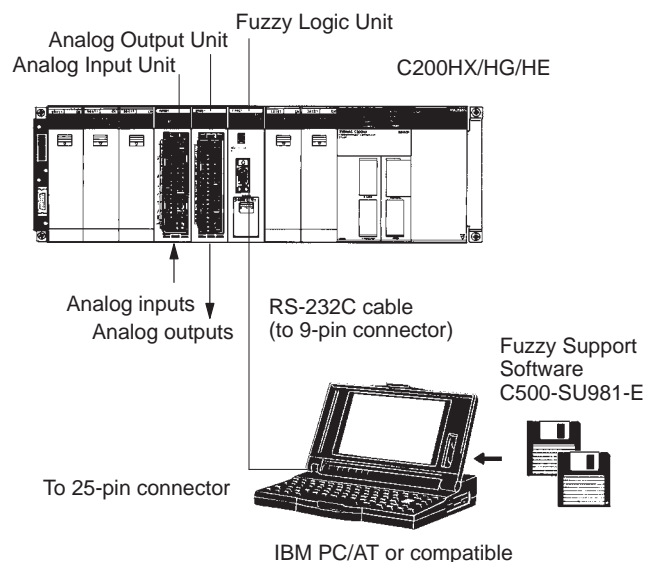
Specifications

Item		Specifications
Fuzzy logic processor	I/O capacity	8 inputs and 4 outputs
	Rule format	8 condition and 2 conclusion parts max.
	Rule capacity	128 rules max.
	Logic process	Forward logic
	Logic rule	MAX–MIN logical product
	Number of labels	7 max.
	Final calculation	Each output can be set independently for calculation by center of gravity, leftmost maximum, or rightmost maximum method.
	Rule with no grade	Can be set to retain the previous value or take a preset value.
Membership functions	Condition	Defined by up to 4 end points. Grade (height) at the end points must be either 0 or 1 (0 or 4095). Resolution is 4095 by 4095.
	Conclusion	Only the horizontal position is set. Height is fixed at 4095. Resolution is 4095 by 4095.
I/O words	Inputs	8 words max. Each input is allocated one word.12 bits of the word are used, so the range is 000 to FFF (0 to 4095 decimal).
	Outputs	4 words max. Each output is allocated one word.12 bits of the word are used, so the range is 000 to FFF (0 to 4095 decimal).
Peripheral device communications	Communications	Half duplex
	Synchronization	Start-stop synchronization
	Baud rate	300, 600, 1200, 2400, 4800, 9600, or 19200 (set on DIP switch 2)
	Transmission distance	15 m max.
	Interface	RS-232C port
	Communications protocol	Special procedure (1:N)
Processing time		6 ms max. for Unit, 3 to 4 times the cycle time for system.
Self-diagnostics	Program check	A "memory error" will be generated if an error occurs during the program check.
Data retained in a power interruption		Rules and membership functions are retained.
Internal current consumption		5 VDC, 0.3 A max. (Supplied from the Backplane.)
Weight		400 g max.

Note: Discontinuation models are contained.

Special I/O Units

Motion Control Unit

Two-axis Motion Control Available with Multi-tasking G-language Programming
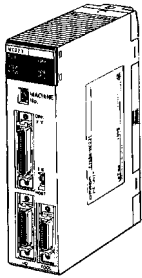
C200H-MC221

- **Servodrivers**
  Connects to servodrivers that can handle analog inputs.

- **Absolute Encoders**
  Absolute Encoders (i.e., encoders that output absolute values) are also available as a standard. If absolute servomotors are used, operations such as origin search after emergency power interruption are unnecessary.

- **Dedicated, Easy-to-connect Cables**
  Connects the Unit to single or two-axis servodrivers and I/O terminals.

- **G-language Programming**
  Makes it possible to write complicated programs without ladder programming.

- **Two-axis Simultaneous Control with a Single Slot**
  Incorporates a multi-tasking function, thus allowing two-axis simultaneous control and single-axis independent control.

- **A Maximum of Eight Mountable Units**
  A maximum of eight Units can be mounted to a single C200HX/HG/HE PLC to control a maximum of 16 axes.

- **S Curves Available**
  S acceleration/deceleration curves for machinery vibration suppression are available in addition to trapezoid acceleration/deceleration curves.

- **A Maximum of 100 Programs can be Registered**

- **Ease of Operation**
  To run a program with a ladder diagram, for example, specify the task and program numbers and execute the instruction through the interface for the SYSMAC PLC.

- **Connects to Manual Pulse Generators (MPG)**

Special I/O Units

Specifications

Item		Specifications	
Number of I/O words		20 (2 slots)	
External connecting devices		IBM PC/AT or compatible, Teaching Box, and MPG (manual pulse generator)	
Controlled driver		Servodrivers that can handle analog inputs	
Absolute Encoder	Applicable Absolute Encoders	OMRON OMNUC U-series Absolute Encoders (no S-phase)	
	Absolute Encoder holding method	Battery backup (Provided externally; there is no holding method in the MC Unit.)	
Control	Control method	Semi-closed loop using incremental encoder (speed command voltage output)	
	Number of controlled axes	2 axes max.	
	Number of simultaneously controlled axes	2 axes max.	
	PTP (independent) control	Execution by independent programs, operation modes for each axis	
Positioning	Linear interpolation	2 axes max.	
	Circular interpolation	2 axes max. on a plane	
	Interrupt inching	Inching on an axis with interrupt input to the axis.	
Speed control		Speed control of up to 2 axes. From 1 to 1,000,000 ppc in single-pulse increments (after quadruplication), if pulses are used as the unit of control.	
Control unit	Minimum unit settings	1, 0.1, 0.01, 0.001, 0.0001 (the unit conversion function is not available.)	
	Units	mm, inch, degree, pulse	
Max. command value		−39,999,999 to +39,999,999	
Acceleration//Deceleration curve		Trapezoid or S curve	
Acceleration/Deceleration time		0 to 9,998 ms in 2-ms units can be set independently for acceleration and deceleration.	
Feed operations	Rapid feed speed	Example: 36.86 m/min.	Conditions Encoder resolution: 2,048 p/r Motor speed: 4,500 r/m Control unit: 0.001 mm/pulse
	Interpolation feed speed	Example: 36.86 m/min.	
	Rapid feed override	0 to 100%	Setting unit: 0.1%
	Interpolation feed override	0 to 199%	
	Jog feed override	0 to 100%	
Task program management	Number of tasks	2 max. (program execution units)	
	Number of programs	The maximum number of programs differs according to the number of tasks (e.g., 100 programs are controlled if 1 task is used and 50 programs are controlled if 2 tasks are used).	
	Program capacity	The maximum number of program blocks varies with the number of tasks (e.g., 800 program blocks are controlled if 1 tasks is used and 400 program blocks are controlled if 2 tasks are used).	
	Position data capacity	2,000 max. when only 1 axis is used.	
	Number of registers	32 (mainly used to specify position data numbers)	
	Sub-program nesting	5 levels max.	
Auxiliary function	M code	0 to 999	
Internal current consumption		0.65 A (0.85 A with Teaching Box connected) at 5 VDC 0.2 A at 24 VDC	
Weight		500 g max.	

Special I/O Units

Windows-based CX-Motion MC Support Software for Easy Programming

- Create, edit, save, or print the system parameters, position data, and G language programs required for the MC Unit. You can also monitor the MC Unit's operating status.

- Control more than one MC Unit as separate projects for integrated data management.

- A special autoloading function can be used to provide essentially infinite memory capacity by using hard disks or floppy disks on a personal computer as a type of extended MC Unit memory. Data transfers can be programmed from the PLC to automatically change data and programs according to machine operating status.

Basic Window
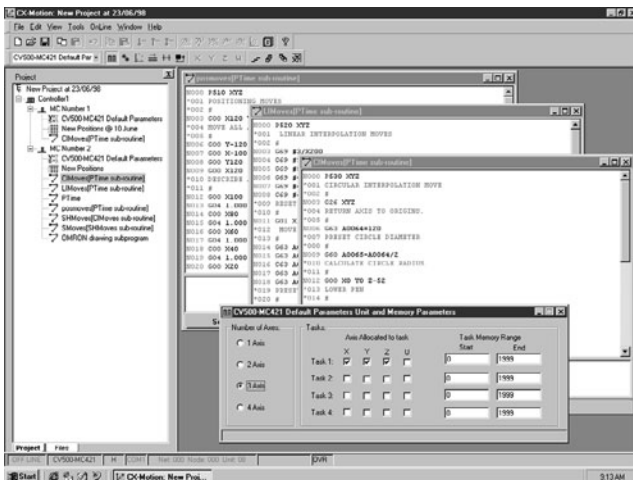
Displays for Present Positions and Other Coordinates
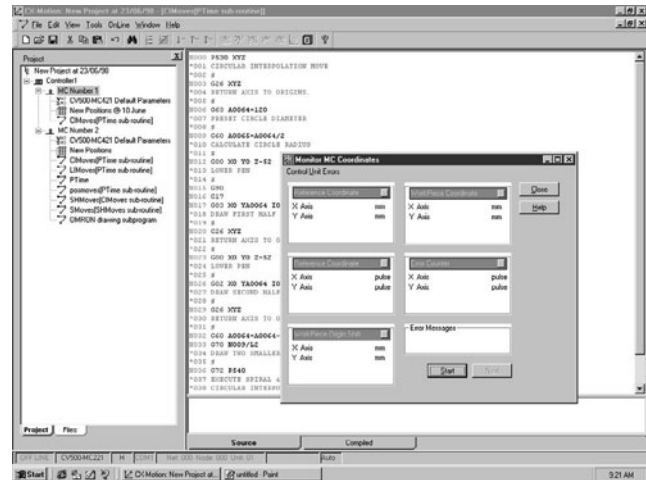
MC Programming Window

Special I/O Units

System Configuration

C200HX/HG/HE PLC

CVM1-PRO01-V1
Teaching Box

WS02-MCTC1-EV2
CX-Motion MC
Support Software

OMNUC U-series
Servo Drivers

OMNUC U-series
Servomotors

The OMNUC H and M Series
can also be used.

Absolute Encoders   Incremental Encoders
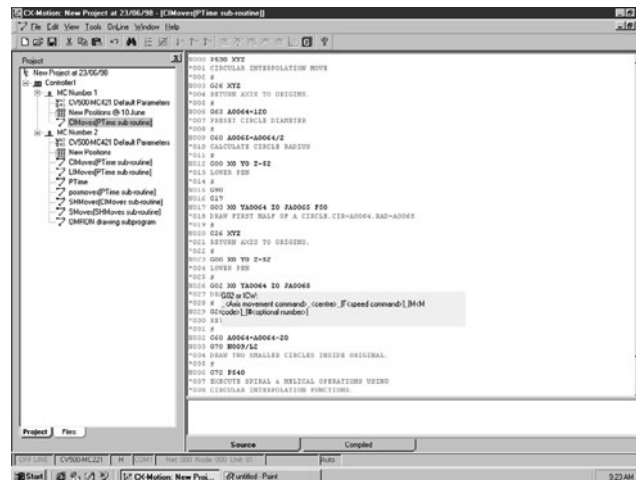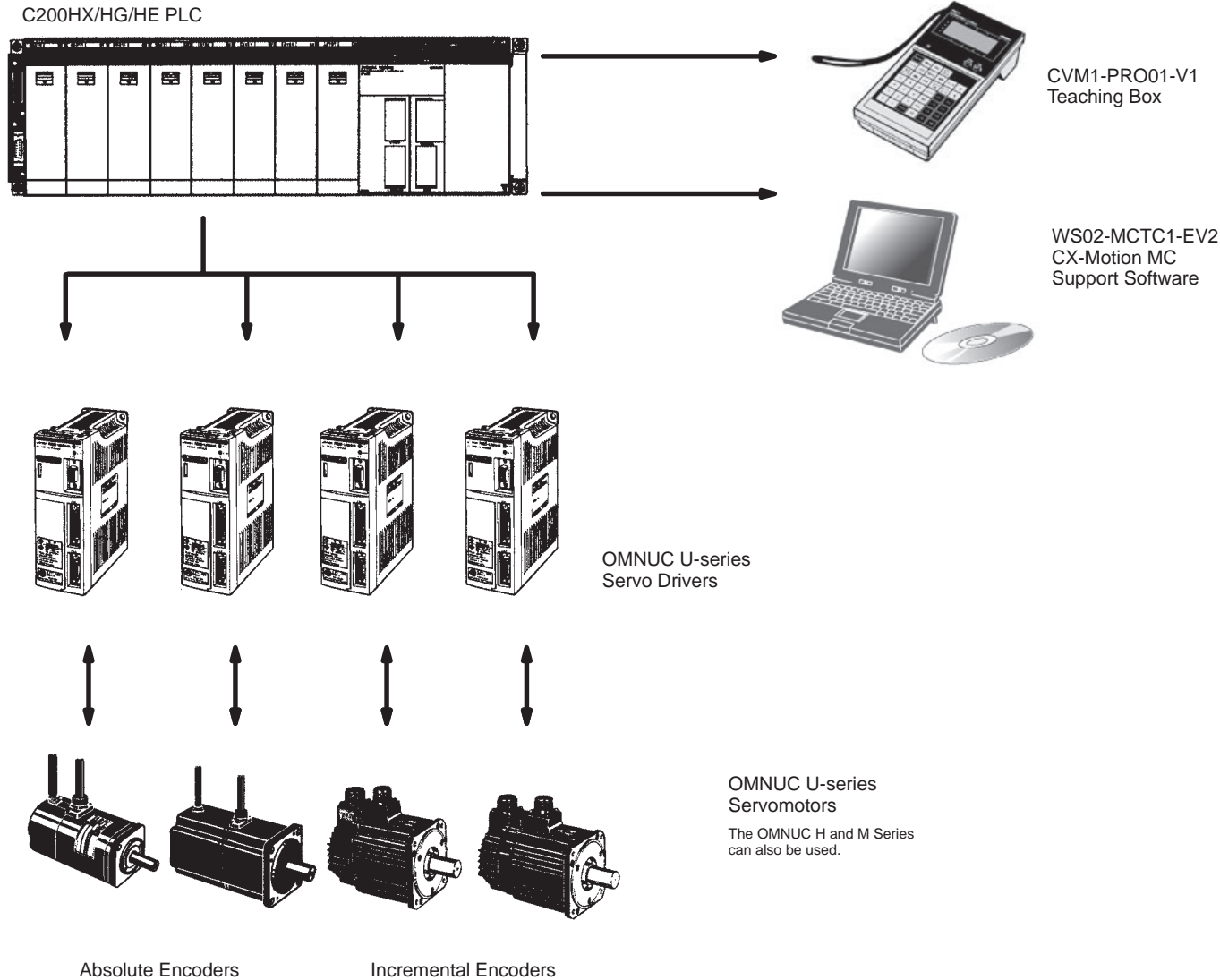
Note: Discontinuation models are contained.

Special I/O Units

Position Control Units

Pulse-train outputs and special features to easily control one or two axes.
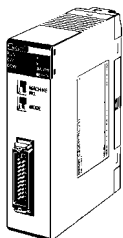
C200HW-NC113/213/413
C200H-NC211/112

These Position Control Units support open-loop control with pulse-train outputs. Position using automatic trapezoid or S-curve acceleration and deceleration. Models available with 1, 2, or 4 axes. Use in combination with servomotors or stepping motors what accept pulse-train inputs.

Features

C200HW-NC113/NC213/NC413

- Simple positioning systems can be created by directly specifying operation from the CPU Unit when required.
- Positioning data is saved in internal flash memory, eliminating the need to maintain a backup battery.
- The SYSMAC-NCT Windows-based Support Software enables easy create of positioning data and storage of the data in files.
- S-curve acceleration/deceleration, forced starting, and other features also supported.

System Configuration

Servo Relay Unit

Inputs

Pulse-input Servo Driver

Servomotor
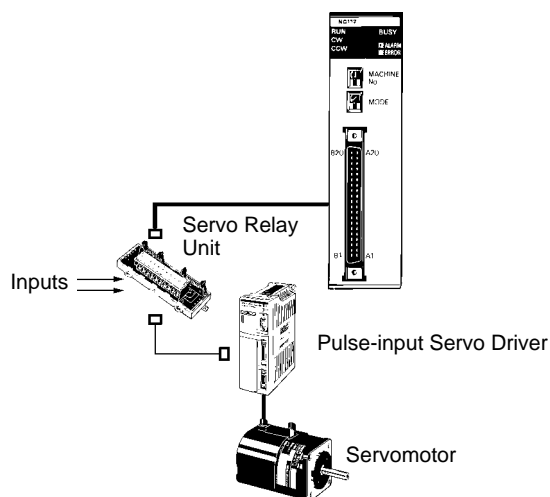
Specifications

Model	C200HW-NC113	C200HW-NC213	C200HW-NC413	C200H-NC112	C200H-NC211
Control method	Open-loop, automatic trapezoid acceleration/deceleration				
Control output signals	Pulse-train outputs				
Controlled axes	1	2	4	1	2
Position data	−9,999,999 to +9,999,999 pulses			−8,388,607 to 8,388,606 pulses	
No. of positions	100 per axis			20 per axis	53 per axis
Speed data	1 to 500 kpps			1 to 250kpps	
No. of speeds	100 per axis			15 per axis	
Acceleration/ deceleration times	1 to 250 s (time to max. speed)			2 to 2 kpps/ms	
Direct operation	Supported.			Not supported.	
S-curves	Supported.			Not supported	
Flash memory	Supported.			Not supported.	
Windows-based Support Software	Supported.			Not supported.	

High-speed Counter Unit

A High-speed Counter Unit counts input signals from incremental rotary encoders or other sources.
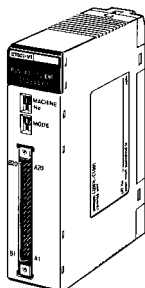
C200H-CT021
C200H-CT001-V1
C200H-CT002

System Configuration

C200H-CT0□□
High-speed Counter Unit

C200HX/HG/HE

Rotary Encoder (E6A, etc)
Sensor input switch, etc.

Two Counters Count Input Signals at a High Speed of 75 kcps Max. (C200H-CT021) from Incremental Rotary Encoders or Other Sources

- **Seven Counting Modes for Varied Applications**

    Simple Counter Mode
    (Counts input pulses. Available with the C200H-CT021 only.)

    Drum Operations
    Linear mode, circular mode

    Preset Counter Operations
    Preset mode

    Counting Operations
    Gate mode (normal and cumulative), latch mode, sampling mode

- **Three Input Modes Available**
  Differential phases, up/down inputs, pulse and direction inputs

- **Provided with Multiplication Function (x2/x4) for Differential Phase Input**

- **Count Values can be Set in Either BCD or HEX**

- **A Maximum of 16 C200H-CT021 Units can be Mounted to a Single C200HX-CPU5□-E, C200HX-CPU6□-E, C200HG-CPU5□-E, or C200HG-CPU6□-E CPU Unit.**
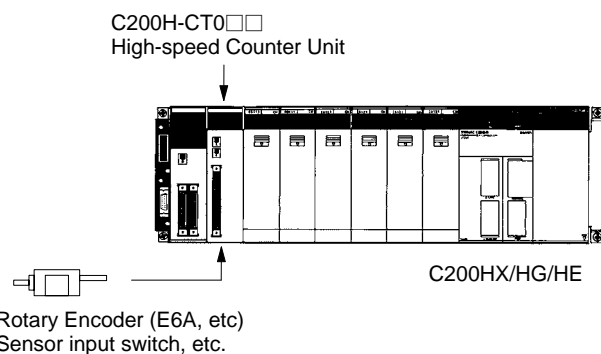
Specifications

	Item	C200H-CT001-V1	C200H-CT002	C200H-CT021
Number of axes		1 axis/Unit		2 axes/Unit
Operating modes		6		7
Count input	Input signal	Encoder inputs A, B		Counter 1 inputs A, B Counter 2 inputs A, B
	Signal level	5, 12, or 24 VDC (selected when wiring)	RS-422 line driver (Am26LS31-compatible)	12 or 24 VDC (selected when wiring) RS-422 line driver (Am26LS31-compatible)
	Input modes	Differential, up/down, pulse and direction		
	Counting speed (see note)	50 kcps	75 kcps	
	Other	Input multiplier (x2 or x4) available for differential inputs		
External input	Input signal	Counter input Z		Counter 1: input Z Counter 2: input Z
	Signal level	External control inputs IN1 and IN2		Counter 1: external control inputs IN1 and IN2 Counter 2: external control inputs IN1 and IN2
		5, 12, or 24 VDC (selected when wiring)	RS-422 line driver (Am26LS31-compatible)	12 or 24 VDC (selected when wiring) RS-422 line driver (Am26LS31-compatible)
	Input signal	Control inputs IN1, IN2		
	Signal level	5, 12, or 24 VDC (selected when wiring)		12 or 24 VDC (selected when wiring)
External output	Output	External outputs 0 to 7 (8 points)		
	Output level	External output power supply: 5 to 24 VDC Switching capacity: 16 to 80 mA		
I/O words required		10 (Special I/O area)		
Internal current consumption		5 VDC, 0.3 A max.		5 VDC, 0.4 A max.
Weight		400 g max.		305 g max.

Note: Affected by the differential phase pulse input.

Special I/O Units

Cam Positioner Unit

The Cam Positioner detects angles of rotation by means of a resolver and provides ON and OFF outputs at specified angles.
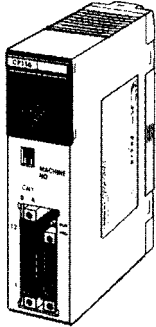
C200H-CP114

C200H-DSC01
Data Setting Console

System Configuration

Cam Positioner Unit

C200HX/HG/HE

3F88L-RS17/17T
3F88L-RS15/15W
Resolver

Solenoid, DC
Input Unit, etc.
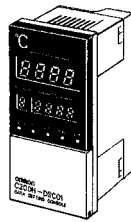
C200H-DSC01
Data Setting Console
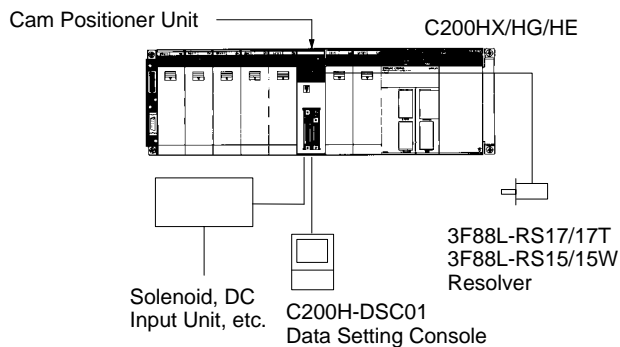
- The cam outputs can be set at 16 external outputs and 32 internal outputs with a total of 48 points. The internal outputs can be taken directly into the C200HX/HG/HE, thus reducing wiring inside the control panel.

- The ON/OFF data for the maximum of seven points can be set for one cam. The data can be registered in one bank and a maximum of eight banks are available for data setting, which facilitates easy set-up changes during operation.

- The Data Setting Console allows easy monitoring of cam data settings, present cam angles, or resolver rpm.

- Fine adjustments of the ON/OFF data can be easily made by using the adjustable operation function, thus providing an optimum output.

- Operating condition data such as the present cam angle, cam outputs for 48 points, resolver rpm, and resolver status can be constantly monitored from the C200HX/HG/HE side.

- The machine origin and the resolver origin can be easily matched by using origin compensation.

- The resolver rpm can be converted into an actual production quantity by using the scaling function.

Specifications

Item	Specifications
Output points	48 points (16 external output points, 32 internal output points)
External outputs	NPN transistor open collector (with photo-coupler insulation) Switching capacity: 100 mA at 24 VDC Simultaneous ON points: 8 points max.
Resolver cable length	100 m max.
Resolver response rpm	800 rpm max.
Resolver response speed	200 μs (at a sampling frequency of 5 kHz)
Resolver resolution	1°
Program memory	EEPROM (8 banks)
Origin compensation	1° or 359° (The present angle needs to be compensated to 0°)
Internal current consumption	5 VDC, 0.3 A max. (Supplied from the Backplane.)
External power supply	24 VDC $^{+10\%}/_{-15\%}$, 2 A min.
Weight	350 g max.

ASCII Unit

With an ASCII Unit, PLC data can be displayed onto a monitor or printed out in real time. Ten non-I/O Words determined by the unit number are required when the Unit is mounted to any C200HX/HG/HE Rack. The ASCII Unit is easily programmed in either BASIC or assembler. This program runs independently from the ladder-diagram program in the PLC.
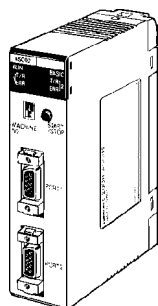
C200H-ASC11
C200H-ASC21
C200H-ASC31

The ASCII Units support BASIC language programming and RS-232C and RS422A/485 serial communications. BASIC programming enables ASCII communications with essential any external device. It can also be used as a special processing unit to aid the CPU Unit without using external communications.

The C200H-ASC21/ASC21/ASC31 provided shared memory with the CPU Unit, and both the ASCII Unit and the CPU Unit can access the shared memory asynchronously, providing for high-speed data exchanges between the two Units without using interrupts.

System Configuration

BASIC program

Terminal (e.g., Windows Hyperterminal)

RS-232C

RS-232C

General-purpose external device
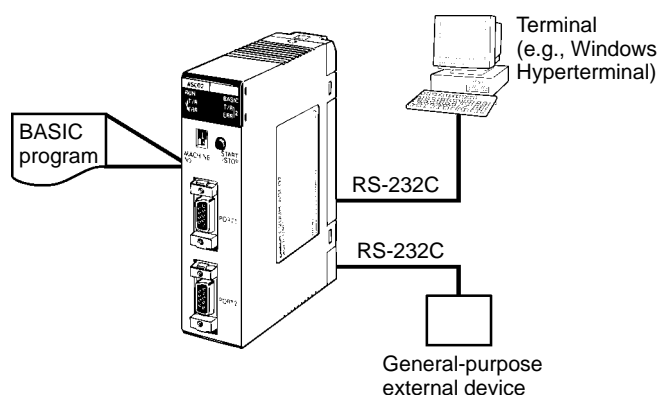
Features

- Perform ASCII communications with a wide range of external devices.
- The C200H-ASC11/ASC21/ASC31 function as special processing units with BASIC programming.
- Large-capacity user memory: 200 Kbytes
- Model available with RS422A/485 port.
- Various forms of data exchanges with CPU Unit: Select the best method for the read/write trigger and timing.
- High-speed data exchanges possible with shared memory (not dependant on I/O refresh).
- A wide range of interrupt processes: Interrupts fro CPU to ASCII Unit, communications interrupt,key interrupts, timer interrupts, error interrupts, etc.
- Easy control of transmission control signals.
- Calculation instructions for error check codes.
- Many BASIC debugging functions (break points, 1-step execution, execution stop monitoring, etc.)
- Error log supported with up to 30 error records.

Special I/O Units

Specifications

Item			Specification		
Model			**C200H-ASC11**	**C200H-ASC21**	**C200H-ASC31**
Communications port	Port 1		RS-232C (peripheral device or terminal connection)	RS-232C (peripheral device or terminal connection)	RS-232C (peripheral device connection)
	Port 2		RS-232C (peripheral device connection)	RS-422A/485 (peripheral device connection)	RS-232C (peripheral device connection)
	Terminal port		None	None	RS-232C (terminal connection)
Baud rate			300, 600, 1,200, 2,400, 4,800, 9,600, 19,200, 38,400 bps (38,400 not possible for connection via the terminal port) **Note:** Using interrupts will limit the baud rates that can be used.		
Transmission distance			RS-232C: 15 m RS-422A/485: 500 m		
Memory capacity	User program memory area (BASIC program + variable area)		200 Kbytes		
	Flash ROM		200 Kbytes		
I/O words required			10 (Special I/O area)		
Battery life			5 years at 25°C (The life of the battery is shortened if the Unit is used at higher temperatures.)		
Diagnostic functions			CPU watchdog timer, battery voltage drop		
Internal current consumption			250 mA max. at 5 VDC	300 mA max. at 5 VDC	300 mA max. at 5 VDC
Weight			400 g max.		

Note: The C200H-ASC02 can also be used on a C200HX/HG/HE PC.

Voice Unit

The Voice Unit generates a vocal output of operation instructions, warnings, etc. It is possible to record directly into the C200H-OV001 Voice Unit, and later store the messages on a floppy disk or PROM chip.
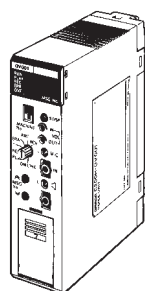
C200H-OV001

System Configuration

Voice Unit

C200HX/HG/HE

Voice Input

Microphone (dynamic, 600 Ω)

Cassette tape recorder (50 kΩ, 3.3 V max., audio use)

Voice Output

Unit's internal amplifier output

Speaker (8 Ω, commercially available)

LINE OUT (600 Ω)

External amplifier   Speaker

Commercially available amplifier and speaker
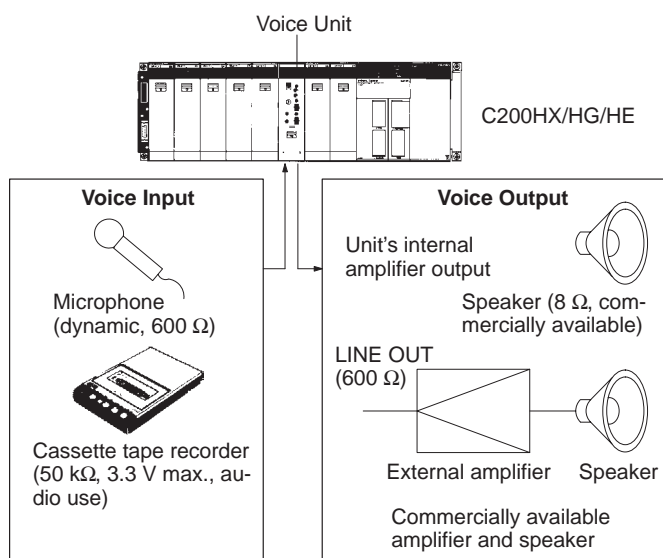
- It is possible to arbitrarily record or change messages on site by connecting a microphone or cassette tape recorder directly to the Voice Unit. Up to 60 messages can be recorded in either the phrase format or word combination format.
- Local dialects or foreign languages can also be registered.
- A recording time of 64 s, 48 s, or 32 s can be selected. The necessary message length and sound quality can be set easily by switching the sampling frequency.
- The recorded message can be replayed through the Unit's internal speaker for immediate verification.
- The audio output type can be set to either the phrase format or word combination format. When set to the phrase format, recorded messages can be reproduced as they are. In the case of the word combination format, messages registered in words can be reproduced in an arbitrary combination.

Specifications

Item		Specifications
Voice synthesis method		Adaptive differential pulse-coded modulation (ADPCM)
Message	Recording time	32, 48, or 64 s (switch selectable)
	Capacity (sentences and phrases)	60 max.
Message input (switch-selectable)	MIC IN	Microphone input: Unbalanced dynamic microphone (600 Ω)
	LINE IN	Tape input: Input impedance: 50 kΩ, unbalanced; Maximum input voltage: 3.3 V
Message output (switch-selectable)	SPEAKER OUT	Built-in amplifier output: 0.14 W (8 Ω speaker)
	LINE OUT	External amplifier output: 600 Ω unbalanced transformer output Maximum output voltage: 0.5 V rms (effective value) Both balanced and unbalanced external amplifiers can be connected.
Built-in monitor speaker		Diameter 27 mm, 0.1 W (8 Ω)
Input frequency		32-second recordings: 8 kHz 48-second recordings: 5.3 kHz 64-second recordings: 4 kHz
Output frequency characteristics		32-second recordings: 100 Hz to 3.2 kHz 48/64-second recordings: 100 Hz to 2.2 kHz
Low-pass filter (LPF) selector function (see note)		Cutoff frequency: 3.2 kHz for 32-second recordings, 2.2 kHz for 48/64-second recordings
Message memory		128K bytes RAM (battery powered)
External communications function (for saving recorded messages)		RS-232C (Baud rate: 19,200/9,600/4,800/2,400 bps. XON/XOFF: yes/no, CTS/RTS: yes/no)
Self-diagnosis function		CPU watchdog timer, LOW battery voltage detection
Battery life		5 years at 25°C (battery life is shorter for higher temperatures)
I/O words required		10 (Special I/O area)
Internal current consumption		5 VDC, 0.3 A max.
Weight		400 g max.

Note: 1. The recording time of the Voice Unit is varied by changing the unit's input frequency. For improved sound quality, the cutoff frequency of the low-pass filter is automatically changed to a lower frequency when the recording time is increased from 32 to either 48 or 64 seconds. (The output frequency is set to 100 Hz to 2.2 kHz when the recording time is set to 48 or 64 seconds.)
2. Discontinuation models are contained.

Special I/O Units

ID Sensor Units

The ID Sensor Unit is a non-contact ID system that unifies product, production, and control data, and provides for efficient production of different products in varying quantities. A separate catalog is available providing information about ID systems in factory automation.
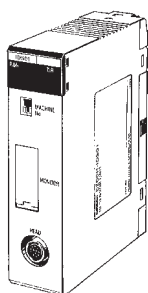
C200H-IDS01-V1
(electromagnetic,
for short distances)

C200H-IDS21
(microwave, for
long distances)

System Configuration

C200H-IDS01-V1
ID Sensor Unit

C200HX/HG/HE

C200H-CN422 (4 m)
C200H-CN222 (2 m)
Connecting Cable

Data can be read from or
written to a moving DC.

V600-H06/H07/H11
Read/Write (R/W)
Head (Antenna)

Special keysheet
for ID Sensor
Unit

C200H-PRO27-E
Programming Console

Tests data transmis-
sion and reads out
error messages.

V600-D□□□□□
Data Carrier (DC)
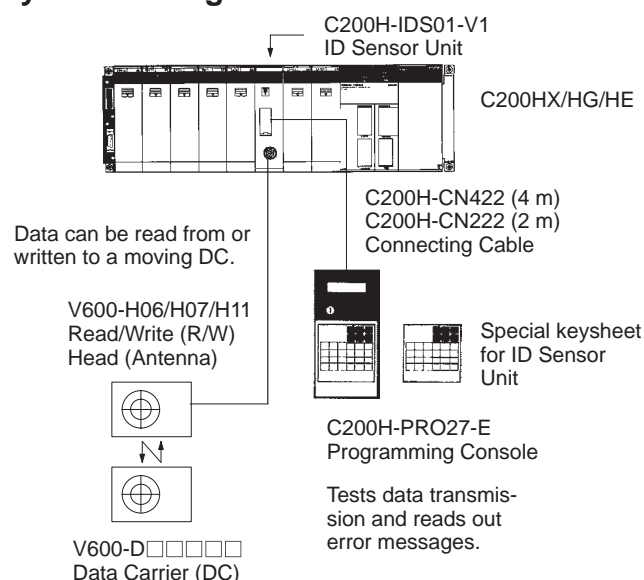
An ID (identification) system configuration can be achieved with the C200HX/HG/HE. The ID Sensor Unit is available for short-distance communications (compatible with the V600 Series) with electromagnetic coupling systems and for long-distance communications with microwave systems (compatible with the V620 Series).

- Possible to read or write data of a maximum of 1,024 bytes (512 words). However, the maximum data that can be input into the C200HX/HG/HE at one time is 40 bytes/scan.

- The ID Sensor Unit continuously monitors the status of communications between the R/W Head and Data Carrier, and records up to the 30 most recent communications errors. It also gathers statistics besides the development of errors, greatly reducing system downtime, and helping improve daily maintenance.

- The Programming Console can be used for monitoring using the special keysheet provided with the Unit. This monitoring function is useful for reading out error messages when a communications error occurs or for performing communications tests when starting up the system.

- English or Japanese messages can be displayed on the Programming Console by setting the DIP switch of the ID Sensor Unit.

Specifications

Item	Specifications
Communications control procedure	Interactive
Number of R/W Heads (antennas) connected	One per ID Sensor Unit.
Data Carrier (DC)	2K-byte/8K-byte SRAM (with built-in battery) 256-byte EEPROM
Data Carrier memory format	8-bit format
Commands	The following seven commands are used: Read, Write, Auto Read, Auto Write, Clear-all, Auto Read/Write Abort, and Data Management (C200H-IDS01-V1 only)
Data transferrable per instruction	Up to 512 words (1024 bytes) can be transferred at 20 words/scan.
Diagnostic functions	• CPU watchdog timer • Communications errors Six communications errors identify the causes of errors that have occurred during communications between the Data Carrier and the ID Sensor Unit. (i.e. Data Carrier missing, communications error) • Error Log The Error Log function allows communications errors to be displayed in statistical form or in order of occurrence. Error information is retained by the back-up capacitor.
Monitoring functions	The following monitoring functions are available when the ID Sensor Unit is connected to a Hand-held Programming Console. (Use the keyboard sheet provided with the ID Sensor Unit.) (Cable length: 4 m max.) Read (1 byte) Stepwise Write (1 byte) Continuous Write Test Error Log
Memory backup	Error information is backed up by a capacitor for 15 days (at 25°C).
I/O words required	5 (Special I/O area)
Internal current consumption	5 VDC, 0.25 A max. 26 VDC, 0.12 A max. (to drive Read/Write Head or R/W Antenna) (see note)
Weight	400 g max.

Note: 1. Use a 26 VDC power supply for the Read/Write Head (or Antenna). Refer to the *C200HX-CPU□□-E/-ZE PC Installation Guide* (W302*) for information on system design.

2. Discontinuation models are contained.

Communications Units

PC Card Unit

Standard PC cards can be used.
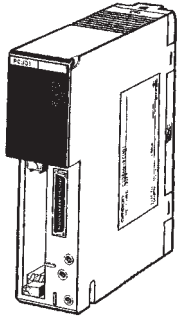
C200HW-PCU01
PC Card Unit
C200HW-PCS01-EV1
Ethernet Set
(with setup utility driver provided)
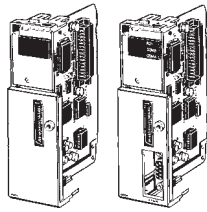
C200HW-COM01
C200HW-COM04-EV1
(w/RS-232C port)
Communications Board
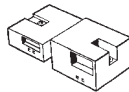
C200HW-CE011 (for 1 Unit)
C200HW-CE012 (for combined use with other Communications Units)
Bus Connection Unit

Note: Discontinuation models are contained.

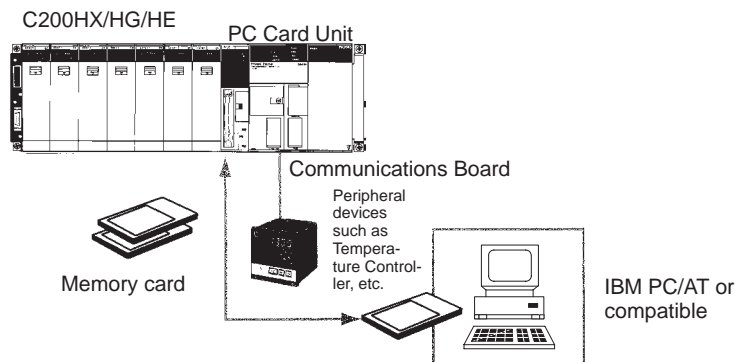### Data Storage and Ease of Production Stage Change with Memory Cards

- A standard SRAM or FLASH card inserted into the slot is used as file storage.

- Data can be loaded and saved between the PLC and memory cards using CMCR (CARD MACRO) instructions.

- Data written with the PC Card Unit to memory cards is read with the IBM PC/AT or compatible and vice versa.

Connects to OA Networks with Ethernet Cards

- A standard Ethernet card can be inserted into the slot and, using the RS-232C port on the front panel, can be set to allow connection of the C200HX/HG/HE PLC with the Ethernet.

- The system supports TCP/IP socket service, thus allowing communications with FA personal computers and UNIX computers.

- Data is loaded and saved between the CPU Unit and host computer by using OMRON's unique FINS (Factory Interface Network Service) commands. In addition, the PC Card Unit allows the PLC to execute the SEND/RECV instruction to communicate with the host computer or other PLCs.

System Configuration

Data Storage and Easy Production Stage Changes using Memory Cards

C200HX/HG/HE
PC Card Unit

Communications Board

Peripheral devices such as Temperature Controller, etc.

Memory card

IBM PC/AT or compatible

Communications with Host Computers and Other Personal Computers with Socket Services, Such as TCP/IP

FINS Communications Service (FINS Command/Response)

OMRON's unique protocol FINS (Factory Interface Network Service) commands make it possible for the Host to write or read data to or from the memory of a SYSMAC CPU Unit, thus the PLC does not require any user program for reception data processing.

FINS command/response

CMCR instruction

C200HX/HG/HE

C200HX/HG/HE

CVM1/CV PLC

Ethernet card   PC Card Unit

IBM PC/AT or compatible
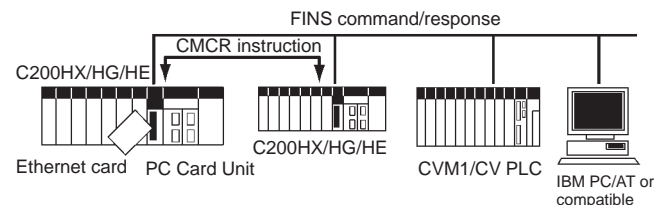
Communications Units

Socket Service

The CMCR instruction is executed to make use of TCP and UDP/IP socket services and allows communications with devices other than OMRON PLCs, such as FA personal computers and UNIX workstations using the appropriate protocols.
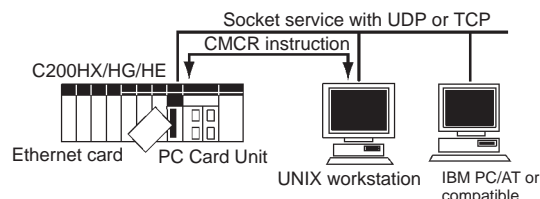
Communications with SEND/RECV Instruction

The SEND and RECV instructions are available for use in data communications, in which case, the setting of data exchanged will be necessary. The automatic processing of data communications is, however, performed internally.
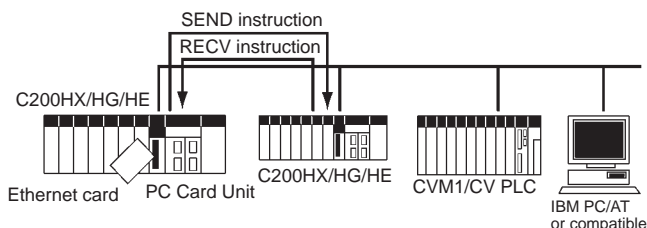
Performance Specifications

Item	Specifications
CPU Unit	i80386-SX25 MHz
Memory	1 MB DRAM
ROM	512 KB (for BIOS, DOS, and system file storage)
FLASH ROM	1 MB (for BIOS, DOS, and system file storage)
Serial port	RS-232C x 1 (for terminal connection setup)
PC card interface	PCMCIA 2.1 (3.3-V type is not supported.) Type II x 2 slots or type III x 1 slot
Indicators	RUN, ERR, PC card access, and PC card formatting
Power supply	5 VDC (supplied by the Power Supply Unit)
Dimensions	34.5 x 130 x 125 (WxHxD)
Weight	400 g max.

Note: i80386 is a registered trademark of Intel, Corp.
Ethernet is a registered trademark of Xerox, Corp.

Recommended Memory Cards

Manufacturer	Product
SunDisk compatibles	SDP5100A (FLASH PACKER series)
Intel	IMC001FLKA (FLASH Card)

Note: OMRON does not guarantee the performance of the above memory cards although OMRON has confirmed that the above memory cards are suitable to the PC Card Unit.

Recommended Ethernet Cards

Manufacturer	Product
XIRCOM (see note 1)	PS-CE2-10BC (AP)
Kingston Technology	KNE-PCM/T
Others	IBM compatibles, etc.

Note: 1. Green and red packages are available. Purchase the green package. The red package includes the ODI driver SPEC4.
2. OMRON does not guarantee the performance of the above Ethernet cards although OMRON has confirmed that the above Ethernet cards are suitable to the PC Card Unit.

Mounting the PC Card Unit

- **Standard Mounting**

C200HW-CE011 Bus Connection Unit (for 1 Unit)

C200HE-CPU32-(Z)E/42-(Z)E
C200HG-CPU33-(Z)E/43-(Z)E/53-(Z)E/63-(Z)E
C200HX-CPU34-(Z)E/44-(Z)E/54-(Z)E/64-(Z)E
C200HX-CPU65-ZE/-85-ZE
CPU Unit

C200HW-PCU01 PC Card Unit

C200HW-PCS01-EV1 Ethernet Set

C200HW-COM01/04-EV1 Communications Board
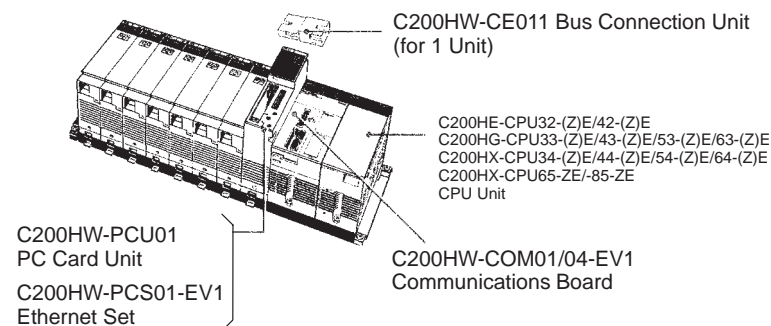
Note: Discontinuation models are contained.

Communications Units

- **Mounting with the Controller Link or SYSMAC LINK Unit**

C200HW-CE012 Bus Connection Unit (for 2 Units)

C200HE-CPU32-(Z)E/42-(Z)E
C200HG-CPU33-(Z)E/43-(Z)E/53-(Z)E/63-(Z)E
C200HX-CPU34-(Z)E/44-(Z)E/54-(Z)E/64-(Z)E
C200HX-CPU65-ZE/-85-ZE
CPU Unit

C200HW-PCU01
PC Card Unit

C200HW-PCS01-EV1
Ethernet Set

C200HW-CLK21
Controller Link Unit
C200HW-SLK13/23/14/24
SYSMAC LINK Unit

C200HW-COM01/04-EV1
Communications Board
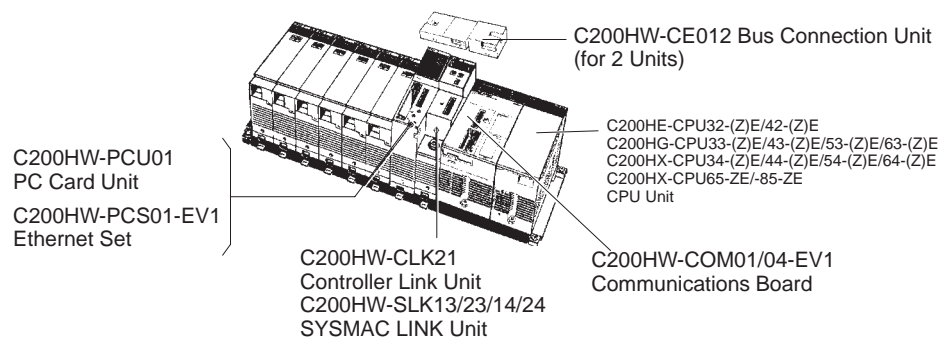
Note: Discontinuation models are contained.

Communications Units

Controller Link Unit

Handles large quantities of data at low cost and allows construction of flexible data links between various SYSMAC Units and between SYSMAC Units and personal computers.
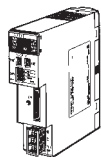
C200HW-CLK21
Twisted-pair Cable Model
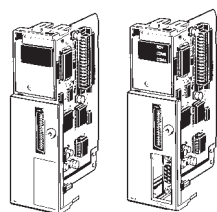
C200HW-COM01
C200HW-COM04-EV1
(with RS-232C port)
Communications Board
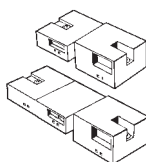
C200HW-CE001 (for Single Unit)
C200HW-CE002 (for Double Unit)
Bus Connection Unit
Connects Controller Link Unit and CPU
Unit (excluding C200HE-CPU11-E)

C200HW-CLK21
Controller Link Unit

C200HW-CLK21
Controller Link
Unit

CVM1-CLK21
Controller Link
Unit

FA computer
(IBM PC/AT or compatible)

C200HX/HG/HE

C200HX/HG/HE

CVM1/CV PLC

Twisted-pair cable (specified)

3G8F5-CLK21-E
Controller Link
Support Board
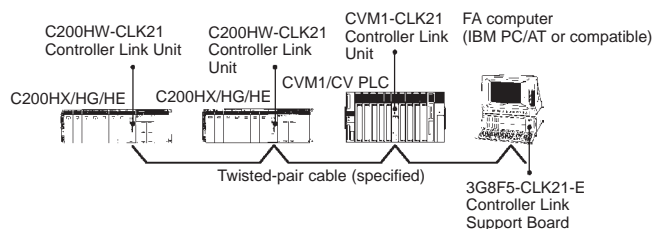
Note: Discontinuation models are contained.

Flexible, Efficient Data Link Function Handles Large Quantities of Data

* Number of send words per node: 1,000 max.
  Number of send and receive words per node: 8,000 max. with the PLC and 32,000 max. with the personal computer

* Easy-to-use automatic setting and optional setting with optional area size designation are selectable.

Message Service Function Exchanges Large Quantities of Data

* The message service function can exchange up to 2,012 bytes of data including the FINS header without having to split the data.

Twisted-pair Cable Ensures Easy Wiring at Low Cost

* The network uses twisted-pair cable, which is easy to use and maintain at low cost compared with coaxial cable and optical fiber cable.

Note: Use the dedicated twisted-pair cable.

* A terminator required for the end of the network is incorporated, which can be easily set with an built-in switch.

Allows Communications Between the Personal Computer and Programmable Controller

* In addition to OMRON's C200HX/HG/HE and CVM1 Units, the Personal Computer Board is available for the ISA Board, which allows the easy construction of data links with personal computers.

Note: Connect the Controller Link Unit on the immediate left side of the CPU Unit. The Controller Link Unit is not available to the C200HE-CPU11-E.

Communications Units

Communications Specifications

Item	Specifications
Communications method	N:N token bus
Code	Manchester code
Modulation	Baseband code
Synchronization	Flag synchronization (conforms to HDLC frames)
Transmission path form	Multi-drop bus
Baud rate and max. transmission distance	The max. transmission distance varies with the baud rate as follows: 2 Mbps: 500 m 1 Mbps: 800 m 500 kbps: 1 km
Transmission path (construction)	Specified twisted-pair cable with shield (two signal lines and one shield line)
Node connection method	PLC: Terminal block IBM PC/AT or compatible: Special connector (provided with the Unit)
Number of nodes	32 max.
Communications functions	Data link and message service
Number of data link words	Transmission words per node: 1,000 max. Data link area per PLC (C200HX/HG/HE, CVM1, or CV): 8,000 max. Data link area per IBM PC/AT or compatible: 32,000 max. Total data link words per network: 32,000 max.
Data link areas	I/O, AR, LR, DM and EM areas
Message length	2,012 bytes max. (including the header)
RAS functions	Polling node backup function Self-diagnosis function (for hardware checking at startup) Echoback and broadcast tests (with FINS commands) Watchdog timer Error log function
Error control	Manchester code check and CRC check (CCITT $X^{16} + X^{12} + X^5 + 1$)

Data Links

Data links enable network nodes (e.g., two SYSMAC PLCs or a SYSMAC PLC and IBM PC/AT or compatible computer) to use a specified area so that the data in the area can be always shared by all the nodes. No communications programs, therefore, are required by the SYSMAC CPU Units or IBM PC/AT or compatible computer. By just writing to the send area of the local node, the data will be automatically shared by the receive area of the remote node.

Data always exchanged (shared)
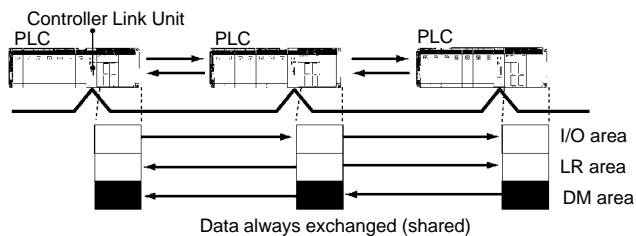
Message Service

The message service is a function that can be used to transfer data when necessary between specific nodes, read/write status information, change the operating mode, and perform other tasks. The message services are accessed by executing communications instructions in the user program. These communications instructions include the SEND and RECV instructions, which are used to transfer data, and the CMND instruction, which is used to execute various commands. The CMND instruction, which is used for the issuance of a variety of commands, is available to the CVM1/CV PLCs only.

Automatic Setting
(Without Controller Link Support Software)

Data links can be automatically set to create simple data links by making a simple setting in the data link parameters in the DM area of the PC. All nodes will have the same size send/receive areas and will share exactly the same data.

Manual Setting
(With Controller Link Support Software)

Data link areas can be set individually for each node using the Controller Link Support Software, allowing the data link areas to be set. The number of words each node sends can be set manually. Nodes can also be set that only receive or only send data. A data link can also be created so that one node receives only part of the data sent from other nodes.

Data sent under specified conditions when required.

Communications Units

Mounting Controller Link Units to the C200HX/HG/HE PLC

One Unit Mounted

C200HW-CE001
Bus Connection Unit (for 1 Unit)
C200HE-CPU32-(Z)E/42-(Z)E
C200HG-
CPU33-(Z)E/43-(Z)E/53-(Z)E/63-(Z)E
C200HX-
CPU34-(Z)E/44-(Z)E/54-(Z)E/64-(Z)E
C200HX-CPU65-ZE/85-ZE
CPU Unit
C200HW-COM01/04-EV1
Communications Board

C200HW-CLK21
Controller Link Unit

Two Units Mounted

C200HW-CE002
Bus Connection Unit (for 2 Units)
C200HE-CPU32-(Z)E/42-(Z)E
C200HG-
CPU33-(Z)E/43-(Z)E/53-(Z)E/63-(Z)E
C200HX-
CPU34-(Z)E/44-(Z)E/54-(Z)E/64-(Z)E
C200HX-CPU65-ZE/85-ZE
CPU Unit
C200HW-COM01/04-EV1
Communications Board

C200HW-CLK21
Controller Link Unit

Note: The Controller Link Unit must be used in combination with the Bus Connection Unit and Communications Board.

Controller Link Support Software

Screen Examples

Main Menu	Data Link Table	Monitor Status

Available to Peripheral Devices and Nodes

The personal computer as a peripheral device connected through RS-232C or as a node connected through the Controller Link Support Board can use the Controller Link Support Software.

As a Peripheral Device	Through the Controller Link Support Board

Peripheral or RS-232C port   Controller Link

Controller Link

Optional Data Link Table Setting

The Controller Link Support Software enables the data link tables and data link area to be set as freely and easily as automatic data link area settings.

Functions

Function	Explanation
Data link management	Creates and edits data link tables for manually set data links, registers data link tables at nodes, saves data link tables as files, and performs other processing related to data links.
Network parameter setting	Adjusts network communications parameter settings to provide the most suitable Controller Link communications for the user application.
Routing table management	Creates and edits routing tables, registers routing tables at nodes, and saves routing tables as files. Routing tables are used to specify data communications paths when data is transferred to/from remote FA networks. (See note.)
Communications testing	Checks whether the Controller Link Network is working properly.
Status display	Displays the network and node status, data link status, error logs, and so on.
Maintenance	Backs up the contents of the EEPROM in the Controller Link Unit or Controller Link Support Board as a file and restores the file to the EEPROM.
PLC ID editing	Assigns a unique ID to each PLC. Using PLC IDs allows easier PLC management than using network and node addresses.
System setup	Sets the communications parameters for the Controller Link Support Software, the PLC to be connected, the service conditions for the Controller Link Support Software, and so on. These must be set before the Controller Link Support Software is connected to a node.

Note: Other FA networks, such as Controller Link Networks and SYSMAC LINK Networks, can be inter-connected.

Communications Units

Operating Environment

Item	Specifications
Processor	80386/80486 or higher
Main memory	400K bytes min.
EMS	Required settings according to the language (e.g., Japanese) in use.
Hard disk	1M bytes min. empty disk space
Display	640 x 480 dots (conforming to OADG standards)
Keyboard	Conforming to OADG standards
OS	IBM PC-DOS 7.0 or later Microsoft MS-DOS 6.2 or later Windows 95

SYSMAC LINK Units

Allows high-speed, large-capacity data exchange among 62 Units max. The network configuration can be large or small depending on the system.
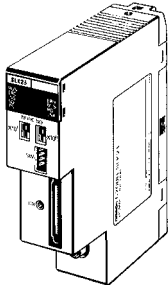
C200HW-SLK23/24
(Coaxial cable)
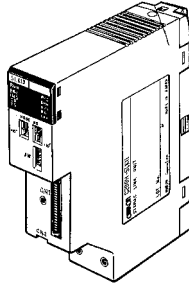
C200HW-SLK13/14
(Optical)
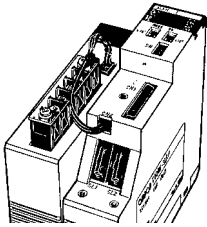
C200H-APS03
Power Supply Unit

Power Supply Unit that Prevents System Shutdowns (Optical Only)
The optical SYSMAC LINK Unit is designed to receive back-up power supply from the Power Supply Unit. When any trouble occurs with the SYSMAC LINK Unit, the node-bypass function operates to prevent shutdown of the whole system.
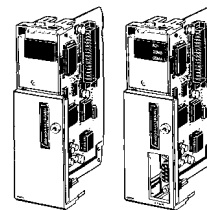
C200HW-COM01
C200HW-COM04-EV1
(w/RS-232C port)
Communications Board
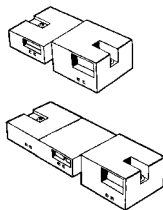
C200HW-CE001 (for 1 Unit)
C200HW-CE002 (for 2 Units)
Bus Connection Unit (for connecting SYSMAC LINK Unit and CPU Unit (except C200HE-CPU11))

- **Maximum of 62 SYSMAC LINK Units**
  Up to 62 SYSMAC LINK Units can be connected in one network. In addition, two SYSMAC LINK Units can be mounted on one PLC, allowing multi-level system configuration.

- **Data Links**
  The data link capacity is as large as 2,966 words. High-speed and large-capacity data communications are possible using the LR area and DM area.

- **Flexible Data Link Configuration**
  Since an optimum data link table can be created for each node (Machine No.) using the SYSMAC Support Software, the data link area can be used effectively.

- **Event Communications**
  Using the SEND and RECV instructions, up to 256 words of data can be sent or received for any node in the network.

- **Remote Programming or Monitoring Using the SYSMAC Support Software**
  Programs can be transferred to any SYSMAC Unit within the network and various monitoring operations can be performed for that Unit.

- **Built-in LSI Exclusively for Communications**
  The built-in LSI allows setting of the communications time period between SYSMAC Units. The control station is automatically switched when any trouble occurs in the data link control station, thus assuring a highly reliable data link system.

Note: Mount the SYSMAC LINK Unit to the left of the CPU Unit. The SYSMAC LINK Unit cannot be used with the C200HE-CPU11-E.

Communications Units

System Configuration

Coaxial Cable System

Up to 62 nodes separated by a total of 1 km max

C200HX/HG/HE

C1000H-TER01
Termination Resistance
is necessary

CVM1

CV500/CV1000/CV2000

IBM PC/AT or
compatible

SYSMAC LINK Support Board
3G8F5-SLK21-E

C1000H-TER01
Termination Resistance
is necessary
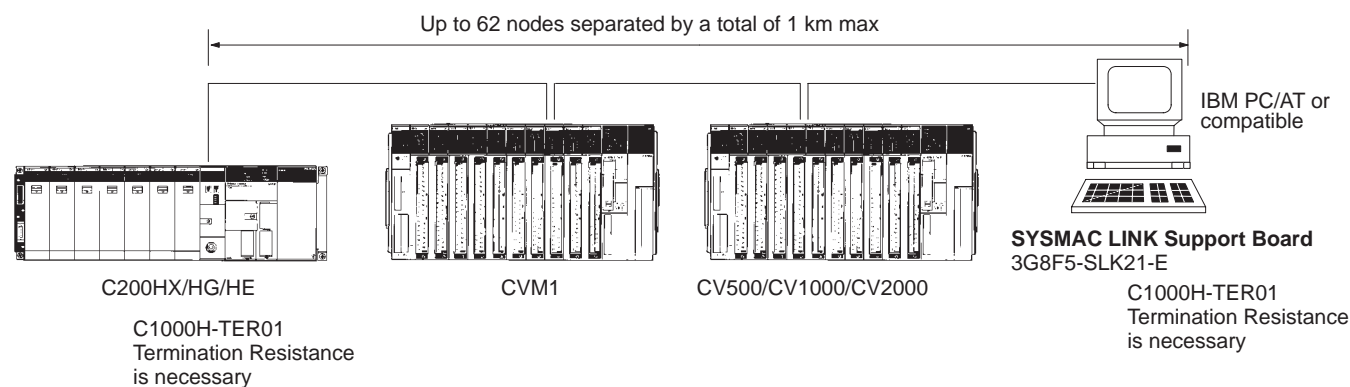
Note: Discontinuation models are contained.

Optical Fiber System

Up to 62 nodes separated by a total of 10 km max.
with 800 m max between nodes

CVM1

CV500/CV1000/CV2000

C200HX/HG/HE

C200H-APS03 Backup Pow-
er Supply Unit (see note 1)

C1000H-APS01
Backup Power Supply Unit

Uninterruptible Power
System (see note 2)
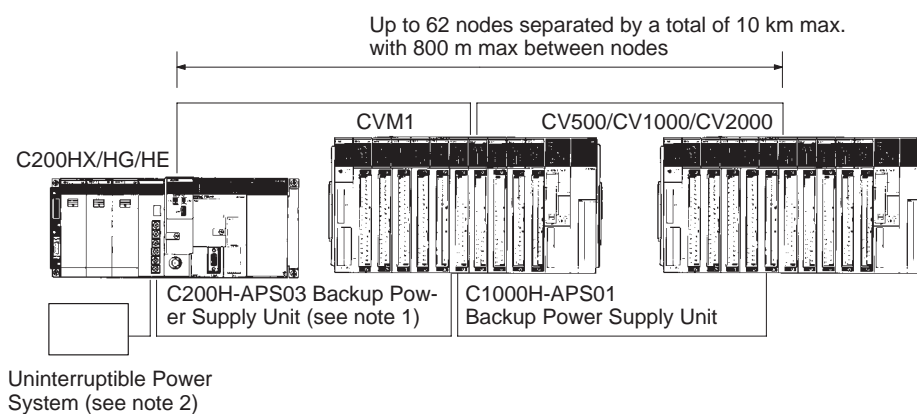
Note: 1. The Backup Power Supply Unit is provided with Power Supply Cables (C200H-CN111, C1000H-CN111 for one Unit).
When supplying power to two Units simultaneously, order the C200H-CN211 Cable for one Unit.
2. The Backup Power Supply Unit must be separated from the main power supply line to the PLC.

Mounting SYSMAC Link Units

One Unit Mounted

C200HW-CE001
Bus Connection Unit (for 1 Unit)

C200HE-CPU32-(Z)E/42-(Z)E
C200HG-
CPU33-(Z)E/43-(Z)E/53-(Z)E/63-(Z)E
C200HX-
CPU34-(Z)E/44-(Z)E/54-(Z)E/64-(Z)E
C200HX-CPU65-ZE/85-ZE
CPU Unit

C200HW-COM01/04-EV1
Communications Board

C200HW-SLK13/23/14/24
SYSMAC LINK Unit

Two Units Mounted

C200HW-CE002-V1
Bus Connection Unit (for 2 Units)

C200HE-CPU32-(Z)E/42-(Z)E
C200HG-
CPU33-(Z)E/43-(Z)E/53-(Z)E/63-(Z)E
C200HX-
CPU34-(Z)E/44-(Z)E/54-(Z)E/64-(Z)E
C200HX-CPU65-ZE/85-ZE
CPU Unit

C200HW-COM01/04-EV1
Communications Board

C200HW-SLK13/23/14/24
SYSMAC LINK Units

Communications Units

Specifications

Item	Specifications	
	C200HW-SLK23/24 (Coaxial)	**C200HW-SLK13/14 (Optical)**
Communications method	N:N token bus	
Transmission method	Manchester code, base band	
Transmission path	Bus	Daisy chain
Data transmission rate	2 Mbps	
Transmission media	Coaxial cable (5C-2V)	Hard-plastic-clad quartz optical fiber cable
Node separation	1 km max.	10 km max. (800 m max. between nodes)
Message length	512 bytes max. (256 words)	
Connectors	BNC (F Adapter)	Full, half-lock press-in connector
Link functions	Data link, data read/write service	
Data link words	C200HW-SLK13/23: 918 words max. C200HW-SLK14/24: 2,966 words max.	
Send buffer capacity	1 message	
Receive buffer capacity	2 messages	
RAS functions	Automatic polling unit backup, self-diagnostics (internode echo tests), watchdog timer, error (CRC-CCITT) detection = $X^{16}+X^{12}+X^5+1$	
Current consumption	0.8 A max.	
Weight	400 g max.	500 g max.

Communications Units

DeviceNet Master Unit

The DeviceNet Master Unit Is a Multi-vendor Bus Conforming to the DeviceNet.
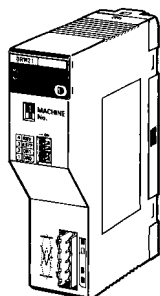
C200HW-
DRM21-V1

- **Conforms to DeviceNet**
  Conforms to Allen-Bradley's DeviceNet, thus connecting to a variety of devices.

- **Dedicated Cable Saves Wiring Effort**
  Two nodes are connected through a single dedicated cable, which greatly reduces wiring effort.

- **Allows T-type Bifurcation, Branching, and Multi-drop Wiring**

- **Connects to 50 Slaves Max. for 1,600-point I/O Control**
  Possible with the C200HX-, C200HG-, and C200HE-series Master.

- **System Expansion with DeviceNet Configurator**
  Possible to make changes in I/O allocation to the Master and more than one Master Unit can be used with a single CPU Unit.

- **Network Length of 500 Meters Max.**
  Possible with a speed of 125 kbps.

- **Communications at 500 kbps Max.**
  Possible with a network length of 100 m max.

Communications Specifications

The communications specifications of the DeviceNet Master Unit conform to the DeviceNet communications protocol.

Item	Specifications			
Baud rate	500, 250, or 125 kbps (selectable)			
Communications distance	Communications speed (kbps)	Max. network length (m)	Branch length (m)	Total branch length (m)
	500	100 max.	6 max.	39 max.
	250	250 max.		78 max.
	125	500 max.		156 max.
Error control	CRC, node address multiple check, and scan list collation			
Cable	Dedicated cable			

Specifications

Item	C200HW-DRM21-V1
Available PLC	C200HX/HG/HE
Max. No. of connecting PLCs	1
Mounting position	Mounted to the CPU or Expansion I/O Rack. (Cannot be mounted to the Slave Rack)
Max. no. of I/O points	1,600
Max. no. of connecting slaves	50

Note: The following conditions are possible if the Configurator is used.
    Input: 1,600 points x 2 blocks
    Output: 1,600 points x 2 blocks
    Total: 4,800 points (300 words)
    A maximum of 1,600 points (100 words) can be used, however, if the message service function is in use.

Communications Units

System Configuration Example

Master

C200HX/HG/HE
800 input and 800 output points (100 words in total)
The following conditions are possible if the Configurator is used.
Input: 1,600 points x 2 blocks
Output: 1,600 points x 2 blocks
Total: 4,800 points (300 words)
A maximum of 1,600 points (100 words) can be used, however, if the message service function is in use.

C200HX/HG/HE

Slave

Sensor Terminal
(8 sensor input points)

Analog Output Terminal
(2 output points)

Analog Input Terminal
(4 or 2 input points)

Remote I/O Terminal
(8 or 16 input and 8 or 16 output points)

Remote Adapter
(16 input and 16 output points)

I/O Block

SYSMAC CQM1

(16 inputs, 16 outputs)

Branching

T-type bifurcation

T-type Bifurcation Tap

T-type bifurcation

T-type Bifurcation Tap

Trunk line

Dedicated cable

Other companies' products

Manifold Valve

Flex-I/O

Bar Code Reader

DeviceLink cable

3G8F5-DRM21
ISA Board (with Configuration Software)

3G8E2-DRM21
PC Card (with Configuration Software)

T-type Bifurcation Tap
(with termination resistor)

Note: Discontinuation models are contained.

Contact the respective companies for the other companies' products listed above.

Main ODVA Member

The ODVA (Open DeviceNet Vendor Association) is an independent organization established to popularize the DeviceNet and give its members the opportunity to negotiate for improvements in DeviceNet specifications. Presently, the ODVA has 51 members worldwide. OMRON as one of the four board members of the ODVA is actively playing an important role in the ODVA.

Note: Refer to the *DeviceNet Catalog (Cat No. Q102-E1)* for more technical information.

Board members

Staff

Board of Technical Review

SIG A   SIG B   SIG C   SIG D   SIG E
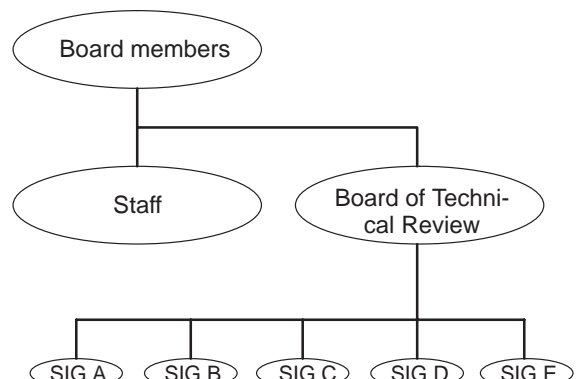
Communications Units

CompoBus/S Master Unit

High-speed ON/OFF Bus Saving Wiring Effort and Manufacturing Steps in Factories
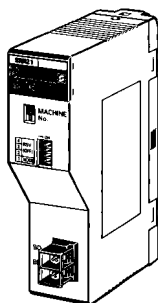
C200HW-
SRM21-V1

- **Maximum Communications Cycle Time of 1 ms Max.**
  Communicates with 32 Slaves max. to exchange 256-point data at a communications cycle time of 1 ms max. A communications cycle time of only 0.5 ms is required to communicate with 16 Slaves max. to exchange 128-point data.

- **Dedicated Cable Saves Wiring Effort**
  A dedicated flat cable or VCTF cable is used to connect the Master Unit to a Slave or a Slave to another Slave.

- **Allows T-type Bifurcation and Multi-drop Wiring**

- **T-type Bifurcation Connectors Make It Possible to Increase the Number of Slaves with Ease**
  T-type bifurcation connectors can be used with dedicated flat cables to increase the number of Slaves with ease.

- **DIP Switch Selection of High-speed Communications Mode (as with previous models) or Long-distance Communications Mode**
  High-speed Communications Mode: Baud rate: 750 bps; Communications distance: 100 m (30 m max. using dedicated flat cable or 4-core VCTF cable)
  Long-distance Communications Mode: Baud rate: 93.75 bps; Communications distance: 500 m (200 m max. using dedicated flat cable or 4-core VCTF cable)

- **Connects to Sensors with Ease**
  A sensor and Slave can be easily connected through connectors.

- **Distributed Control of Several I/O Points**

- **A Great Increase in the Number of Units Mounted with a Single CPU Unit**
  The following conditions are possible with the C200HX-CPU54/64-(Z)E or C200HG-CPU53/63-(Z)E.
  256 I/O points in use: 8 Units
  128 I/O points in use: 16 Units

Communications Specifications

Item		Specifications			
Communications protocol		Dedicated CompoBus/S protocol			
Baud rate		High-speed Communications Mode: 750 kbps Long-distance Communications Mode: 93.75 kbps (See note 1.)			
Modulation		Baseband			
Mark		Manchester			
Cable		2-core VCTF cable (2 VCTF cords with a nominal cross-section of 0.75 mm^2) 4-core VCTF cable (4 VCTF cords with a nominal cross-section of 0.75 mm^2) Dedicated flat cable (See note 2.)			
Communica-tions distance	Cable type	Communications mode	Trunk line length	Branch line length	Total branch line length
	2-core VCTF cable	High-speed Communications Mode	100 m max.	3 m max.	50 m max.
		Long-distance Communications Mode	500 m max.	6 m max.	120 m max.
	Dedicated flat cable or 4-core VCTF cable	High-speed Communications Mode (See note 3.)	30 m max.	3 m max.	30 m max.
		Long-distance Communications Mode (See note 4.)	Unrestricted branching up to a total cable length of 200 m		
Max. number of nodes		32			
Error control checks		Manchester code check, frame length check, and parity check			

Note: 1. The baud rate is selected with the DIP switch. (The baud rate is switched using a setting in the DM Area. The default setting is 750 kbps.)

2. Dedicated flat cables, 2-core VCTF cables, and 4-core VCTF cables cannot be used in combination.

3. If the number of Slaves connected is 16 or less, communications are possible with a trunk line length of 100 m max. and a total branch line length of 50 m max.

4. There are no restrictions on the branching configuration, trunk line length, branch line length, or total branch line length. Connect a terminating resistance to the node farthest from the Master.

Specifications

Item	Specification		
Internal current consumption	5 VDC, 150 mA max.		
Number of I/O points	256 points (128 input points, 128 output points) or 128 points (64 input points, 64 output points) (Switched using switch)		
Number of allocated words	256 I/O points: 20 words (8 input words, 8 output words, 4 words for status information) 128 I/O points: 10 words (4 input words, 4 output words, 2 words for status information)		
Number of Master Units that can be mounted	**PC or CPU Unit**	**128 I/O points**	**256 I/O points**
	C200HE	10 Units	5 Units
	C200HG-CPU33/43	10 Units	5 Units
	C200HG-CPU53/63	16 Units	8 Units
	C200HX-CPU34/44	10 Units	5 Units
	C200HX-CPU54/64	16 Units	8 Units
	C200HS	10 Units	5 Units
	CS1	16 Units	8 Units
Node address units	8 points		
Number of Slaves that can be connected	32 Units		
Status information	Communications error flags, participation flags (See note.)		
Weight	200 g max.		

Note: Using bits in the Special I/O Unit Area (AR Area).

Communications Units

System Configuration Example

Connections with Flat Cables

Master

C200HX/HG/HE

Master Unit (128 inputs/128 outputs)

Slave

Remote I/O Terminal (4 or 8 input and 4 or 8 output points)

Sensor Terminal (4 or 8 sensor input points)

Bit Chain Terminal (8 input and 8 output points)

Output Block (8 or 16 output points)

B1T Slave

B1T terminator

Press-fit connector with termination resistor

Press-fit connector for bifurcation

Dedicated flat cable
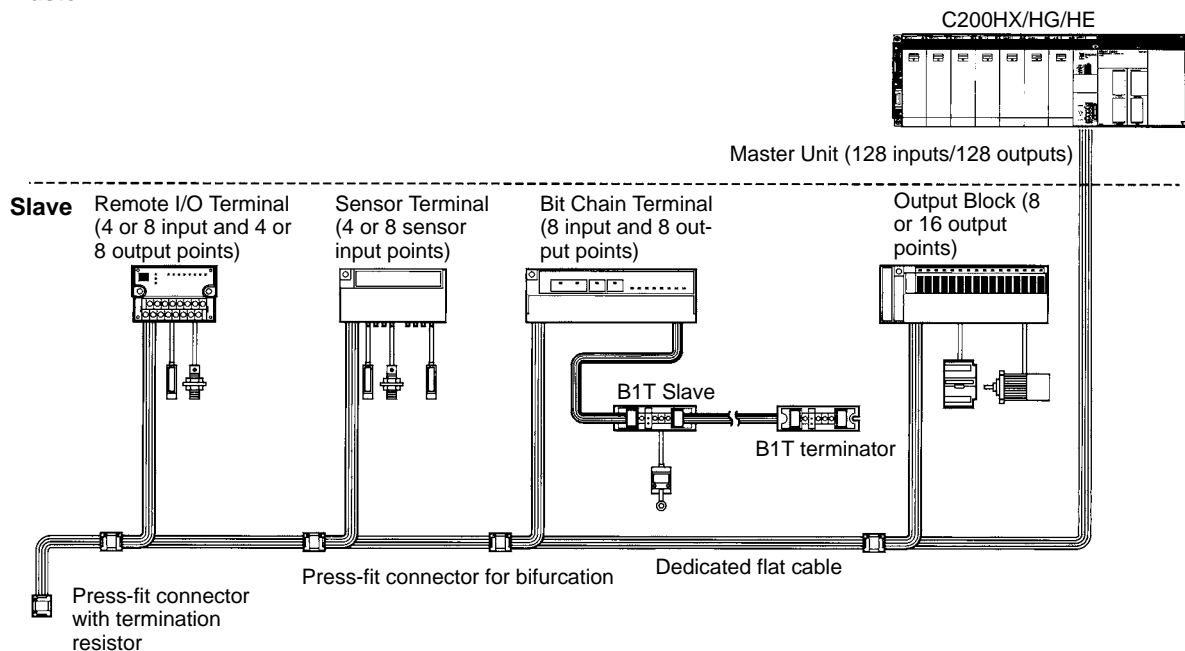
Connections with VCTF Cables

Master

C200HX/HG/HE

Master Unit (128 inputs/128 outputs)

Slave

Remote I/O Terminal (4 or 8 input and 4 or 8 output points)

Sensor Terminal (4 or 8 sensor input points)

Bit Chain Terminal (8 input and 8 output points)

Multiple bifurcation

T-type bifurcation

B1T Slave

B1T terminator

Output Block (8 or 16 output points)

Terminal with termination resistor

Multi-drop wiring
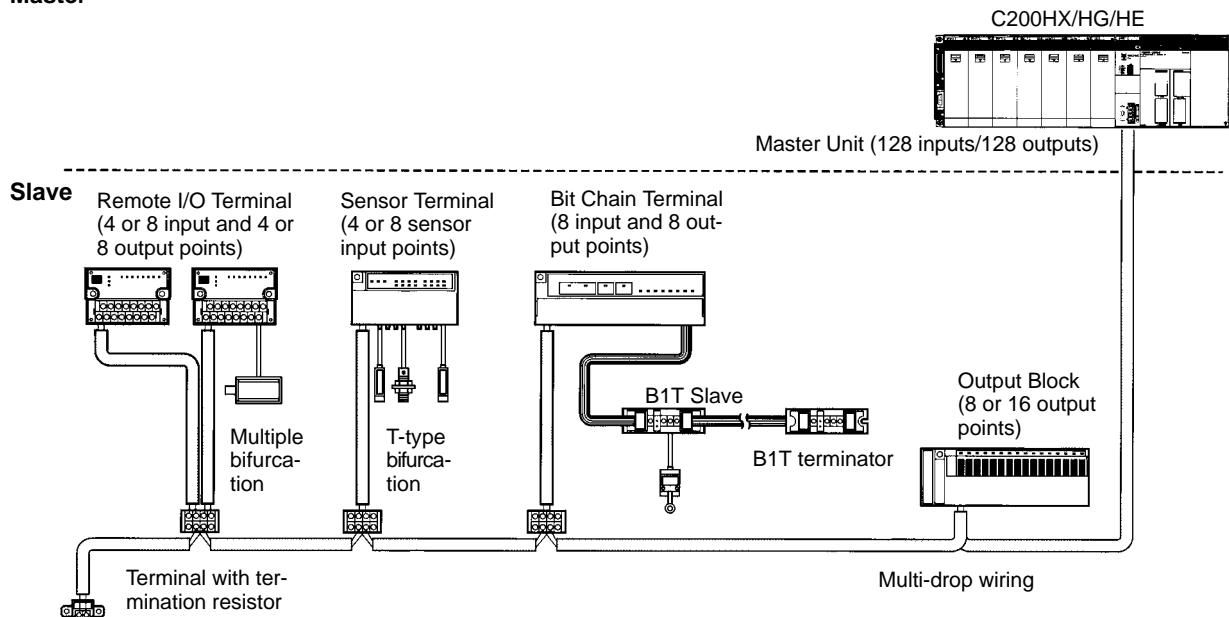
Note: Refer to the *CompoBus/S Catalog (Cat No. Q103-E1)* for more technical information.

Remote I/O Master Units

The wired model or optical model can be selected depending on the on-site condition.
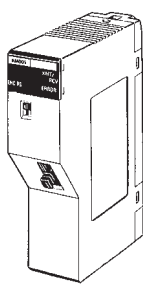
Optical Master
C200H-RM001-PV1
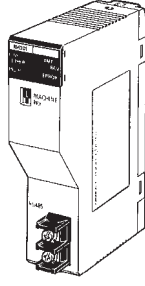
Wired Master
C200H-RM201

Use the Remote I/O Master Unit when setting a Remote I/O Slave Unit away from the CPU Unit. Use a wired model for the transmission terminal.

- A total of two wired or optical Remote I/O Master Units can be connected to a CPU Unit or Expansion I/O Unit.
- Use the C200H-BC101-V2/BC081-V2/BC051-V2/BC031-V2 Backplane for the Remote I/O Slave Unit.

- Up to five Remote I/O Slave Units can be connected to the two Master Units.
- In an optical system, up to 64 (512 points for 32 words) Optical I/O Units or I/O Link Units can be connected in addition to the Remote I/O Slave Units.
- In a wired system, up to 32 (512 points for 32 words) I/O Terminals, Programmable Terminals, or valve wiring blocks can be connected in addition to the Remote I/O Slave Units.
- The Remote I/O Slave Unit can be connected to the C500 or C1000H Remote I/O Master Unit. (Settings are required on the Slave Unit side.)
- When mounting a High-density I/O Unit to the Slave Rack, use the C200H-RM001-PV1 or C200H-RM201 Remote I/O Master Unit. The C200H-RM001-P Unit cannot be used.
- Two C200HX/HG/HE Expansion I/O Racks can be connected to the Remote I/O Slave Unit. The Expansion I/O Rack is included in the number of usable Units (5 Units max.).
- The High-density I/O Unit and Interrupt Unit cannot be used with the Remote I/O Slave Unit.

Note: 1. The Remote I/O Master Unit cannot be used with the DeviceNet Master Unit.
2. Discontinuation models are contained.

Units Connectable to Remote I/O Systems

Unit		Words allocated	Max. in Optical Systems	Max. in Wired Systems	
Remote I/O Slave Units	C200H Slave Racks	IR 050 to IR 099	5 (any Expansion I/O Racks connected to Slave Racks must be counted as one additional Slave each)		
	C500 Slave Racks		2 (If C200H and C500 Slave Racks are both used under the same Master, compute the total for C200H Slaves, counting each C500 Slave as two C200H Slaves.)		
Optical I/O Unit		IR 200 to IR 231	32	Cannot connect.	
Programmable Terminals			Cannot connect.	8 (4 words allocated to each)	(See note.)
3G3EV/3G3FV-series Inverters				8 (4 words allocated to each)	
I/O Terminals				32 (1 word allocated to each)	
Remote Interfaces				32 (1 word allocated to each)	
CQM1	I/O links created to C200H			8 (4 words allocated to each)	
SK20				16 (2 words allocated to each)	
Valve wiring blocks				32 (1 word allocated to each)	

Note: 1. When using the above Units in combination, be careful not to allocate the same words.
2. Discontinuation models are contained.

I/O Links to the CQM1 and SK20

C200HX/HG/HE with
C200H-RM201 Master

CQM1 with I/O Link Unit
(CQM1-LK501)

SK20 (with built-in I/O link)

Set to #0 at the CQM1	IR 200/201	Output →	IR 001/002	The CQM1 allocates I/O words according to the slot the I/O Link Unit is mounted to.
	IR 202/203	← Input	IR 100/101	

Set to #4 at the SK20	IR 204	← Input	IR 19	The SK20 allocates IR 19 and IR 20 automatically (fixed).
	IR 205	Output →	IR 20	
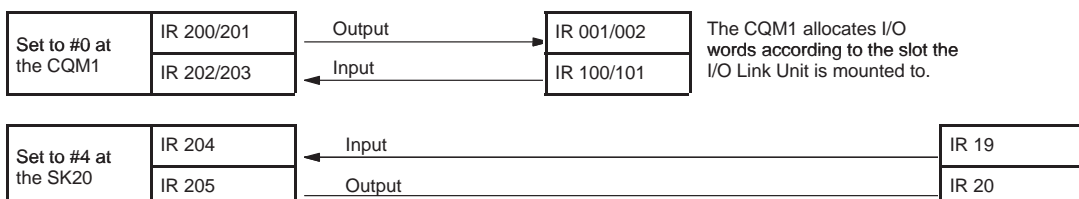
Note: Discontinuation models are contained.

Communications Units

System Configuration

Optical Remote I/O System

C200H-RM001-PV1
Optical Remote I/O Master Unit

(Maximum of two Units can be mounted.)

C200H-RT001-P/RT002-P
Remote I/O Slave Unit

Slave Rack

C200H-BC☐☐1-V2
Backplane

5 Slave Racks max., C500 Slave Rack counted as 2.

C500 Slave Rack

(Calculate one C500 Unit as two C200HX/HG/HE Units)

C500-RT001/002-(P)V1
Remote I/O Slave Unit

Optical fiber cable

I/O Link Unit

Terminator

Optical I/O Unit   Optical I/O Unit

64 Units (32 words) max.;
L and H in the same words
of Optical I/O Units can be
used for a mixture of input
and output.

Wired Remote I/O System

C200H-RM201
Wired Remote I/O Master Unit

(Maximum of two Units can be mounted.)

C200H-RT201/RT202
Remote I/O Slave Unit

Slave Rack

C200H-BC☐☐1-V2
Backplane

5 Slave Racks max., C500 Slave Rack counted as 2.

C500 Slave Rack

(Calculate one C500 Unit as two C200HX/HG/HE Units)

C500-RT201
Remote I/O Slave Unit

Twisted-pair cable

G7TC I/O Block

G71 I/O Interface

32 Units (32 words) max.

G72C I/O Terminal

To other Slaves (PTs, I/O Link Units, etc.)

Note: Discontinuation models are contained.

Host Link Units

Suitable for connecting to computers.
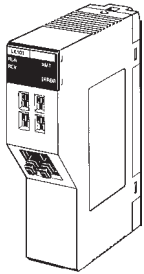
C200H-LK101-PV1
Host Link Unit
(optical)
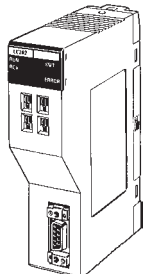
C200H-LK202-V1
Host Link Unit
(RS-422)
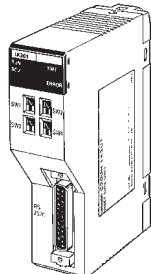
C200H-LK201-V1
Host Link Unit
(RS-232C)

The following can be performed on the Host Link Unit side.

- PLC operating conditions can be monitored or changed.

- IR area can be read or written.

- Programs can be uploaded or downloaded.

- Up to two Host Link Units can be connected to a CPU Unit or Expansion I/O Unit. RS-232C, RS-422, and Plastic-clad Optical Fiber are available.

- Host Link Units can be used in combination (multi-drop) with other C-series Units

- Host Link Units can be connected to the PT.

- Using the transmit instruction (TXD) of the C200HX/HG/HE, data can be transmitted by starting up the PLC side.

System Configuration

Multilevel Host Link System

The following example illustrates the use of the C200H-LK101-PV1 (optical) with two personal computers for system monitoring and data loading.

3G2A9-AL004-PE
Link Adapter

Optical fiber cable

Optical fiber cable

RS-232C

Host computer
(IBM PC/AT or compatible) for system monitoring

Two Host
Link Units

Host Link Unit

RS-232C

Host computer
(IBM PC/AT or compatible) for data management

Optical fiber cable

3G2A9-AL004-PE
Link Adapter
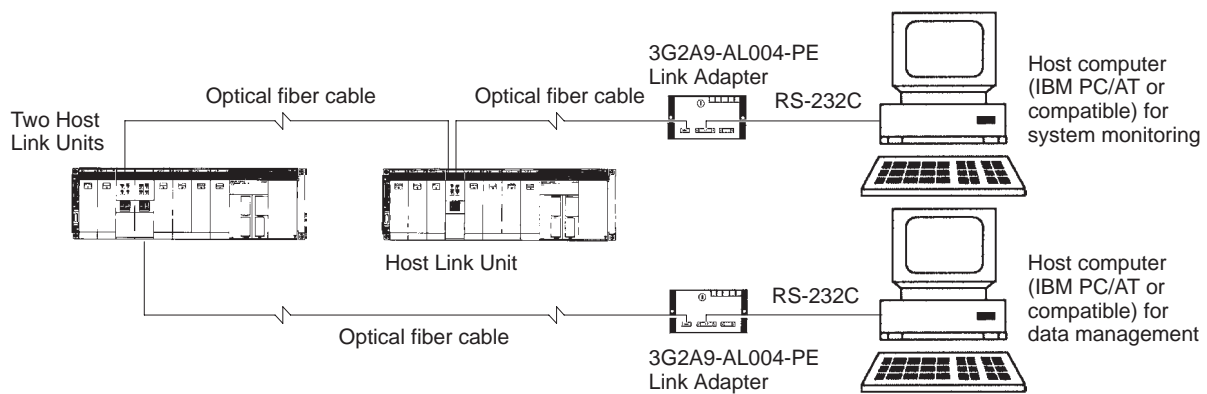
Host Link System with CX-Programmer

Various functions, such as offline programming or online monitoring, can be developed by connecting to the IBM PC/AT or compatible (SYSMAC Support Software).

3G2A9-AL004
Link Adapter

RS-422

RS-232C

WS02-CXPC1-E-V31
CX-Programmer
PLC Programming Tool
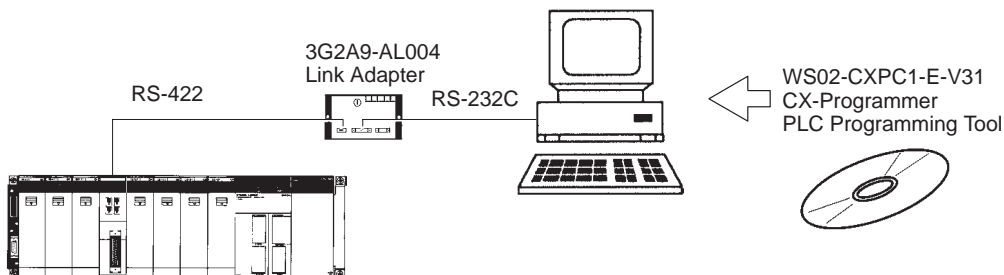
In the case of C200H-LK202-V1

Note: Discontinuation models are contained.

Communications Units

PC Link Unit

Distributed control using the PC Link Unit.
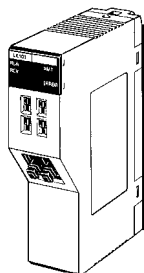
C200H-LK401
PC Link Unit

- Up to two PC Link Units can be connected to the C200HX/HG/HE CPU Unit or Expansion I/O Unit.
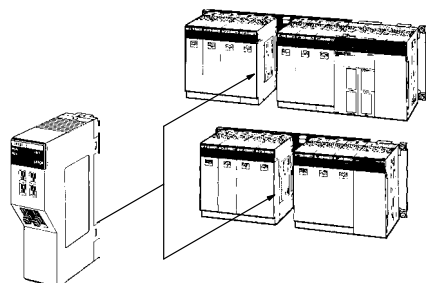
C200HX/HG/HE
CPU Rack

C200HX/HG/HE
Expansion I/O Rack

- The PC Link Unit is included in the connectable number of Special I/O Units (10 Units max.). Although this requires Machine No. setting, it doesn't occupy the IR area or DM area.

- Using the split processing of the PC Link Unit, PC link service can be divided into two, four, or eight parts, preventing any increase in the cycle time.

For efficiently operating a large-scale system with more than one PLC, the PC Link Units are essential for data exchange among PLCs.

- The PC Link Unit uses the Link Relay (LR) Area so that data can be exchanged with other C-series PLCs. Since it doesn't use the I/O Area, the number of I/O points can be saved.

Item	Specifications				
Communications method	2-conductor, half duplex				
Synchronization	HDLC				
Transmission speed	128 kbps				
Transmission method	Broadcasting				
Transmission distance	500 m (total cable length in system without optical links, including branch lines)				
Max. no. of PC Link Units per System (see note)	PC of polling unit		Single-level	Multilevel	
	C200HX/HG/HE, C1000H, or C2000H		32	16	
Transmission LR bits	No. of PC Link Units	2	3 to 4	5 to 8	9 to 16 / 17 to 32
	C200HX/HG/HE, C1000H, or C2000H	512	256	128	64 / 32
Transmission time	35 ms max. (for 128 bits with 8 PC Link Units)				
Diagnostic functions	CPU watchdog timer, CRC transmission error check				
Interface	RS-485				
Cable used	Shielded twisted pair				

Note: Use a 3G2A5-LK009-V1 PC Link Unit when connecting to the C1000H(F) or C2000H.

PC Link System Hierarchy

PC link	PC link	PC link	PC link
PLC	PLC	PLC	PLC
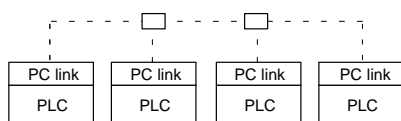
Use a Link Adapter.
Use RS-232C, RS-422, or optical fiber cable depending on application.

Multi-level System (4 Levels Max.)

Level 1

PC link	PC link	PC link	PC link
PLC	PLC	PLC	PLC
PC link			

Level 2

PC link	PC link	PC link	PC link
PLC	PLC	PLC	PLC
	PC link		

Level 3

PC link	PC link	PC link	PC link
PLC	PLC	PLC	PLC
		PC link	

Level 4

PC link	PC link	PC link	PC link
PLC	PLC	PLC	PLC

Usage of Link Relay Area

PLC #0
LR area

Own area
Machine #1 data input area
Machine #2 data input area

Machine #n data input area

PLC #1
LR area

Machine #0 data input area
Own area
Machine #2 data input area

Machine #n data input area

PLC #2
LR area

Machine #0 data input area
Machine #1 data input area
Own area

Machine #n data input area

PLC #3
LR area

Machine #0 data input area
Machine #1 data input area
Machine #2 data input area

Own area

Own area becomes the write area (send) for the other machine.

Read (Receive) — Own LR → Other machine's LR — Read (Receive)

Write (Send) — Other machine's LR ← Own LR — Write (Send)
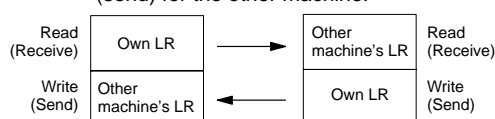
For example, when inputting data 5232 into LR 00 of machine #0, the data 5232 is output to the LR 00 of machines #1 to #n.

Programming Instructions

■ Summary

- An instruction marked with "@" can be used as a differentiated instruction that will be executed only once each time the instruction execution condition is turned ON.

- An instruction marked with "★" is an expansion instruction. These instructions must be assigned function codes before they can be used.

- An instruction with a function code and a "★" mark in parentheses is a regular instruction in C200HX/HG/HE-CPU□□-Z PCs, but an expansion instruction in C200HX/HG/HE-CPU□□ PCs. These instructions must be assigned function codes before they can be used in C200HX/HG/HE-CPU□□ PCs.

- In C200HX/HG/HE-CPU□□-ZE PCs, function codes have been assigned to all instructions except the few expansion instructions (IEMS, BXF2, XFR2, ADBL, SBBL, MBS, DBS, MBSL, and DBSL). It generally is not necessary to transfer expansion instructions or edit the instruction setup table with the Support Software.

- An instruction marked with "✳" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.

Basic Instructions
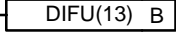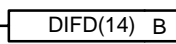
Name Mnemonic	Symbol	Function
LOAD LD	B	Defines the status of bit B as the execution condition for subsequent operations in the instruction line.
LOAD NOT LD NOT	B	Defines the status of the inverse of bit B as the execution condition for subsequent operations in the instruction line.
AND AND	B	Logically ANDs the status of the designated bit with the current execution condition.
AND NOT AND NOT	B	Logically ANDs the inverse of the designated bit with the current execution condition.
OR OR	B	Logically ORs the status of the designated bit with the current execution condition.
OR NOT OR NOT	B	Logically ORs the inverse of the designated bit with the execution condition.
AND LOAD AND LD		Logically ANDs the resultant execution conditions of the preceding logic blocks.
OR LOAD OR LD		Logically ORs the resultant execution conditions of the preceding logic blocks.
OUTPUT OUT	B	Turns ON B for an ON execution condition; turns OFF B for an OFF execution condition.

Name Mnemonic	Symbol	Function
OUTPUT NOT OUT NOT	B	Turns OFF B for an ON execution condition; turns ON B for an OFF execution condition.
SET SET	SET B	Turns the operand bit OFF when the execution condition is ON, and does not affect the status of the operand bit when the execution condition is OFF.
RESET RSET	RST B	Turns the operand bit ON when the execution condition is ON, and does not affect the status of the operand bit when the execution condition is OFF.
COUNTER CNT	CP — CNT N — R — SV	A decrementing counter. SV: 0 to 9999; CP: count pulse; R: reset input. The TC bit is entered as a constant.
REVERSIBLE COUNTER CNTR (12)	II — DI — CNTR(12) N — R — SV	Increases or decreases the PV by one whenever the increment input (II) or decrement input (DI) signals, respectively, go from OFF to ON. SV: 0 to 9999; R: reset input.
TIMER TIM	TIM N — SV	ON-delay (decrementing) timer operation. Set value: 000.0 to 999.9 s.
TOTALIZING TIMER TTIM(87) ✳	TTIM(87) — N — SV — RB	Creates a totalizing timer.
HIGH-SPEED TIMER TIMH(15)	TIMH(15) N — SV	A high-speed, ON-delay (decrementing) timer. SV: 00.02 to 99.99 s. The TC bit is entered as a constant.
END END(01)	END(01)	Required at the end of each program. Instructions located after END(01) will not be executed.
INTERLOCK IL(02) **INTERLOCK CLEAR** ILC(03)	IL(02) — ILC(03)	Creates interlocks used to control execution of program sections. The entire section is reset when execution is completed.
JUMP JMP(04) **JUMP END** JME(05)	JMP(04) N — JME(05) N	JUMP transfer program execution to the JUMP END with the same number.
KEEP KEEP(11)	S — KEEP(11) — R — B	Defines a bit (B) as a latch, controlled by the set (S) and reset (R) inputs.
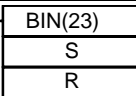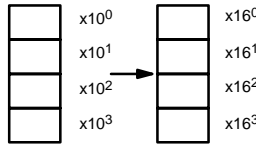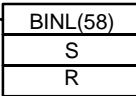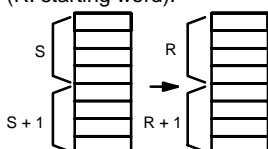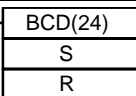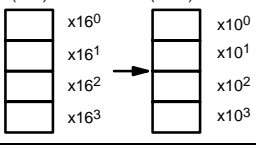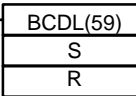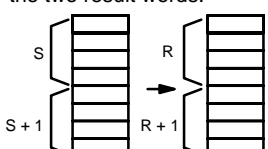
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- An instruction marked with "★" is an expansion instruction. These instructions must be assigned function codes before they can be used.

- An instruction marked with "✳" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.

83

Programming Instructions
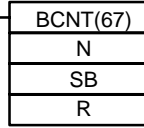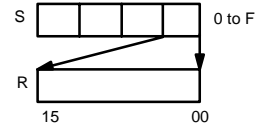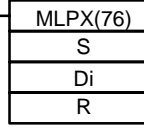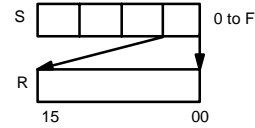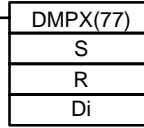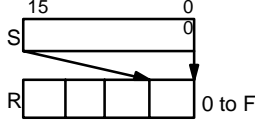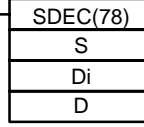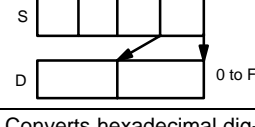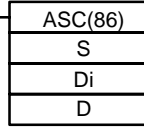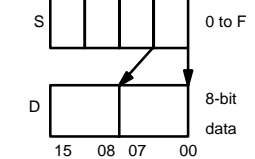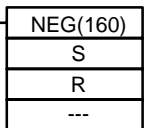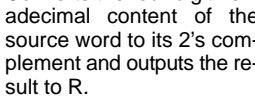
Name Mnemonic	Symbol	Function
NO OPERATION NOP(00)	None	Nothing is executed and program operation moves to the next instruction.
DIFFERENTI-ATE UP DIFU(13)	DIFU(13)　B	DIFU(13) turns ON the designated bit (B) for one cycle on reception of the leading (rising) edge of the input signal.
DIFFERENTI-ATE DOWN DIFD(14)	DIFD(14)　B	DIFD(14) turns ON the bit for one cycle on reception of the trailing (falling) edge.

Data Conversion Instructions

Name Mnemonic	Symbol	Function
BCD-TO-BINARY (@)BIN(23)	BIN(23) / S / R	Converts 4-digit, BCD data in source word (S) into 16-bit binary data, and outputs converted data to result word (R).
DOUBLE BCD-TO-DOUBLE BINARY (@)BINL(58)	BINL(58) / S / R	Converts the BCD value of the two source words (S: starting word) into binary and outputs the converted data to the two result words (R: starting word).
BINARY-TO-BCD (@)BCD(24)	BCD(24) / S / R	Converts binary data in source word (S) into BCD, and outputs converted data to result word (R).
DOUBLE BINARY-TO-DOUBLE BCD (@)BCDL(59)	BCDL(59) / S / R	Converts the binary value of the two source words (S: starting word) into eight digits of BCD data, and outputs the converted data to the two result words.

Name Mnemonic	Symbol	Function
BIT COUNTER (@)BCNT(67) ✳	BCNT(67) / N / SB / R	Counts the number of ON bits in one or more words.
4-TO-16 DECODER (@)MLPX(76)	MLPX(76) / S / Di / R	Converts up to four hexadecimal digits in the source word (S), into decimal values from 0 to 15, and turns ON the corresponding bit(s) in the result word(s) (R).
16-TO-4 ENCODER (@)DMPX(77)	DMPX(77) / S / R / Di	Determines the position of the leftmost ON bit in the source word(s) (starting word: S) and turns ON the corresponding bit(s) in the specified digit of the result word (R).
7-SEGMENT DECODER (@)SDEC(78)	SDEC(78) / S / Di / D	Converts hexadecimal values from the source word (S) into 7-segment display data. Results are placed in consecutive half-words, starting at the first destination word (D)
ASCII CONVERT (@)ASC(86)	ASC(86) / S / Di / D	Converts hexadecimal digits from the source word (S) into 8-bit ASCII values, starting at leftmost or rightmost half of the starting destination word (D).
2'S COMPLE-MENT (@)NEG(160) (★)	NEG(160) / S / R / ---	Converts the four-digit hexadecimal content of the source word to its 2's complement and outputs the result to R.

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Name Mnemonic	Symbol	Function
DOUBLE 2'S COMPLE-MENT (@)NEGL(161) (★)	NEGL(161) / S / R / ---	Converts the eight-digit hexadecimal content of the source words to its 2's complement and outputs the result to R and R+1.
ASCII-TO-HEXADECI-MAL (@)HEX ★	HEX(--) / S / Di / D	Converts ASCII data to hexadecimal data.
LINE (@)LINE(63)	LINE(63) / S / C / D	Fetches data from the same numbered bit (C) in 16 consecutive words (where S is the address of the first source word), and creates a 4-digit word with them.
LINE-TO- COL-UMN (@)COLM(64) ✳	COLM(64) / S / D / C	Places bit data from the source word (S), consecutively into the same numbered bits of the 16 consecutive destination words.
HOURS-TO-SECONDS (@)SEC(65) ✳	SEC(65) / S / R / ___	Converts a time given in hours/minutes/seconds (S and S+1) to an equivalent time in seconds only (R and R+1).
SECONDS-TO-HOURS (@)HMS(66) ✳	HMS(66) / S / R / ___	Converts a time given in seconds (S and S+1) to an equivalent time in hours/minutes/seconds (R and R+1).
ARITHMETIC PROCESS (@)APR(69) ✳	APR(69) / C / S / D	Calculates the cosine, or sine of the given degree value, or determines the y-coordinate of the given x value in a previously established line graph.

Special Processing Instructions

Name Mnemonic	Symbol	Function
TRACE MEMORY SAMPLING TRSM(45)	TRSM(45)	Initiates data tracing.
DISPLAY MESSAGE (@)MSG(46)	MSG(46) / FM	Displays eight words of ASCII code, starting from FM, on the Programming Console or GPC.
LONG MESSAGE (@)LMSG(47) ✳	LMSG(47) / S / D / ___	Outputs a 32-character message to either a Programming Console, or a device connected via the RS-232C interface. The output message must be in ASCII beginning at address S.
SCALING (@)SCL(194) (★)	SCL(194) / S / P1 / R	Performs a scaling conversion on the calculated value.
DATA SEARCH (@)SRCH(181) (★)	SRCH(181) / N / R₁ / C	Searches the specified range of memory for the specified data. Outputs the word address(es) of words in the range that contain the data.
FIND MAXIMUM (@)MAX(182) (★)	MAX(182) / C / R₁ / D	Finds the maximum value in specified data area and outputs that value to another word.
FIND MINIMUM (@)MIN(183) (★)	MIN(183) / C / R₁ / D	Finds the minimum value in specified data area and outputs that value to another word.
SUM (@)SUM(184) (★)	SUM(184) / C / R₁ / D	Computes the sum of the contents of the words in the specified range of memory.

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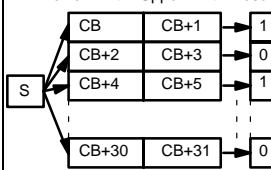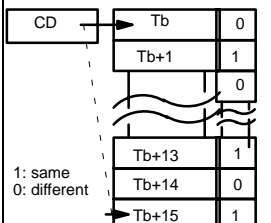
Programming Instructions

Name Mnemonic	Symbol	Function
FRAME CHECKSUM (@)FCS(180) (★)	FCS(180) / C / R₁ / D	Checks for errors in data transmitted by a Host Link command. MSB LSB R₁ = 1, 2 R₁+1 = 3, 4 R₁+2 = 5, 6 R₁+3 = 7, 8
AVERAGE VALUE AVG(195) (★)	AVG(195) / S / N / D	Adds the specified number of hexadecimal words and computes the mean value. Rounds off to 4 digits past the decimal point.
FAILURE POINT DETECTION FPD(269) (★)	FPD(269) / C / T / D	Finds errors within an instruction block.
PID CONTROL PID(190) (★)	PID(190) / S / C / D	PID control is performed according to the operand and PID parameters that are preset.

Data Shifting Instructions

Name Mnemonic	Symbol	Function
SHIFT REGISTER SFT(10)	I / P / R — SFT(10) St E	Creates a bit shift register for data from the starting word (St) through to the ending word (E). 15 00 / St / IN
REVERSIBLE SHIFT REGISTER (@)SFTR(84)	SFTR(84) / C / St / E	Shifts bits in the specified words either left or right. Starting (St) and ending words (E) must be specified. 15 00 15 00 / E St ← IN / CY IN → E St / CY
ASYNCHRONOUS SHIFT REGISTER (@)ASFT(17) ✳	ASFT(17) / C / St / E	Creates and controls a reversible non-synchronous word shift register between St and E. Exchanges the content of a word containing zero with the content of either the preceding or following word, depending on the shift direction.

Name Mnemonic	Symbol	Function
WORD SHIFT (@)WSFT(16)	WSFT(16) / St / E	The data in the words from the starting word (St) through to the ending word (E), is shifted left in word units, writing all zeros into the starting word.
ARITHMETIC SHIFT LEFT (@)ASL(25)	ASL(25) / Wd	Each bit within a single word of data (Wd) is shifted one bit to the left, with zero written to bit 00 and bit 15 moving to CY. 15 00 / CY ← Wd ← 0
ARITHMETIC SHIFT RIGHT (@)ASR(26)	ASR(26) / Wd	Each bit within a single word of data (Wd) is shifted one bit to the right, with zero written to bit 15 and bit 00 moving to CY. 15 00 / 0 → Wd → CY
ROTATE LEFT (@)ROL(27)	ROL(27) / Wd	Each bit within a single word of data (Wd) is moved one bit to the left, with bit 15 moving to carry (CY), and CY moving to bit 00. 15 00 / Wd ← CY
ROTATE RIGHT (@)ROR(28)	ROR(28) / Wd	Each bit within a single word of data (Wd) is moved one bit to the right, with bit 00 moving to carry (CY), and CY moving to bit 15. 15 00 / CY → Wd
ONE DIGIT SHIFT LEFT (@)SLD(74)	SLD(74) / St / E	Shifts all data, between the starting word (St) and ending word (E), one digit (four bits) to the left, writing zero into the rightmost digit of the starting word. St ← 0 / St + 1 / E
ONE DIGIT SHIFT RIGHT (@)SRD(75)	SRD(75) / E / St	Shifts all data, between starting word (St) and ending word (E), one digit (four bits) to the right, writing zero into the leftmost digit of the ending word. E / E – 1 / St 0

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86

BCD Arithmetic Instructions

Name Mnemonic	Symbol	Function
BCD ADD (@)ADD(30)	ADD(30) / Au / Ad / R	Adds two 4-digit BCD values (Au and Ad) and content of CY, and outputs the result to the specified result word (R). Au + Ad + CY → R, CY
DOUBLE BCD ADD (@)ADDL(54)	ADDL(54) / Au / Ad / R	Adds two 8-digit values (2 words each) and the content of CY, and outputs the result. Au+1, Au + Ad+1, Ad + CY → CY, R+1, R
BCD SUBTRACT (@)SUB(31)	SUB(31) / Mi / Su / R	Subtracts both the 4-digit BCD subtrahend (Su) and content of CY, from the 4-digit BCD minuend (Mi) and outputs the result to the specified result word (R). Mi − Su − CY → R, CY
DOUBLE BCD SUBTRACT (@)SUBL(55)	SUBL(55) / Mi / Su / R	Subtracts both the 8-digit BCD subtrahend and the content of CY from an 8-digit BCD minuend, and outputs the result. Mi+1, Mi − Su+1, Su − CY → CY, R+1, R
BCD MULTIPLY (@)MUL(32)	MUL(32) / Md / Mr / R	Multiplies the 4-digit BCD multiplicand (Md) and 4-digit BCD multiplier (Mr), and outputs the result to the specified result words (R and R + 1). Md x Mr → R+1, R
DOUBLE BCD MULTIPLY (@)MULL(56)	MULL(56) / Md / Mr / R	Multiplies the 8-digit BCD multiplicand and 8-digit BCD multiplier, and outputs the result. Md+1, Md X Mr+1, Md → R+3, R+2, R+1, R

Name Mnemonic	Symbol	Function
BCD DIVIDE (@)DIV(33)	DIV(33) / Dd / Dr / R	Divides the 4-digit BCD dividend (Dd) by the 4-digit BCD divisor (Dr), and outputs the result to the specified result words. R receives the quotient; R + 1 receives the remainder. Dd ÷ Dr → R+1, R
DOUBLE BCD DIVIDE (@)DIVL(57)	DIVL(57) / Dd / Dr / R	Divides the 8-digit BCD dividend by an 8-digit BCD divisor, and outputs the result. Dd+1, Dd ÷ Dr+1, Dr Quotient R+1, R Remainder R+3, R+2
SET CARRY (@)STC(40)	STC(40)	Sets the Carry Flag (i.e., turns CY ON).
CLEAR CARRY (@)CLC(41)	CLC(41)	Clears the Carry Flag (i.e, turns CY OFF).
INCREMENT (@)INC(38)	INC(38) / Wd	Increments the value of a 4-digit BCD word (Wd) by one, without affecting carry (CY).
DECREMENT (@)DEC(39)	DEC(39) / Wd	Decrements the value of a 4-digit BCD word by 1, without affecting carry (CY).
SQUARE ROOT (@)ROOT(72)	ROOT(72) / Sq / R	Computes the square root of an 8-digit BCD value (Sq and Sq + 1) and outputs the truncated 4-digit, integer result to the specified result word (R). √(Sq+1, Sq) R
FLOATING POINT DIVIDE (@)FDIV(79)	FDIV(79) / Dd / Dr / R	Divides one floating point value by another and outputs a floating point result. Dd+1, Dd ÷ Dr+1, Dr R+1, R

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Programming Instructions

Advanced I/O Instructions

Name Mnemonic	Symbol	Function
TEN KEY INPUT TKY(211) (★)	TKY(211) / IW / D_1 / D_2	Inputs 8 digits of BCD data from a 10-key keypad.
HEXADECIMAL KEY INPUT HKY(212) (★)	HKY(212) / IW / OW / D	This instruction inputs 8 digits in hexadecimal from a hexadecimal keyboard.
DIGITAL SWITCH INPUT DSW(210) (★)	DSW(210) / IW / OW / R	Inputs 4- or 8-digit BCD data from a digital switch.
7-SEGMENT DISPLAY OUTPUT 7SEG(214) (★)	7SEG(214) / S / O / C	Converts 4- or 8-digit BCD data to 7-segment display format and then outputs the converted data.
MATRIX INPUT MTR(213) (★)	MTR(213) / IW / OW / D	Inputs data from an 8 input point × 8 output point matrix and records that data in D to D+3.

Subroutine Instructions

Name Mnemonic	Symbol	Function
SUBROUTINE ENTRY (@)SBS(91)	SBS(91)　N	Calls subroutine N. Moves program operation to the specified subroutine.
SUBROUTINE DEFINE SBN(92)	SBN(92)　N	Marks the start of subroutine N.
SUBROUTINE RETURN RET(93)	RET(93)	Marks the end of a subroutine and returns control to the main program.
MACRO (@)MCRO(99)	MCRO(99) / N / I1 / O1	Calls and executes a subroutine replacing I/O words.
INTERRUPT CONTROL (@)INT(89) ✳	INT(89) / CC / N / D	Controls scheduled interrupts and interrupts from Interrupt Input Units.

Data Comparison Instructions

Name Mnemonic	Symbol	Function
COMPARE (@)CMP(20)	CMP(20) / Cp1 / Cp2	Compares the data in two 4-digit hexadecimal words (Cp1 and Cp2) and outputs result to the GR, EQ, or LE flags.
SIGNED BINARY COMPARE CPS(114) (★)	CPS(114) / Cp1 / Cp2	Compares two 16-bit (4-digit) signed binary values and outputs the result to the GR, EQ, and LE flags.
DOUBLE COMPARE CMPL(60)	CMPL(60) / S_1 / S_2	Compares the 8-digit hexadecimal values in words S_1+1 and S_1 with the values in S_2+1 and S_2, and indicates the result using the GR, EQ, and LE flags.
DOUBLE SIGNED BINARY COMPARE CPSL(115) (★)	CPSL(115) / Cp1 / Cp2	Compares two 32-bit (8-digit) signed binary values and outputs the result to the GR, EQ, and LE flags.
BLOCK COMPARE (@)BCMP(68)	BCMP(68) / S / CB / R	Compares a 1-word binary value (S) with the 16 ranges given in the comparison table (CB is the starting word of the comparison block). If the value falls within any of the ranges, the corresponding bits in the result word (R) will be set.
TABLE COMPARE (@)TCMP(85)	TCMP(85) / CD / TB / R	Compares a 4-digit hexadecimal value (CD) with values in table consisting of 16 words. If the value of CD falls within any of the comparison ranges, corresponding bits in result word (R) are set.

Lower limit　Upper limit　Result

CB	CB+1	→ 1
CB+2	CB+3	→ 0
CB+4	CB+5	→ 1
CB+30	CB+31	→ 0

Lower limit ≤ S ≤ Upper limit 1

R

CD →	Tb	0
	Tb+1	1
		0
	Tb+13	1
	Tb+14	0
→	Tb+15	1

1: same
0: different

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Name Mnemonic	Symbol	Function
MULTI-WORD COMPARE (@)MCMP(19) ✻	MCMP(19) / S_1 / S_2 / D	Compares the data within a block of 16 words of 4-digit hexadecimal data (S_1 to S_1+15) with that in another block of 16 words (S_2 to S_2+15) on a word-by-word basis. If the words are not the same, the bit corresponding to different words turns ON in the result word, D.
AREA RANGE COMPARE ZCP(88) ✻	ZCP(--) / CD / LL / UL	Compares a word to a range defined by lower and upper limits and outputs the result to the GR, EQ, and LE flags.
DOUBLE AREA RANGE COMPARE ZCPL(116) (★)	ZCPL(116) / CD / LL / UL	Compares an 8-digit value to a range defined by lower and upper limits and outputs the result to the GR, EQ, and LE flags.
EQUAL =(300)	=(300) / S_1 / S_2 / —	Compares two unsigned values. (True when $S_1=S_2$.)
DOUBLE EQUAL =L(301)	=L(301) / S_1 / S_2 / —	Compares two double unsigned values. (True when $S_1=S_2$.)
SIGNED EQUAL =S(302)	=S(302) / S_1 / S_2 / —	Compares two signed binary values. (True when $S_1=S_2$.)
DOUBLE SIGNED EQUAL =SL(303)	=SL(303) / S_1 / S_2 / —	Compares two double signed values. (True when $S_1=S_2$.)
NOT EQUAL <>(305)	<>(305) / S_1 / S_2 / —	Compares two unsigned values. (True when $S_1 \neq S_2$.)
DOUBLE NOT EQUAL <>L(306)	<>L(306) / S_1 / S_2 / —	Compares two double unsigned values. (True when $S_1 \neq S_2$.)
SIGNED NOT EQUAL <>S(307)	<>S(307) / S_1 / S_2 / —	Compares two signed binary values. (True when $S_1 \neq S_2$.)
DOUBLE SIGNED NOT EQUAL <>SL(308)	<>SL(308) / S_1 / S_2 / —	Compares two double signed values. (True when $S_1 \neq S_2$.)

Name Mnemonic	Symbol	Function
LESS THAN <(310)	<(310) / S_1 / S_2 / —	Compares two unsigned values. (True when $S_1<S_2$.)
DOUBLE LESS THAN <L(311)	<L(311) / S_1 / S_2 / —	Compares two double unsigned values. (True when $S_1<S_2$.)
SIGNED LESS THAN <S(312)	<S(312) / S_1 / S_2 / —	Compares two signed binary values. (True when $S_1<S_2$.)
DOUBLE SIGNED LESS THAN <SL(313)	<SL(313) / S_1 / S_2 / —	Compares two double signed values. (True when $S_1<S_2$.)
LESS THAN OR EQUAL <=(315)	<=(315) / S_1 / S_2 / —	Compares two unsigned values. (True when $S_1 \leq S_2$.)
DOUBLE LESS THAN OR EQUAL <=L(316)	<=L(316) / S_1 / S_2 / —	Compares two double unsigned values. (True when $S_1 \leq S_2$.)
SIGNED LESS THAN OR EQUAL <=S(317)	<=S(317) / S_1 / S_2 / —	Compares two signed binary values. (True when $S_1 \leq S_2$.)
DOUBLE SIGNED LESS THAN OR EQUAL <=SL(318)	<=SL(318) / S_1 / S_2 / —	Compares two double signed values. (True when $S_1 \leq S_2$.)
GREATER THAN >(320)	>(320) / S_1 / S_2 / —	Compares two unsigned values. (True when $S_1>S_2$.)
DOUBLE GREATER THAN >L(321)	>L(321) / S_1 / S_2 / —	Compares two double unsigned values. (True when $S_1>S_2$.)
SIGNED GREATER THAN >S(322)	>S(322) / S_1 / S_2 / —	Compares two signed binary values. (True when $S_1>S_2$.)
DOUBLE SIGNED GREATER THAN >SL(323)	>SL(323) / S_1 / S_2 / —	Compares two double signed values. (True when $S_1>S_2$.)

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Programming Instructions

Name Mnemonic	Symbol	Function
GREATER THAN OR EQUAL >=(325)	>=(325) / S₁ / S₂ / —	Compares two unsigned values. (True when $S_1 \geq S_2$.)
DOUBLE GREATER THAN OR EQUAL >=L(326)	>=L(326) / S₁ / S₂ / —	Compares two double un-signed values. (True when $S_1 \geq S_2$.)
SIGNED GREATER THAN OR EQUAL >=S(327)	>=S(327) / S₁ / S₂ / —	Compares two signed binary values. (True when $S_1 \geq S_2$.)
DOUBLE SIGNED GREATER THAN OR EQUAL >=SL(328)	>=SL(328) / S₁ / S₂ / —	Compares two double signed values. (True when $S_1 \geq S_2$.)

Data Transfer Instructions

Name Mnemonic	Symbol	Function
MOVE (@)MOV(21)	MOV(21) / S / D	Transfers data from source word, (S) to destination word (D).
MOVE NOT (@)MVN(22)	MVN(22) / S / D	Transfers the inverse of the data in the source word (S) to destination word (D).
BLOCK TRANSFER (@)XFER(70)	XFER(70) / N / S / D	Moves the content of con-secutive source words (S gives the address of the starting source word) to consecutive destination words (D is the starting des-tination word). S → D S + 1 → D + 1 S+N–1 → D+N–1
DATA EXCHANGE (@)XCHG(73)	XCHG(73) / E1 / E2	Exchanges the contents of two words (E1 and E2). E1 ⟷ E2
BLOCK SET (@)BSET(71)	BSET(71) / S / St / E	Copies the content of one word or constant (S) to sev-eral consecutive words (from the starting word, St, through to the ending word, E). S → St ... E

Name Mnemonic	Symbol	Function
MOVE BIT (@)MOVB(82)	MOVB(82) / S / Bi / D	Transfers the designated bit of the source word or constant (S) to the desig-nated bit of the destination word (D). S → D
TRANSFER BITS @XFRB(62) ✳	XFRB(--) / C / S / D	Copies the status of up to 255 specified source bits to the specified destination bits.
MOVE DIGIT (@)MOVD(83)	MOVD(83) / S / Di / D	Moves hexadecimal con-tent of up to four specified 4-bit source digit(s) from the source word to the spe-cified destination digit(s). 15 ... 00 S → D
NETWORK SEND (@)SEND(90)	SEND(90) / S / D / C	Transfers data from n source words (S is the start-ing word) to the destination words (D is the first ad-dress) in node N of the spe-cified network (in a SYS-MAC LINK or NET Link System).
NETWORK RECEIVE (@)RECV(98)	RECV(98) / S / D / C	Transfers data from the source words (S is the first word) from node N of the specified network (in a SYSMAC LINK or NET Link System) to the destination words starting at D.
SINGLE WORD DISTRIBUTE (@)DIST(80)	DIST(80) / S / DBs / Of	Moves one word of source data (S) to the destination given by the destination base word (DBs) plus offset (Of). S → Base (DBs) + Offset (OF) (S) → (DBs + Of)
DATA COLLECT (@)COLL(81)	COLL(81) / SBs / Of / D	Extracts data from the source word and writes it to the destination word (D). Base (DBs) + Offset (OF) (SBs+Of) → (D)

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Programming Instructions

Name Mnemonic	Symbol	Function
EXPANSION DM READ (@)XDMR(290) (★)	XDMR(290) N S D	The contents of the designated number of words of the fixed expansion DM data are read and output to the destination word on the PC side.
RECEIVE (@)RXD(235) (★)	RXD(235) D C N	Receives data via a communications port.
TRANSMIT (@)TXD(236) (★)	TXD(236) S C N	Sends data via a communications port.
SETUP CHANGE (@)STUP(237) (★)	STUP(237) N S	Sends the designated word content (for 5 words) to the system setting area of designated RS-232 port.
EM BANK TRANSFER (@)BXFR(125)	BXFR(125) C S D	Copies the contents of S, S+1, ..., S+N to D, D+1, ..., D+N. The bank can be specified (in C) if an EM address is used for S or D.
EM CONSTANT BLOCK TRANSFER (@)XFR2 ★	XFR2 W S N	Sends data of more than one word existing in series from the designated word to the words following the designated word. When a constant is designated where the data is sent to or sent from, the EM area is designated.
EM CONSTANT INTERBANK BLOCK TRANSFER (@)BXF2 ★	BXF2 C S D	Sends data of more than one word existing in series from the designated word to the words following the designated word. If the designated word is in an EM area, the bank number can be specified.
EXPANSION DM BANK CHANGE (@)EMBC(281) (★)	EMBC(281) N	Changes the current bank of the Expansion DM.
INDIRECT EXPANSION DM SETTING (@)IEMS(282) (★)	IEMS(282) C	Switches the indirect execution area between DM and EM. Current bank can be switched when changing to EM.

Logic Instructions

Name Mnemonic	Symbol	Function
LOGICAL AND (@)ANDW(34)	ANDW(34) I1 I2 R	Logically ANDs two 16-bit input words (I1 and I2) and sets the bits in the result word (R) if the corresponding bits in the input words are both ON.
LOGICAL OR (@)ORW(35)	ORW(35) I1 I2 R	Logically ORs two 16-bit input words (I1 and I2) and sets the bits in the result word (R) when one or both of the corresponding bits in the input words is/are ON.
EXCLUSIVE OR (@)XORW(36)	XORW(36) I1 I2 R	Exclusively ORs two 16-bit input words (I1 and I2) and sets the bits in the result word (R) when the corresponding bits in input words differ in status.
EXCLUSIVE NOR (@)XNRW(37)	XNRW(37) I1 I2 R	Exclusively NORs two 16-bit input words (I1 and I2) and sets the bits in the result word (R) when the corresponding bits in both input words have the same status.
COMPLEMENT (@)COM(29)	COM(29) Wd	Inverts bit status of one word (Wd) of data, changing 0s to 1s, and vice versa. Wd ⟶ $\overline{Wd}$

System Processing Instructions

Name Mnemonic	Symbol	Function
FAILURE ALARM (@)FAL(06)	FAL(06) N	Assigns a failure alarm code to the given execution condition. This code is generated as an error code whenever the instruction is executed.
SEVERE FAILURE ALARM FALS(07)	FALS(07) N	A fatal version of FAL(06). When a FALS(07) instruction is executed the CPU Unit is stopped and the number is generated as an error code.
CYCLE TIME SCAN(18) ✳	SCAN(18) Mi —— ——	Sets the minimum cycle time, Mi, in tenths of milliseconds. The possible setting range is from 0 to 999.0 ms.
TERMINAL MODE (@)TERM(48) ✳	TERM(48) —— —— ——	Shifts the Programming Console to TERMINAL mode.

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- An instruction marked with "★" is an expansion instruction. These instructions must be assigned function codes before they can be used.
- An instruction marked with "✳" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.

Programming Instructions

Name Mnemonic	Symbol	Function
WATCHDOG TIMER REFRESH WDT(94)	WDT(94) T	Sets the maximum and minimum limits for the watchdog timer (normally 0 to 130 ms). New limits: Maximum time = 130 + (10 x T) Minimum time = 130 + (10 x (T–1))
I/O REFRESH (@)IORF(97)	IORF(97) / St / E	Can refresh I/O words allocated to CPU or Expansion I/O Racks and Special I/O Units.
GROUP-2 HIGH-DENSITY I/O REFRESH (@)MPRF(61) ✶	MPRF(61) / St / E	Refreshes I/O words allocated to Group-2 High-density I/O Units.
INTELLIGENT IO READ (@)IORD(222) (★)	IORD(222) / C / S / D	Reads data of more than one word from an ASCII Unit, etc.
INTELLIGENT IO WRITE (@)IOWR(223) (★)	IOWR(223) / C / S / D	Writes data of more than one word from a PC Unit to an ASCII Unit.
PROTOCOL MACRO (@)PMCR(260) (★)	PMCR(260) / C / S / D	By calling the send/receive sequence (protocol data) registered in the Communications Board connected to a PC Unit, data can be sent to or received from another personal computer that has RS-232C.
CARD MACRO (@)CMCR(261) (★)	CMCR(261) / C / S / D	Reads or writes files in the memory card of the PC Card Unit.
BIT TEST TST(350) TSTN(351)	TST(350) / S / N / ---	Turns ON the execution condition when bit N in word S is ON and turns OFF the execution condition when the bit is OFF.
	TSTN(351) / S / N / ---	Turns OFF the execution condition when bit N in word S is ON and turns ON the execution condition when the bit is OFF.

Step Ladder Instructions

Name Mnemonic	Symbol	Function
STEP DEFINE STEP(08)	STEP(08) B	When used with a control bit (B), defines the start of a new step and resets the previous step. When used without B, it defines the end of step execution.
STEP START SNXT(09)	SNXT(09) B	Used with a control bit (B) to indicate the end of the step, reset the step, and start the next step which has been defined with the same control bit.

Binary Arithmetic Instructions

Name Mnemonic	Symbol	Function
BINARY ADD (@)ADB(50)	ADB(50) / Au / Ad / R	Adds the 4-digit augend (Au), 4-digit addend (Ad), and content of CY and outputs the result to the specified result word (R). $$\begin{array}{r} Au \\ + \quad Ad \\ + \quad CY \\ \hline R \\ \hline CY \end{array}$$
DOUBLE BINARY ADD (@)ADBL(480)	ADBL(--) / Au / Ad / R	Adds two 8-digit binary values (normal or signed data) and contents of carry, and outputs the result to R and R+1. $$\begin{array}{cc} Au+1 & Au \\ Ad+1 & Ad \\ + & CY \\ \hline CY \quad R+1 & R \end{array}$$
BINARY SUBTRACT (@)SBB(51)	SBB(51) / Mi / Su / R	Subtracts the 4-digit hexadecimal subtrahend (Su) and content of carry, from the 4-digit hexadecimal minuend (Mi), and outputs the result to the specified result word (R). $$\begin{array}{r} Mi \\ - \quad Su \\ - \quad CY \\ \hline R \\ \hline CY \end{array}$$

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- An instruction marked with "★" is an expansion instruction. These instructions must be assigned function codes before they can be used.
- An instruction marked with "✶" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.

Name Mnemonic	Symbol	Function	Name Mnemonic	Symbol	Function
DOUBLE BINARY SUBTRACT (@)SBBL(481)	SBBL(--) / Mi / Su / R	Subtracts an 8-digit binary value (normal or signed data) and contents of carry from another and outputs the result to R and R+1. $$\begin{array}{\|c\|c\|}\hline Mi+1 & Mi \\\hline\end{array}$$ $$\begin{array}{\|c\|c\|}\hline Su+1 & Su \\\hline\end{array}$$ $$- \quad \boxed{CY}$$ $$\begin{array}{\|c\|c\|}\hline CY & R+1 & R \\\hline\end{array}$$	**DOUBLE SIGNED BINARY ADD WITH CARRY** (@)+CL(403)	+CL(403) / Au / Ad / R	Adds the 8-digit binary augend, addend, and CY and outputs the result to the specified result word (R). $$\begin{array}{\|c\|c\|}\hline Au+1 & Au \\\hline\end{array}$$ $$\begin{array}{\|c\|c\|}\hline Ad+1 & Ad \\\hline\end{array}$$ $$+ \quad \boxed{CY}$$ $$\begin{array}{\|c\|c\|c\|}\hline CY & R+1 & R \\\hline\end{array}$$
BINARY MULTIPLY (@)MLB(52)	MLB(52) / Md / Mr / R	Multiplies the 4-digit hexadecimal multiplicand (Md) and 4-digit multiplier (Mr), and outputs the 8-digit hexadecimal result to the specified result words (R and R+1). $$\begin{array}{cc} & Md \\ X & Mr \\ \hline \end{array}$$ $$\begin{array}{\|c\|c\|}\hline R+1 & R \\\hline\end{array}$$	**SIGNED BCD ADD WITHOUT CARRY** (@)+B(404)	+B(404) / Au / Ad / R	Adds the 4-digit BCD augend and addend and outputs the result to the specified result word (R). $$\begin{array}{cc} & Au \\ + & Ad \\ \hline \end{array}$$ $$\boxed{CY} \quad \boxed{R}$$
BINARY DIVIDE (@)DVB(53)	DVB(53) / Dd / Dr / R	Divides the 4-digit hexadecimal dividend (Dd) by the 4-digit divisor (Dr), and outputs result to the designated result words (R and R + 1). $$\begin{array}{cc} & Dd \\ \div & Dr \\ \hline \end{array}$$ Quotient $\boxed{R}$ Remainder $\boxed{R+1}$	**DOUBLE SIGNED BCD ADD WITHOUT CARRY** (@)+BL(405)	+BL(405) / Au / Ad / R	Adds the 8-digit BCD augend and addend and outputs the result to the specified result word (R). $$\begin{array}{\|c\|c\|}\hline Au+1 & Au \\\hline\end{array}$$ $$+\begin{array}{\|c\|c\|}\hline Ad+1 & Ad \\\hline\end{array}$$ $$\begin{array}{\|c\|c\|c\|}\hline CY & R+1 & R \\\hline\end{array}$$
SIGNED BINARY ADD WITHOUT CARRY (@)+(400)	+(400) / Au / Ad / R	Adds the 4-digit binary augend and addend and outputs the result to the specified result word (R). $$\begin{array}{cc} & Au \\ + & Ad \\ \hline \end{array}$$ $$\boxed{CY} \quad \boxed{R}$$	**SIGNED BCD ADD WITH CARRY** (@)+BC(406)	+BC(406) / Au / Ad / R	Adds the 4-digit BCD augend, addend, and CY and outputs the result to the specified result word (R). $$\begin{array}{cc} & Au \\ + & Ad \\ + & \boxed{CY} \\ \hline \end{array}$$ $$\boxed{CY} \quad \boxed{R}$$
DOUBLE SIGNED BINARY ADD WITHOUT CARRY (@)+L(401)	+L(401) / Au / Ad / R	Adds the 8-digit binary augend and addend and outputs the result to the specified result word (R). $$\begin{array}{\|c\|c\|}\hline Au+1 & Au \\\hline\end{array}$$ $$+\begin{array}{\|c\|c\|}\hline Ad+1 & Ad \\\hline\end{array}$$ $$\begin{array}{\|c\|c\|c\|}\hline CY & R+1 & R \\\hline\end{array}$$	**DOUBLE SIGNED BCD ADD WITH CARRY** (@)+BCL(407)	+BCL(407) / Au / Ad / R	Adds the 8-digit BCD augend, addend, and CY and outputs the result to the specified result word (R). $$\begin{array}{\|c\|c\|}\hline Au+1 & Au \\\hline\end{array}$$ $$\begin{array}{\|c\|c\|}\hline Ad+1 & Ad \\\hline\end{array}$$ $$+ \quad \boxed{CY}$$ $$\begin{array}{\|c\|c\|c\|}\hline CY & R+1 & R \\\hline\end{array}$$
SIGNED BINARY ADD WITH CARRY (@)+C(402)	+C(402) / Au / Ad / R	Adds the 4-digit binary augend, addend, and CY and outputs the result to the specified result word (R). $$\begin{array}{cc} & Au \\ + & Ad \\ + & \boxed{CY} \\ \hline \end{array}$$ $$\boxed{CY} \quad \boxed{R}$$	**SIGNED BINARY SUBTRACT WITHOUT CARRY** (@)–(410)	–(410) / Mi / Su / R	Subtracts the 4-digit binary content of the subtrahend from the minuend and outputs the result to the specified result word (R). $$\begin{array}{cc} & Mi \\ - & Su \\ \hline \end{array}$$ $$\boxed{CY} \quad \boxed{R}$$
			DOUBLE SIGNED BINARY SUBTRACT WITHOUT CARRY (@)–L(411)	–L(411) / Mi / Su / R	Subtracts the 8-digit binary content of the subtrahend from the minuend and outputs the result to the specified result word (R). $$\begin{array}{\|c\|c\|}\hline Mi+1 & Mi \\\hline\end{array}$$ $$-\begin{array}{\|c\|c\|}\hline Su+1 & Su \\\hline\end{array}$$ $$\begin{array}{\|c\|c\|c\|}\hline CY & R+1 & R \\\hline\end{array}$$

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- An instruction marked with "✳" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.
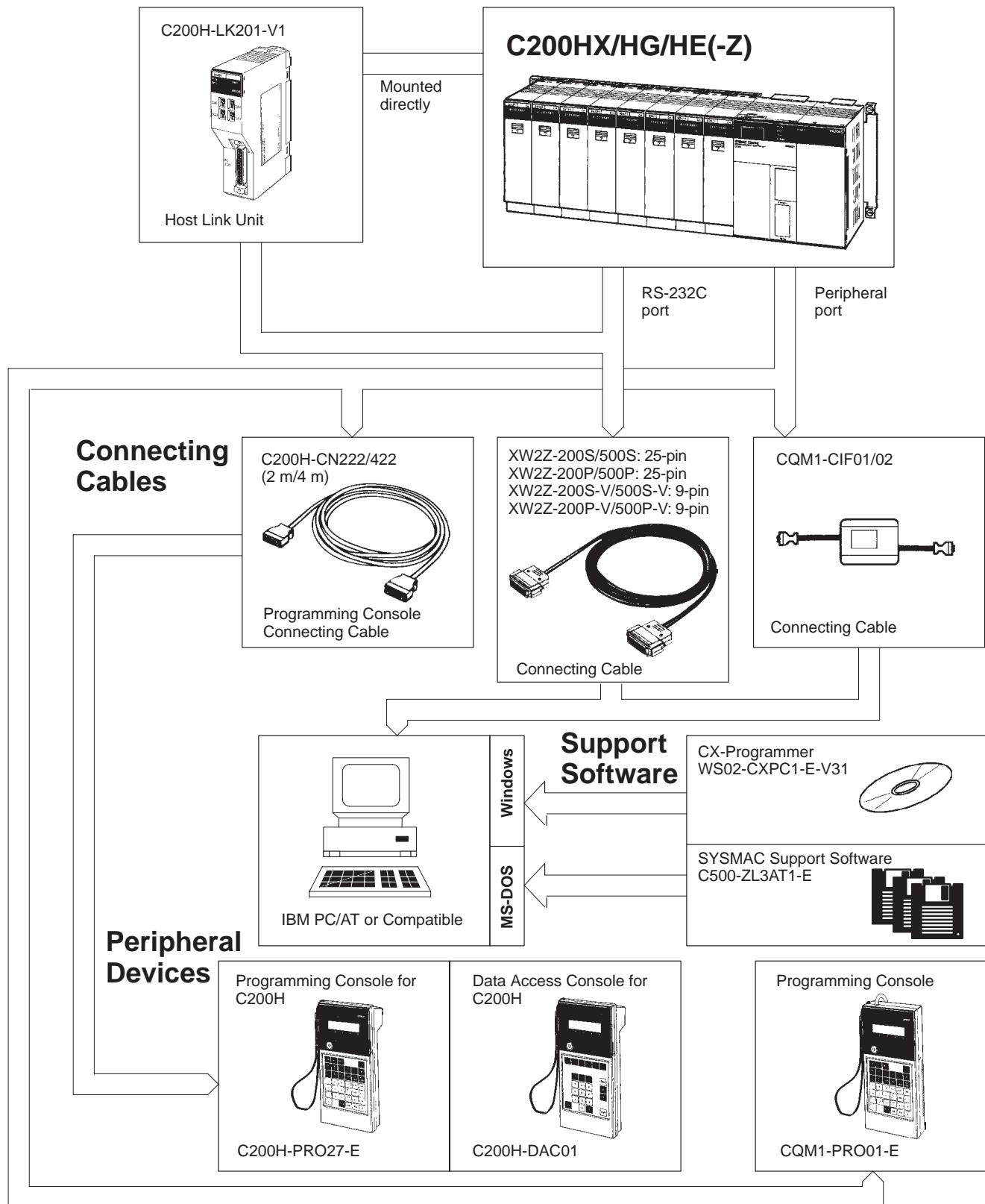
Programming Instructions

Name Mnemonic	Symbol	Function
SIGNED BINARY SUBTRACT WITH CARRY (@)–C(412)	—[–C(412) / Mi / Su / R]	Subtracts the 4-digit binary content of the subtrahend and CY from the minuend and outputs the result to the specified result word (R). $\begin{array}{r} Mi \\ - \quad Su \\ - \quad \boxed{CY} \\ \hline \boxed{CY}\quad\boxed{R} \end{array}$
DOUBLE SIGNED BINARY SUBTRACT WITH CARRY (@)–CL(413)	—[–CL(413) / Mi / Su / R]	Subtracts the 8-digit binary content of the subtrahend and CY from the minuend and outputs the result to the specified result word (R). $\begin{array}{r} \boxed{Mi+1}\ \boxed{Mi} \\ - \boxed{Su+1}\ \boxed{Su} \\ - \quad \boxed{CY} \\ \hline \boxed{CY}\ \boxed{R+1}\ \boxed{R} \end{array}$
SIGNED BCD SUBTRACT WITHOUT CARRY (@)–B(414)	—[–B(414) / Mi / Su / R]	Subtracts the 4-digit BCD content of the subtrahend from the minuend and outputs the result to the specified result word (R). $\begin{array}{r} Mi \\ - \quad Su \\ \hline \boxed{CY}\quad\boxed{R} \end{array}$
DOUBLE SIGNED BCD SUBTRACT WITHOUT CARRY (@)–BL(415)	—[–BL(415) / Mi / Su / R]	Subtracts the 8-digit BCD content of the subtrahend from the minuend and outputs the result to the specified result word (R). $\begin{array}{r} \boxed{Mi+1}\ \boxed{Mi} \\ - \boxed{Su+1}\ \boxed{Su} \\ \hline \boxed{CY}\ \boxed{R+1}\ \boxed{R} \end{array}$
SIGNED BCD SUBTRACT WITH CARRY (@)–BC(416)	—[–BC(416) / Mi / Su / R]	Subtracts the 4-digit BCD content of the subtrahend and CY from the minuend and outputs the result to the specified result word (R). $\begin{array}{r} Mi \\ - \quad Su \\ - \quad \boxed{CY} \\ \hline \boxed{CY}\quad\boxed{R} \end{array}$
DOUBLE SIGNED BCD SUBTRACT WITH CARRY (@)–BCL(417)	—[–BCL(417) / Mi / Su / R]	Subtracts the 8-digit BCD content of the subtrahend and CY from the minuend and outputs the result to the specified result word (R). $\begin{array}{r} \boxed{Mi+1}\ \boxed{Mi} \\ \boxed{Su+1}\ \boxed{Su} \\ - \quad \boxed{CY} \\ \hline \boxed{CY}\ \boxed{R+1}\ \boxed{R} \end{array}$

Name Mnemonic	Symbol	Function
SIGNED BINARY MULTIPLY (@)✳(420)	—[✳(420) / Md / Mr / R]	Multiplies the signed binary content of two words and outputs the 8-digit signed binary result to R+1 and R. $\begin{array}{r} \boxed{Md} \\ \times\ \boxed{Mr} \\ \hline \boxed{R+1}\ \boxed{R} \end{array}$
DOUBLE SIGNED BINARY MULTIPLY (@)✳L(421)	—[✳L(421) / Md / Mr / R]	Multiplies two 32-bit (8-digit) signed binary values and outputs the 16-digit signed binary result to R+3 through R. $\begin{array}{r} \boxed{Md+1}\ \boxed{Md} \\ \times\ \boxed{Mr+1}\ \boxed{Mr} \\ \hline \boxed{R+3}\ \boxed{R+2}\ \boxed{R+1}\ \boxed{R} \end{array}$
UNSIGNED BINARY MULTIPLY (@)✳U(422)	—[✳U(422) / Md / Mr / R]	Multiplies the unsigned binary content of two words and outputs the 8-digit result to R+1 and R. $\begin{array}{r} \boxed{Md} \\ \times\ \boxed{Mr} \\ \hline \boxed{R+1}\ \boxed{R} \end{array}$
DOUBLE SIGNED BINARY MULTIPLY (@)✳UL(423)	—[✳UL(423) / Md / Mr / R]	Multiplies two 32-bit (8-digit) unsigned binary values and outputs the 16-digit result to R+3 through R. $\begin{array}{r} \boxed{Md+1}\ \boxed{Md} \\ \times\ \boxed{Mr+1}\ \boxed{Mr} \\ \hline \boxed{R+3}\ \boxed{R+2}\ \boxed{R+1}\ \boxed{R} \end{array}$
BCD MULTIPLY (@)✳B(424)	—[✳B(424) / Md / Mr / R]	Multiplies the BCD content of two words and outputs the 8-digit BCD result to R+1 and R. $\begin{array}{r} \boxed{Md} \\ \times\ \boxed{Mr} \\ \hline \boxed{R+1}\ \boxed{R} \end{array}$
DOUBLE BCD MULTIPLY (@)✳BL(425)	—[✳BL(425) / Md / Mr / R]	Multiplies two 32-bit (8-digit) BCD values and outputs the 16-digit BCD result to R+3 through R. $\begin{array}{r} \boxed{Md+1}\ \boxed{Md} \\ \times\ \boxed{Mr+1}\ \boxed{Mr} \\ \hline \boxed{R+3}\ \boxed{R+2}\ \boxed{R+1}\ \boxed{R} \end{array}$
SIGNED BINARY DIVIDE (@)/(430)	—[/(430) / Dd / Dr / R]	Divides one 16-bit signed binary value by another and outputs the 32-bit signed binary result to R+1 and R. Quotient Remainder $\boxed{R}\quad\boxed{R+1}$ $\boxed{Dr}\,)\,\boxed{Dd}$

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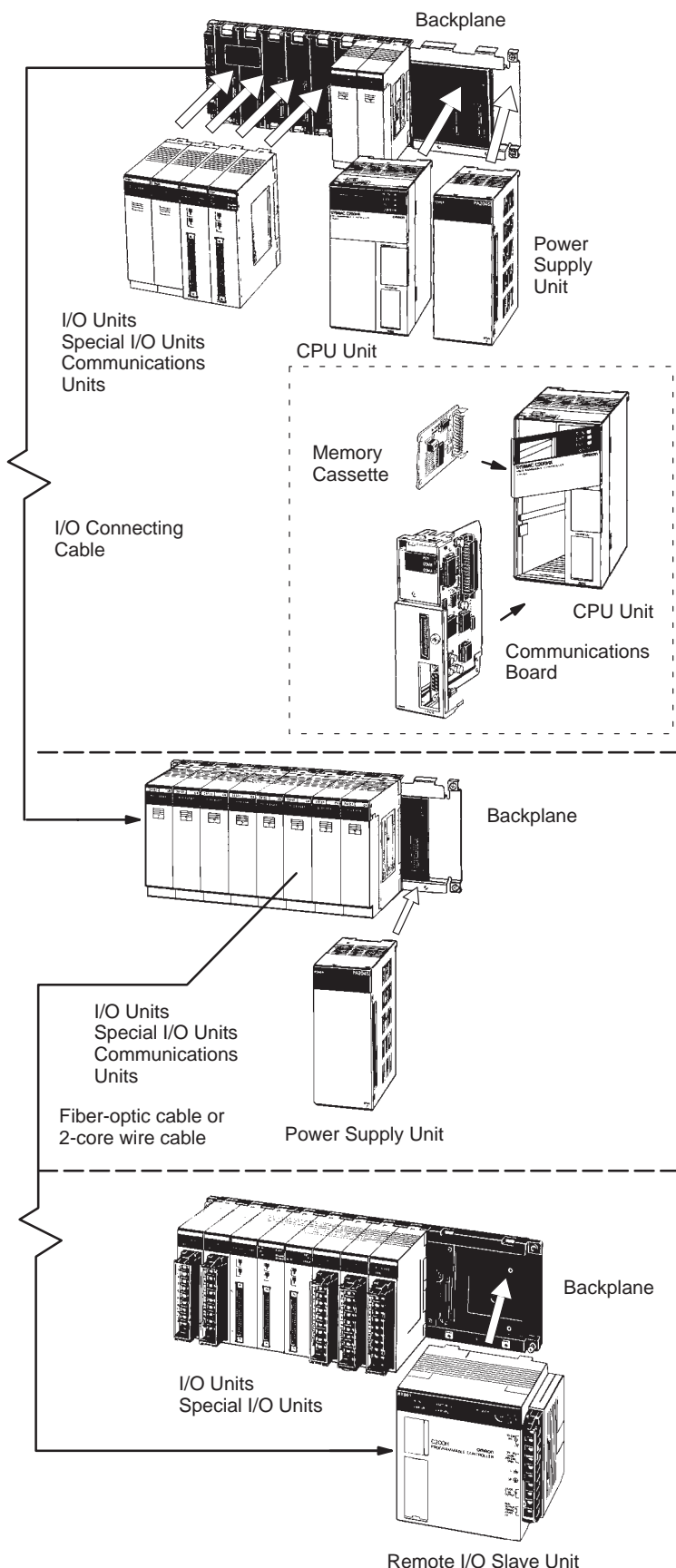
- An instruction marked with "★" is an expansion instruction. These instructions must be assigned function codes before they can be used.

- An instruction marked with "✳" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.

Programming Instructions

Name Mnemonic	Symbol	Function
DOUBLE SIGNED BINARY DIVIDE (@)/L(431)	/L(431) Dd Dr R	Divides one 32-bit signed binary value by another and outputs the 64-bit signed binary result to R+3 to R. Remainder Quotient R+3 R+2 R+1 R Dr+1 Dr) Dd+1 Dd
UNSIGNED BINARY DIVIDE (@)/U(432)	/U(432) Dd Dr R	Divides one 16-bit unsigned binary value by another and outputs the 32-bit signed binary result to R+1 and R. Quotient Remainder R R+1 Dr) Dd
DOUBLE UNSIGNED BINARY DIVIDE (@)/UL(433)	/UL(433) Dd Dr R	Divides one 32-bit unsigned binary value by another and outputs the 64-bit signed binary result to R+3 to R. Remainder Quotient R+3 R+2 R+1 R Dr+1 Dr) Dd+1 Dd
BCD DIVIDE (@)/B(434)	/B(434) Dd Dr R	Divides one 4-digit BCD value by another and outputs the BCD result to R+1 and R. Quotient Remainder R R+1 Dr) Dd
DOUBLE BCD DIVIDE (@)/BL(435)	/BL(435) Dd Dr R	Divides one 8-digit BCD value by another and outputs the result to R+3 to R. Remainder Quotient R+3 R+2 R+1 R Dr+1 Dr) Dd+1 Dd

Name Mnemonic	Symbol	Function
SIGNED BINARY MULTIPLY (@)MBS ★	MBS(--) Md Mr R	Multiplies the signed binary content of two words and outputs the 8-digit signed binary result to R+1 and R. Md x Mr R+1 R
DOUBLE SIGNED BINARY MULTIPLY (@)MBSL ★	MBSL(--) Md Mr R	Multiplies two 32-bit (8-digit) signed binary values and outputs the 16-digit signed binary result to R+3 through R. Md+1 Md x Mr+1 Mr R+3 R+2 R+1 R
SIGNED BINARY DIVIDE (@)DBS ★	DBS(--) Dd Dr R	Divides one 16-bit signed binary value by another and outputs the 32-bit signed binary result to R+1 and R. Quotient Remainder R R+1 Dr) Dd
DOUBLE SIGNED BINARY DIVIDE (@)DBSL ★	DBSL(--) Dd Dr R	Divides one 32-bit signed binary value by another and outputs the 64-bit signed binary result to R+3 to R. Remainder Quotient R+3 R+2 R+1 R Dr+1 Dr) Dd+1 Dd

- An instruction marked with "@" can be used as a differentiated instruction that will be executed only once each time the instruction executing condition is turned ON.
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- An instruction marked with "✻" is an expansion instruction. The assigned function code is the default for the C200HX/HG/HE PC.

Peripheral Devices

C200H-LK201-V1

Mounted directly

C200HX/HG/HE(-Z)

Host Link Unit

RS-232C port

Peripheral port

Connecting Cables

C200H-CN222/422 (2 m/4 m)

Programming Console Connecting Cable

XW2Z-200S/500S: 25-pin
XW2Z-200P/500P: 25-pin
XW2Z-200S-V/500S-V: 9-pin
XW2Z-200P-V/500P-V: 9-pin

Connecting Cable

CQM1-CIF01/02

Connecting Cable

Support Software

Windows

MS-DOS

IBM PC/AT or Compatible

CX-Programmer
WS02-CXPC1-E-V31

SYSMAC Support Software
C500-ZL3AT1-E

Peripheral Devices

Programming Console for C200H

C200H-PRO27-E

Data Access Console for C200H

C200H-DAC01

Programming Console

CQM1-PRO01-E

Note: Discontinuation models are contained.

Standard Models

CPU Racks

- The CPU Rack is configured of the CPU Unit, a Backplane, Power Supply Unit, I/O Units, and Special I/O Units or Link Units.

- A power supply circuit and RAM (15.2K words) are built into the CPU Unit.

- The Communications Board or Memory Cassette is not provided with the CPU Unit.

- A total of two SYSMAC LINK Units can be mounted to the CPU Unit if the C200HW-COM01 or C200HW-COM04-EV1 Communications Board is connected to the CPU Unit.

- Only two C200HS-INT01 Interrupt Input Unit can be mounted for a single CPU Unit.

- Backplanes are necessary for the CPU Rack, Expansion I/O Rack, and Slave Rack. These Backplanes are different to each other in model.

Expansion I/O Racks

- Up to three Expansion I/O Racks can be connected to the C200HX-CPU□5-ZE, C200HX-CPU54-(Z)E, C200HX-CPU64-(Z)E, C200HG-CPU53-(Z)E, or C200HG-CPU63-(Z)E. Up to two Expansion I/O Racks can be connected to any other CPU Unit for the C200HX, C200HG, and C200HE.

- An Expansion I/O Rack is configured of an I/O Power Supply Unit, a Backplane, I/O Units, Special I/O Units, and Link Units.

- Backplanes are necessary for the CPU Unit, Expansion I/O Rack, and the Slave Rack. These Backplanes are different to each other in model. The width of the Expansion I/O Rack for the C200HX, C200HG, and C200HE is smaller than that of the Expansion I/O Rack used for the C200HS.

Slave Racks
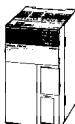
- A maximum total of five Slave Racks can be connected to two Remote I/O Master Units (combined).

- A Slave Rack is configured of a Remote I/O Slave Unit, a Backplane (for the C200HX/HG/HE Slave Rack), I/O Units, and Special I/O Units. Group-2 High-density I/O Units, Communications I/O Units, and Interrupt Input Units cannot be mounted.

- If a High-density I/O Unit is mounted to a Slave Rack, a C200H-RM001-PV1 /RM201 must be used. C200H-RM001-P Master Units cannot be used.

- A maximum of two Expansion I/O Racks can be connected to Slave Racks by means of I/O Connecting Cable, but the Expansion I/O Racks must also be counted against the maximum of five Slave Racks that can be connected.

Backplane

Power Supply Unit

CPU Unit

I/O Units
Special I/O Units
Communications Units

I/O Connecting Cable

Memory Cassette

CPU Unit

Communications Board

Backplane

I/O Units
Special I/O Units
Communications Units

Fiber-optic cable or 2-core wire cable

Power Supply Unit

Backplane

I/O Units
Special I/O Units

Remote I/O Slave Unit

Note: 1. Discontinuation models are contained.
2. The above tables indicate conformance to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of the end of September 2001. (U: UL; C: CSA; UC: cULus; CU: cUL; N: NK; L: Lloyd's Register; CE: EC Directives.) Please contact your OMRON representative for application conditions.
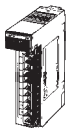
Standard Models

CPU Rack
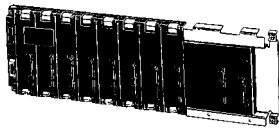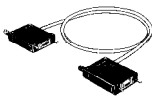
Name	Specifications					Model number	Standards
CPU Units (Model numbers with suffix ZE.) (All models incorporate a clock function and slot for the Communications Board except for the CPU11-E.)	UM	DM	EM	I/O points	RS-232C		U, C, N, L, CE
	3.2K words	4K words	---	640	No	C200HE-CPU11-ZE	
	7.2K words	6K words	---	880	No	C200HE-CPU32-ZE	
					Yes	C200HE-CPU42-ZE	
	15.2K words		6K words		No	C200HG-CPU33-ZE	
					Yes	C200HG-CPU43-ZE	
				1,184	No	C200HG-CPU53-ZE	
					Yes	C200HG-CPU63-ZE	
	31.2K words		6K words x 3	880	No	C200HX-CPU34-ZE	
					Yes	C200HX-CPU44-ZE	
				1,184	No	C200HX-CPU54-ZE	
					Yes	C200HX-CPU64-ZE	
	63.2K words		6K words x 8			C200HX-CPU65-ZE	
			6K words x 16			C200HX-CPU85-ZE	
CPU Units (Model numbers without suffix ZE) (All models incorporate a clock function and slot for the Communications Board except for the CPU11-E.)	3.2K words	4K words	---	640	No	C200HE-CPU11-E	
	7.2K words	6K words	---	880	No	C200HE-CPU32-E	
					Yes	C200HE-CPU42-E	
	15.2K words		6K words		No	C200HG-CPU33-E	
					Yes	C200HG-CPU43-E	
				1,184	No	C200HG-CPU53-E	
					Yes	C200HG-CPU63-E	
	31.2K words		6K words x 3	880	No	C200HX-CPU34-E	
					Yes	C200HX-CPU44-E	
				1,184	No	C200HX-CPU54-E	
					Yes	C200HX-CPU64-E	
Power Supply Units	100 to 120/200 to 240 VAC					C200HW-PA204	
	100 to 120/200 to 240 VAC (with 24-VDC output terminals)					C200HW-PA204S	
	100 to 120/200 to 240 VAC (with output contacts during operation)					C200HW-PA204R	U, C
	100 to 120/200 to 240 VAC (with output contacts during operation) Output capacity: 9 A at 5 VDC					C200HW-PA209R	U, C, N, L, CE
	Power supply voltage: 24VDC					C200HW-PD024	
CPU I/O Backplanes	3 slots					C200HW-BC031	
	5 slots					C200HW-BC051	
	8 slots					C200HW-BC081-V1	U, C, CE
	10 slots					C200HW-BC101-V1	
Communications Boards	Communications port for SYSMAC LINK					C200HW-COM01	U, C, N, L, CE
	RS-232C port					C200HW-COM02-V1	
	RS-422/485 port					C200HW-COM03-V1	
	Communications port for the SYSMAC LINK Unit and a protocol macro function					C200HW-COM04-EV1	
	Two RS-232C ports and a protocol macro function					C200HW-COM05-EV1	
	RS-422/485 port, an RS-232C port, and a protocol macro function					C200HW-COM06-EV1	

Note: The above tables indicate conformance to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of the end of September 2001. (U: UL; C: CSA; UC: cULus; CU: cUL; N: NK; L: Lloyd's Register; CE: EC Directives.) Please contact your OMRON representative for application conditions.

Standard Models

Name	Specifications			Model number	Standards
Memory Cassettes	EEPROM	4K words		C200HW-ME04K	U, C, N, L, CE
		8K words		C200HW-ME08K	
		16K words		C200HW-ME16K	N, L, CE
		32K words		C200HW-ME32K	U, C, N, CE, L
		64K words (see note)		C200HW-ME64K	CE
		16K words/32K words		C200HS-MP16K	N, L, CE
		Equivalent to 27256, 150 ns, 12.5 V		ROM-JD-B	CE
		Equivalent to 27512, 150 ns, 12.5 V		ROM-KD-B	
Backup Battery for C200HS and C200HX/C200HG/C200HE CPU RAM Units				C200H-BAT09	---

Note: The C200HW-ME64K can only be used with the C200HX-CPU65-ZE/CPU85-ZE CPU Units only.
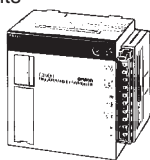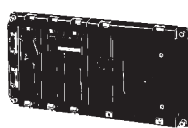
Expansion I/O Racks

Name	Specifications		Model number	Standards
Power Supply Units	100 to 120/200 to 240 VAC		C200HW-PA204	U, C, N, L, CE
	100 to 120/200 to 240 VAC (with 24-VDC output terminals)		C200HW-PA204S	
	100 to 120/200 to 240 VAC (with output contacts during operation)		C200HW-PA204R	U, C
	100 to 120/200 to 240 VAC (with output contacts during operation) Output capacity: 9 A at 5 VDC		C200HW-PA209R	U, C, N, L, CE
	24 VDC		C200HW-PD024	
Expansion I/O Backplanes	3 slots		C200HW-BI031	
	5 slots		C200HW-BI051	
	8 slots		C200HW-BI081-V1	
	10 slots		C200HW-BI101-V1	
I/O Connecting Cables	30 cm	The total length of the I/O Connecting Cables used in a network must be 12 m maximum.	C200H-CN311	N, L, CE
	70 cm		C200H-CN711	
	200 cm		C200H-CN221	CE
	500 cm		C200H-CN521	L, CE
	1,000 cm		C200H-CN131	

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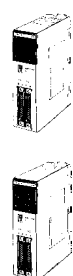
Standard Models

Slave Racks

Name		Specifications			Model number	Standards
Slave Racks *	Remote I/O Slave Units	100 to 120/200 to 240 VAC (switchable)		APF/PCF	C200H-RT001-P	U, C, N, L
		24 VDC			C200H-RT002-P	N, L
		100 to 120/200 to 240 VAC (switchable)		Wired	C200H-RT201	U, C, N, L
					C200H-RT201-C	CE
		24 VDC			C200H-RT202	N, L, CE
Backplanes		3 slots			C200H-BC031-V2	U, C, N, L, CE
		5 slots			C200H-BC051-V2	
		8 slots			C200H-BC081-V2	
		10 slots			C200H-BC101-V2	
I/O Blocks		Input	Specify either 12 or 24 VDC.		G71-IC16	---
		Output			G71-OD16	
I/O Terminals	AC input	Specify either 100 or 200 VAC.			G7TC-IA16	
	DC input	Specify either 12 or 24 VDC.			G7TC-ID16	
	Output	Specify either 12 or 24 VDC.			G7TC-OC16	
Link Adapter *		O/E converter; 1 connector for RS-485, 1 connector each for APF/PCF			B500-AL007-P	

* Discontinuation models.

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Standard Models

I/O Units

Name			Specifications		Model number	Standards
Input Units	AC Input Units		8 pts	100 to 120 VAC	C200H-IA121	U, C, N, L
			16 pts	100 to 120 VAC	C200H-IA122	
					C200H-IA122V	CE
			8 pts	200 to 240 VAC	C200H-IA221	U, C, N, L
			16 pts	200 to 240 VAC	C200H-IA222	
				200 to 240 VAC	C200H-IA222V	CE
	DC Input Units		8 pts	12 to 24 VDC	C200H-ID211	U, C, N, L, CE
			16 pts	24 VDC	C200H-ID212	
	AC/DC Input Units		8 pts	12 to 24 VAC/DC	C200H-IM211	
			16 pts	24 VAC/DC	C200H-IM212	
	Interrupt Input Unit (see note)		8 pts	12 to 24 VDC	C200HS-INT01	U, C, CE
Output Units	Relay Output Units		8 pts	2 A, 250 VAC/24 VDC (for resistive load)	C200H-OC221	U, C, N, L
			12 pts	2 A, 250 VAC/24 VDC (for resistive load)	C200H-OC222	
					C200H-OC222N	CE
			5 pts	2 A, 250 VAC/24 VDC (for resistive load) Independent commons	C200H-OC223	U, C, N, L
			8 pts	2 A, 250 VAC/24 VDC (for resistive load) Independent commons	C200H-OC224	
					C200H-OC224N	CE
			16 pts	2 A, 250 VAC/24 VDC (for resistive load) (see note)	C200H-OC225	U, C, N, L
	Triac Output Units		8 pts	1 A, 200 VAC	C200H-OA223	CE
			12 pts	0.3 A, 200 VAC	C200H-OA222V *	
	Transistor Output Units		8 pts	1 A, 12 to 48 VDC	C200H-OD411	U, C, N, L, CE
			12 pts	0.3 A, 24 VDC	C200H-OD211	
			16 pts	0.3 A, 24 VDC (see note)	C200H-OD212	
			8 pts	2.1 A, 24 VDC	C200H-OD213	
			8 pts	0.8 A, 24 VDC; source type (PNP); w/load short protection	C200H-OD214 *	U, C, N, L
			8 pts	0.3 A, 5 to 24 VDC; source type (PNP)	C200H-OD216	
			12 pts	0.3 A, 5 to 24 VDC; source type (PNP)	C200H-OD217	U, C, N, L, CE
			16 pts	1 A, 24 VDC; source type (PNP); w/load short protection	C200H-OD21A	CE
Analog Timer Unit			4 timers	0.1 to 1 s/1 to 10 s/10 to 60 s/1 min to 10 min (switchable)	C200H-TM001	U, C
	Variable Resistor Connector		Connector w/lead wire (2 m) for 1 external resistor		C4K-CN223 *	---
B7A Interface Units			15 or 16 input pts	Connects to B7A Link Terminals. Standard transmission delay.	C200H-B7AI1	U, C, CE
			16 output pts	Connects to B7A Link Terminals. Standard transmission delay.	C200H-B7AO1	
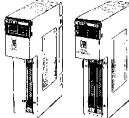
* Discontinuation models.

Note: If the Interrupt Input Unit is mounted on an Expansion I/O Rack, the interrupt function cannot be used and the Interrupt Input Unit will be treated as an ordinary 8-point Input Unit. Moreover, Interrupt Input Units cannot be used on Slave Racks.

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Standard Models

Group-2 I/O Units

Name		Specifications		Model number	Standards
	DC Input Units	32 pts	4.1 mA at 24 VDC	C200H-ID216	U, C, N, L, CE
		64 pts		C200H-ID217	
		64 pts	4.1 mA at 12 VDC	C200H-ID111	U, C
		32 pts	6 mA at 24 VDC	C200H-ID218	U, C, CE
		64 pts		C200H-ID219	
	Transistor Output Units	32 pts	16 mA at 4.5 V to 100 mA at 26.4 V	C200H-OD218	U, C, N, L, CE
		64 pts		C200H-OD219	
		32 pts	0.5 A at 24 VDC with PNP load short-circuit protection	C200H-OD21B	CE
B7A Interface Units		32 input pts	Connects to B7A Link Terminals. Standard or high-speed transmission delay.	C200H-B7A12	U, C
		32 output pts		C200H-B7A02	U, C, CE
		16 input and 16 output points		C200H-B7A21	
		32 input and 32 output points		C200H-B7A22	

Connectors for Group-2 I/O Units

Name	Made by OMRON		Made by Fujitsu
Solder terminals	C500-CE404	One set	FCN-361J040-AU: Connector FCN-360C040-J2: Connector cover (Included with product.)
Crimp terminals	C500-CE405		FCN-363J040: Housing FCN-363J-AU: Contact FCN-360C040-J2: Connector cover
Pressure-welded terminals (without cover)	C500-CE403		FCN-367J040-AU/F

Special I/O Units

Name		Specifications		Model number	Standards
High-density I/O Units (see note 1)	DC Input Units	32 pts	5 VDC (TTL inputs); w/high-speed input	C200H-ID501	U, C, N, L, CE
		32 pts	24 VDC; w/high-speed input	C200H-ID215	
	Transistor Output Units	32 pts	0.1 A, 24 VDC (useable as 128-point dynamic output unit)	C200H-OD215	U, C, CE, N, L
		32 pts	35 mA, 5 VDC (TTL outputs) (useable as 128-point dynamic output unit)	C200H-OD501	U, C, N, L, CE
	DC Input/Transistor Output Units	16 input and 16 output pts	24-VDC inputs; w/high-speed input; 0.1-A, 24-VDC outputs (useable as 128-point dynamic input unit)	C200H-MD215	
		16 input and 16 output pts	5-VDC TTL inputs; w/high speed input; 35-mA, 5-VDC TTL outputs (useable as 128-point dynamic input unit)	C200H-MD501	
		16 input and 16 output pts	12-VDC TTL inputs; w/high speed input; 12-VDC TTL outputs (useable as 128-point dynamic input unit)	C200H-MD115	U, C, N

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Standard Models

Name		Specifications		Model number	Standards
Analog I/O Units	Analog I/O Unit	1 to 5 V/0 to 10 V/–10 to 10 V (switchable); 2 inputs and 2 outputs; resolution of 1/4,000		C200H-MAD01	U, C, N, L, CE
	Analog Input Units	4 to 20 mA/1 to 5 V/0 to 10 V/–10 to 10 V (switchable); 8 inputs; resolution of 1/4,000		C200H-AD003	U, C, N, L, CE
	Analog Output Units	1 to 5 V/0 to 10 V/–10 to 10 V (switchable); 8 outputs (voltage output); resolution of 1/4,000		C200H-DA003	U, C, N, L, CE
		4 to 20 mA; 8 outputs (current output); resolution of 1/4,000		C200H-DA004	
Temperature Sensor Units		Thermocouple	K(CA) or J(IC), switchable; 4 inputs	C200H-TS001	U, C
			K(CA) or L(Fe-CuNi) DIN standards; 4 inputs	C200H-TS002	
		Pt resistance thermometer	Pt 100 Ω; 4 inputs	C200H-TS101	
			Pt 100 Ω; 4 inputs; DIN and 1989 JIS standards	C200H-TS102	
Temperature Control Units		Thermocouple	Transistor output	C200H-TC001	U, C, CE
			Voltage output	C200H-TC002	
			Current output	C200H-TC003	
		Pt resistance thermometer	Transistor output	C200H-TC101	
			Voltage output	C200H-TC102	
			Current output	C200H-TC103	
Heat/Cool Temperature Control Units		Thermocouple	Transistor output	C200H-TV001	
			Voltage output	C200H-TV002	
			Current output	C200H-TV003	
		Pt resistance thermometer	Transistor output	C200H-TV101	
			Voltage output	C200H-TV102	
			Current output	C200H-TV103	
Cam Positioner Unit		Detects angles of rotation by means of a resolver and provides ON and OFF outputs at specified angles. A maximum of 48 cam outputs (16 external outputs and 32 internal outputs) maximum are available.		C200H-CP114	U, C
Data Setting Console		Used to set and monitor data in Temperature Control Units and Cam Positioner Units.		C200H-DSC01	---
	Connecting Cables	2 m		C200H-CN225	
		4 m		C200H-CN425	

* Discontinuation models.

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103

Standard Models

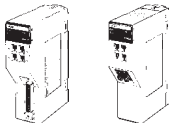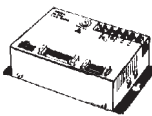| Name	Specifications		Model number	Standards
PID Control Units	Transistor output; 4 to 20 mA/1 to 5 V/0 to 5V/0 to 10 V inputs (selectable)		C200H-PID01	U, C, CE
	Voltage output; 4 to 20 mA/1 to 5 V/0 to 5V/0 to 10 V inputs (selectable)		C200H-PID02	
	Current output; 4 to 20 mA/1 to 5 V/0 to 5V/0 to 10 V inputs (selectable)		C200H-PID03	
Position Control Units	1 axis	Pulse output; speeds: 1 to 500,000 pps; directly connects to servomotor driver	C200HW-NC113	
	1 axis	Pulse output; speeds: 1 to 250,000 pps; directly connects to servomotor driver	C200H-NC112	
	2 axis	Pulse output; speeds: 1 to 500,000 pps; directly connects to servomotor driver	C200HW-NC213	
	2 axis	Pulse output; speeds: 1 to 250,000 pps; directly connects to servomotor driver	C200H-NC211	U, C
	4 axis	Pulse output; speeds: 1 to 500,000 pps; directly connects to servomotor driver	C200HW-NC413	U, C, CE
NC Support Software (SYSMAC-NCT)	Windows 95		WS01-NCTF1-E *	---
Connecting cable	2 m		XW2Z-200S (see note 2)	
	5 m		XW2Z-500S (see note 2)	
Position Control Unit Cable (1 axis, U, H, M Series)	Connecting cables for C200HW-NC113		XW2Z-050J-A6	---
			XW2Z-100J-A6	
Position Control Unit Cable (2 axes, U, H, M Series)	Connecting cables for C200HW-NC213/NC413		XW2Z-050J-A7	
			XW2Z-100J-A7	
Position Control Unit Cable (1 axis, UEP)	Connecting cables for C200HW-NC113		XW2Z-050J-A8	
			XW2Z-100J-A8	
Position Control Unit Cable (2 axes, UEP)	Connecting cables for C200HW-NC213/NC413		XW2Z-050J-A9	
			XW2Z-100J-A9	
Position Control Unit Cable (1 axis, U, H, M Series)	Connecting cables for C200H-NC112		XW2Z-□□□J-A1	
Position Control Unit Cable (1 axis, UEP)			XW2Z-□□□J-A4	
Servo Relay Unit (1 axis)			XW2Z-20J6-1B	
Position Control Unit Cable (2 axes, U, H, M Series)	Connecting cables for C200H-NC211		XW2Z-□□□J-A2	
Position Control Unit Cable (2 axes, UEP)			XW2Z-□□□J-A5	
Servo Relay Unit (2 axes)			XW2Z-40J6-2B	
High-speed Counter Units	1 axis	Pulse input; counting speed: 50 kcps; 5 VDC/12 VDC/24 VDC	C200H-CT001-V1	U, C, CE
	1 axis	Pulse input; counting speed: 75 kcps; RS-422 line driver	C200H-CT002	
	2 axis	Pulse input; counting speed: 75 kcps; RS-422 line driver	C200H-CT021	
ASCII Unit	200K-byte RAM and 2 RS-232C ports		C200H-ASC11	
	200K-byte RAM, 1 RS-232C port, 1 RS-422A/485 port		C200H-ASC21	
	200K-byte RAM, 2 RS-232C ports, 1 RS-232C port for terminal connection		C200H-ASC31	
	200K-byte RAM and 24K-byte EEPROM are built-in.		C200H-ASC02	N, CE

* Discontinuation models.

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Standard Models

Name		Specifications	Model number	Standards
ID Sensor Units		Local application, electromagnetic coupling	C200H-IDS01-V1	U, C
		Remote application; microwave transmissions	C200H-IDS21 *	---
	Read/Write Heads	Electromagnetic type	V600-H series	
		Microwave type	V620-H series	
	Data Carriers	SRAM type for V600-H series.	V600-D□□R□□	
		EEPROM type for V600-H series.	V600-D□□P□□	
Voice Unit		60 messages max.; message length: 32, 48, or 64 s (switchable)	C200H-OV001 *	
	Connecting Cable	RS-232C	C200H-CN224 *	
Motion Control Unit		G-language programmable 2-axis analog outputs	C200H-MC221	U, C, CE
	CX-Motion MC Support Software	Windows 98SE/Me/NT4.0 (Service Pack6a)/ 2000(ServicePack3 or higher)/XP/Vista/7	WS02-MCTC1-EV2	---
	Connecting cable	6 m	CV500-CIF01 *	
	Teaching Box	---	CVM1-PRO01-V1	U, C, CE
	Connection cable for Teaching Box	2 m long	CV500-CN224 *	CE, L
	Memory Pack (with key sheet) (see note 2)	---	CVM1-MP702-V1	U, C, CE
	Terminal Block Conversion Unit	Simplifies wiring for I/O connectors.	XW2B-20J6-6	---
	Connecting cable for Terminal Block Conversion Unit		XW2Z-100J-F1	

* Discontinuation models.

Note: 1. When mounting a High-density I/O Unit as a Special I/O Unit to a Slave Rack, the Remote I/O Master must be the C200H-RM001-PV1 or C200H-RM201.

2. The CV-series Programming Console can be used as a Teaching Box by replacing the Memory Pack of the Programming Console.

Connectors for High-density I/O Units Used as Special I/O Units

Name	Made by OMRON		Made by Fujitsu
Solder terminals	C500-CE241	One set	FCN-361J024-AU: Connector FCN-360C024-J2: Connector cover (Included with product.)
Crimp terminals	C500-CE242		FCN-363J024: Housing FCN-363J-AU: Contact FCN-360C024-J2: Connector cover
Pressure-welded terminals (without cover)	C500-CE243		FCN-367J024-AU/F
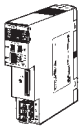
Communications Units

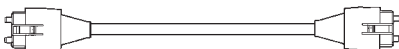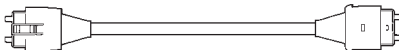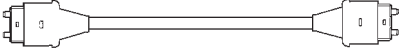| Name		Specifications	Model number	Standards
PC Card Unit (see note 1)		A memory card suitable for Phoenix PCM+3.2 and one of the following Bus Connection Units is required. No PC card is provided with the Unit.	C200HW-PCU01 *	U, C, CE
	Ethernet Set	A floppy disk containing Ethernet setup utility data is provided. One of the following Bus Connection Units is required. No PC card is provided with the Unit.	C200HW-PCS01-EV1 *	---
	Bus Connection Units	For 1 Unit	C200HW-CE011 *	U, C
		Commonly used with other Communications Units.	C200HW-CE012 *	
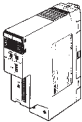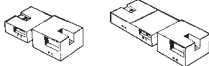
* Discontinuation models.

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105

Standard Models

Name	Specifications		Model number	Standards
Controller Link Unit (Twisted-pair cable model)	One of the above Bus Connection Units is required.		C200HW-CLK21	U, C, N, CE
Controller Link Relay Terminal Block	Wire type (set of 5)		CJ1W-TB101	---
SYSMAC LINK Unit (coaxial cable)	A Bus Connection Unit must be ordered separately.	Data link table: 918 words	C200HW-SLK23	U, C, N, L
		Data link table: 2,966 words	C200HW-SLK24	
Terminator	One required for each node at ends of System.		C1000H-TER01	N
Attachment Stirrup	Provided with SYSMAC LINK Unit.		C200H-TL001	---
F Adapter	To connect network		C1000H-CE001	N
F Adapter Cover	To connect network		C1000H-COV01	---
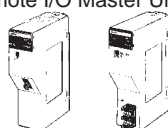
Note: 1. Only a single PC Card Unit can be used with the CPU Unit.

2. Contact OMRON your sales representative. (Ordered in units of 100 m or more)

Name	Specifications		Model number	Standards
SYSMAC LINK Unit (optical fiber cable)	Connect with H-PCF cable. A Bus Connection Unit must be ordered separately.	Data link table: 918 words	C200HW-SLK13	U, C, N, L, CE
		Data link table: 2,966 words	C200HW-SLK14	
Power Supply Adapter	Required when supplying backup power	For 1 or 2 Units	C200H-APS03	U, C, N
Power Cable	Connects Power Supply Adapter and SYSMAC Link Unit.	For 1 Unit	C200H-CN111	---
		For 2 Units	C200H-CN211	
SYSMAC LINK Support Board (coaxial cable)	To connect IBM PC/AT or compatible as node in SYSMAC LINK system		3G8F5-SLK21-E *	
Bus Connection Units	Connects SYSMAC LINK Unit, Controller Link Unit to CPU Unit.	For 1 Unit	C200HW-CE001	U, C, N, L, CE
		For 2 Units	C200HW-CE002	
Host Link Units	Rack-mounting	C200HS, C200HE, C200HG, C200HX	RS-422	C200H-LK202-V1	U, C, N, CE
			RS-232C	C200H-LK201-V1	
DeviceNet Master Unit	Number of I/O points: 1,600 max. Number of Slave Units: 50 max.		C200HW-DRM21-V1	U, C, N, L, CE
DeviceNet I/O Link Unit	I/O Slave Unit Number of words: 64		C200HW-DRT21	U, C, N, CE
CompoBus/S Master Unit	Number of I/O points: 256/128 (selectable) Number of Slave Units: 32 max.		C200HW-SRM21-V1	U, C, N, L, CE

* Discontinuation models.

Note: The above tables indicate conformance to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of the end of September 2001. (U: UL; C: CSA; UC: cULus; CU: cUL; N: NK; L: Lloyd's Register; CE: EC Directives.) Please contact your OMRON representative for application conditions.

Standard Models

Name	Specifications		Model number	Standards
PC Link Unit	Single level: 32 Units Multilevel: 16 Units	RS-485	C200H-LK401	N, L, CE
Remote I/O Master Units *	Up to two per PLC; connectable to up to 5 Slaves per PLC total	APF/PCF	C200H-RM001-PV1	N, L
		Wired	C200H-RM201	N, L, CE
Remote I/O Slave Units	See *Racks* at beginning of product lists.			

* Discontinuation models.

Link Adapters

Name	Specifications	Model number	Standards
Link Adapters *	3 RS-422 connectors	3G2A9-AL001	N, L
	3 optical connectors (APF/PCF)	3G2A9-AL002-PE	N
	3 optical connectors (PCF)	3G2A9-AL002-E	
	1 connector for RS-232C; 2 for RS-422	3G2A9-AL003	---
	1 connector each for APF/PCF, RS-422, and RS-232C	3G2A9-AL004-PE	L
	1 connector each for PCF, RS-422, and RS-232C	3G2A9-AL004-E	
	1 connector each for APF/PCF and APF	3G2A9-AL005-PE	---
	1 connector each for PCF and AGF	3G2A9-AL005-E	
	1 connector for APF/PCF; 2 for AGF	3G2A9-AL006-PE	
	1 connector for PCF; 2 for AGF	3G2A9-AL006-E	
	O/E converter; 1 connector for RS-485, 1 connector each for APF/PCF	B500-AL007-P	L

* Discontinuation models.

Note: The above tables indicate conformance to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of the end of September 2001. (U: UL; C: CSA; UC: cULus; CU: cUL; N: NK; L: Lloyd's Register; CE: EC Directives.) Please contact your OMRON representative for application conditions.
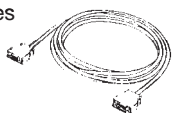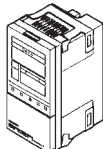
Standard Models

Optical Fiber Products

Optical Fiber Cable for SYSMAC LINK
H-PCF Optical Fiber Cable with Connectors

System	Appearance	Model number
SYSMAC LINK		S3200-CN□□□-20-20
		S3200-CN□□□-20-25
		S3200-CN□□□-25-25

Model Numbers

The above cable model numbers specify the type of cable, the length, and the type of connectors attached.

$$\underline{\text{S3200-CN}}\square\square\square\underline{\text{-20}}\underline{\text{-25}}$$
1.   2.   3.

1. **S3200-CN** specifies H-PCF optical fiber cable.

2. The boxes (□□□) are replaced by codes indicating the standard model lengths, as shown below.

   Consult with your OMRON representative for longer cables. When ordering longer cables, omit the portion represented by the boxes and specify the length in meters separately, e.g., S3200-CN-20-20, 30 m.

Code	Length	Code	Length
201	2 m	152	15 m
501	5 m	202	20 m
102	10 m	Omitted	Over 20 m

3. The last two portions of the model numbers (e.g., 20-25) specify the connectors, as shown below.

Code	Connector
20	S3200-COCF2071
25	S3200-COCF2571

Applicable Optical Fiber Connectors

Model number/Appearance	Applicable Units
	SYSMAC LINK
S3200-COCF2071	CV500-SLK11 * C1000H-SLK11 *
S3200-COCF2571	C200HW-SLK13/14

* Discontinuation models.

All Plastic Optical Fiber Cable for SYSMAC BUS

Name	Specifications	Model number	Standards
All Plastic Optical Fiber Cable	Cable only; order desired length in 5 m increments between 5 and 100 m, or in increments of 200 m or 500 m.	3G5A2-PF002	---
Optical Connectors A	Two optical connectors (brown) for APF (10 m max.)	3G5A2-CO001	
Optical Connectors B	Two optical connectors (black) for APF (8 to 20 m)	3G5A2-CO002	
All Plastic Optical Fiber Cable Set	1-m cable with an Optical Connector A connected to each end	3G5A2-PF101	

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Standard Models

Plastic Clad Optical Fiber Cable for SYSMAC BUS

Name	Specifications		Model number	Standards
Plastic Clad Optical Fiber Cables (indoor)	0.1 m, w/connectors	Ambient temp: –10° to 70°C	3G5A2-OF011	---
	1 m, w/connectors		3G5A2-OF101	
	2 m, w/connectors		3G5A2-OF201	
	3 m, w/connectors		3G5A2-OF301	
	5 m, w/connectors		3G5A2-OF501	
	10 m, w/connectors		3G5A2-OF111	
	20 m, w/connectors		3G5A2-OF211	
	30 m, w/connectors		3G5A2-OF311	
	40 m, w/connectors		3G5A2-OF411	
	50 m, w/connectors		3G5A2-OF511	
	Cable only; order desired length between 1 and 500 m in increments of 1 m.		3G5A2-OF002	
	Cable only; order desired length between 501 and 800 m in increments of 1 m.	Ambient temp: 0° to 55°C (do not expose to direct sunlight)		

H-PCF Optical Fiber Cables (For SYSMAC LINK, and SYSMAC BUS)

Name	Specifications		Model number	Standards
Optical Fiber Cables SYSMAC LINK, SYSMAC BUS, SYSMAC WAY	10 m, black	Two-core cable	S3200-HCCB101	---
	50 m, black		S3200-HCCB501	
	100 m, black		S3200-HCCB102	
	500 m, black		S3200-HCCB502	
	1000 m, black		S3200-HCCB103	
	10 m, orange		S3200-HCCO101	
	50 m, orange		S3200-HCCO501	
	100 m, orange		S3200-HCCO102	
	500 m, orange		S3200-HCCO502	
	1,000 m, orange		S3200-HCCO103	
Optical Fiber Cables SYSMAC BUS/2 *	10 m, black	Two-core cord	S3200-HBCB101	
	50 m, black		S3200-HBCB501	
	100 m, black		S3200-HBCB102	
	500 m, black		S3200-HBCB502	
	1,000 m, black		S3200-HBCB103	
Optical Fiber Cable Connector	SYSMAC BUS: C200H-RM001-(P)V1 C200H-RT001/RT002-P C500-RM001-(P)V1 C500-RT001/RT002-(P)V1 3G2A9-□□□(-P)	Half-lock connector for Remote I/O Master, Remote I/O Slave, Host Link Unit, and Link Adapter	S3200-COCH82 *	
	SYSMAC LINK C200HW-SLK13/14	Half-lock connector	S3200-COCF2571	
	SYSMAC LINK CV500-SLK11 C1000H-SLK11	Full-lock connector	S3200-COCF2071	

* Discontinuation models.

Note: 1. Optical fiber cables must be prepared and connected by specialists.

2. If the user prepares and connects optical fiber cables, the user must take a seminar held under the auspices of Sumitomo Electric Industries, Ltd. and obtain a proper certificate.

3. The Optical Power Tester, Head Unit, Master Fiber Set, and Optical Fiber Assembling Tool are required to connect optical fiber cables.

4. You may want to use the Plastic Clad Optical Fiber Cable/All Plastic Optical Fiber Cable with connectors listed on the previous two pages.

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Standard Models

Optical Fiber Assembling Tool

Name	Specifications	Model number	Standards
Optical Fiber Assembling Tool	Used to connect H-PCF and crimp-cut connectors for optical transmission systems such as the SYSMAC LINK.	CAK-0057 (Sumitomo Electric Industries)	---

Note: 1. Optical fiber cables must be prepared and connected by specialists.

2. The Optical Power Tester, Head Unit, Master Fiber set, and Optical Fiber Assembling Tool are required to connect optical fiber cables.
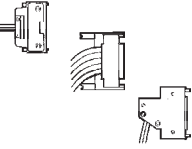
Programming Devices

Name	Specifications		Model number	Standards
Programming Consoles	Provided with a 2-m cable for ladder programming		C200H-PRO27-E	U, C, N, CE
	One of the following connection cables is required for ladder programming.		CQM1-PRO01-E *	
Programming Console Mounting Bracket	Used to attach Hand-held Programming Console to a panel.		C200H-ATT01	---
Programming Console Connecting Cables	For C200H-PRO27-E Hand-held Programming Console	2 m	C200H-CN222	N
			C200HS-CN222	CE
		4 m	C200H-CN422	---
			C200HS-CN422	CE
Data Setting Console	Used for data input and process value display for the C200H-TC□□□.		C200H-DSC01	---
Data Setting Console **Connecting Cables**	For C200H-DSC01	2 m	C200H-CN225	
		4 m	C200H-CN425	
Connecting Cable	Used to connect an IBM PC/AT or compatible to the C200HX/HG/HE.	3.3 m	CQM1-CIF02	U, C, N, L, CE

* Discontinuation models.

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Optional Products
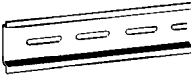
Name	Specifications	Model number	Standards
I/O Unit Cover	Cover for 10-pin terminal block	C200H-COV11	---
Terminal Block Covers	Short protection for 10-pin terminal block (package of 10 covers); 8 pts	C200H-COV02 *	
	Short protection for 19-pin terminal block (package of 10 covers); 12 pts	C200H-COV03 *	
Connector Cover	Protective cover for unused I/O Connecting Cable connectors	C500-COV02 *	
Space Unit	Used for vacant slots	C200H-SP001	N, L
Battery Set	For C200HE/HG/HX RAM Memory Unit only	C200H-BAT09	---
Relay	24 VDC	G6B-1174P-FD-US	
CPU Backplane Insulation Plates	For 3-slot Backplane	C200H-ATT31	---
	For 5-slot Backplane	C200H-ATT51	
	For 8-slot Backplane	C200H-ATT81	
	For 10-slot Backplane	C200H-ATTA1	
I/O Backplane Insulation Plates	For 3-slot Backplane	C200HW-ATT32	CE, N, L
	For 5-slot Backplane	C200HW-ATT52	
	For 8-slot Backplane	C200HW-ATT82	
	For 10-slot Backplane	C200HW-ATTA2	
External Connectors	Solder terminal; 40p and a Connector Cover	C500-CE401	---
	Solderless terminal; 40p and a Connector Cover (Crimp-type)	C500-CE402	
	Pressure welded terminal; 40p	C500-CE403	
	Solder terminal; 40p and a Connector Cover (Horizontal-type)	C500-CE404	
	Crimp-style terminal; 40p and a Connector Cover (Horizontal-type)	C500-CE405	

* Discontinuation models.

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Standard Models

Mounting Rails and Accessories

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

Note: Order DIN Tracks, End Plates, and Spacers in units of 10 each.

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Standard Models

Programming Software

Windows Environment

Name	Specifications	Number of licenses	Media	Model number	Standards
FA Integrated Tool Package CX-One Ver.4.☐	The CX-One is a comprehensive software package that integrates Support Software for OMRON PLCs and components. CX-One runs on the following OS. Windows XP (Service Pack 3 or higher), Vista or 7 **Note:** Except for Windows XP 64-bit version CX-One Version 4.☐ includes CX-Programmer Ver.9.☐ and CX-Protcol Ver.1.☐. For details, refer to the CX-One catalog (Cat. No. R134).	1 license *1	DVD *2	CXONE-AL01D-V4	---
CX-Motion Ver.2.☐	Support Software for Motion Control Units OS: Windows 95/98/Me/NT4.0/2000/XP/Vista/7 **Note:** Except for Windows XP 64-bit version	1 license	CD	WS02-MCTC1-EV2	

*1: Multi licenses are available for the CX-One (3, 10, 30, or 50 licenses).
*2: The CX-One is also available on CD (CXONE-AL☐☐C-V4).

MS-DOS Environment

Name	Specifications	Model number	Standards
SYSMAC Support Software	For IBM PC/AT or compatible computer **Note:** Does not support the additional functions of the C200HX/HG/HE-ZE.	C500-ZL3AT1-E	---
Controller Link Support Software *	IBM PC/AT or compatible	C200HW-ZW3DV2-V2	
		C200HW-ZW3AT2-EV2	

* Discontinuation models.

Controller Link

Name	Specifications	Model number	Standards
Controller Link Support Board *	Provided with the Support Software for ISA bus	3G8F5-CLK21-E	---
	Provided with the Support Software for PCI bus	3G8F7-CLK21-EV1	---

* Discontinuation models.

DeviceNet

Name	Specifications	Model number	Standards
DeviceNet Configurator	Software only Windows 2000 (Service Pack 2 or higher), XP, Vista or 7	WS02-CFDC1-E	---
	Provided with the software for Windows 95, 98, Me, 2000. and XP and PC Card for the IBM PC/AT or compatible	3G8E2-DRM21-EV1 *	
DeviceNet VME Board	I/O allocation space of 12,288 bytes	3G8B3-DRM21-E *	

* Discontinuation models.

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113

Programmable Terminals

■ NT631/31 Series

Supporting the C200HX/HG/HE with More Power than Ever Before

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

NT31C

NT631C

Software Advancements for More Advanced Displays

Hardware: Multi-window Functionality for More Efficient Screen Applications

Up to three windows can be displayed at the same time and many more display components can be positioned. Just touch the screen to move a window, display analog meters along with other forms of graph displays.
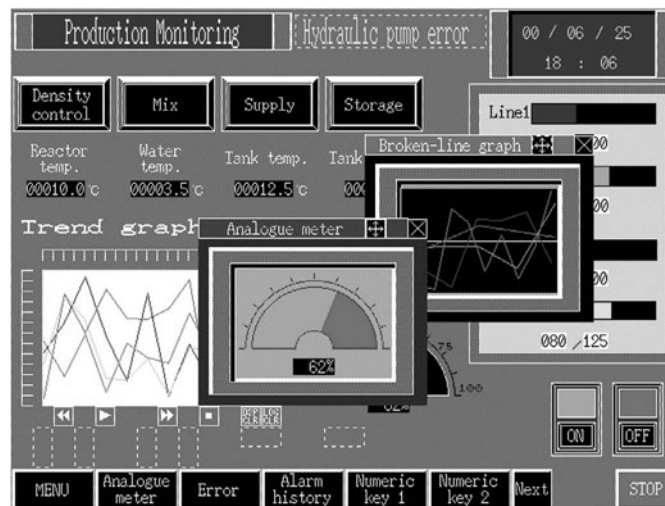
Hand-held PT: The NTH25/25C

Connects to C200HX/HG/HE PLCs via Host Link

NTH25C

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

Software: The Following New Functions

- Copy screens and tables between files.
- Component alignment functions.
- Preview images and libraries.
- ON/OFF simulation for lamps and touch switches.
- Use I/O comments are labels.
- Multi-line labels, separate ON and OFF labels, and more.
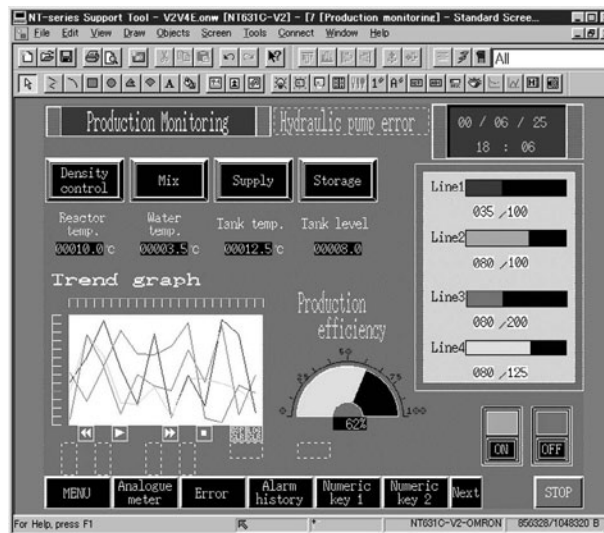
Version 2 NT631 and NT31 PTs

Even More Advance Capabilities

- High-speed NT Links for C200HX/HG/HE PLCs.
- Device monitoring.
- Interlocks.
- Calculations.
- And many other functional improvements.

Programmable Terminals

1:N NT Links: Improved Functionality for PLC Compatibility

- Connect more than one PT to each port on the C200HX/HG/HE CPU Unit.

- Give priority treatment to registered PT communications.

- Connect up to eight PTs to each C200HX/HG PLC port, or up to four PTs to each C200HE PLC port (except C200HE-CPU11) with 1:N NT Links.
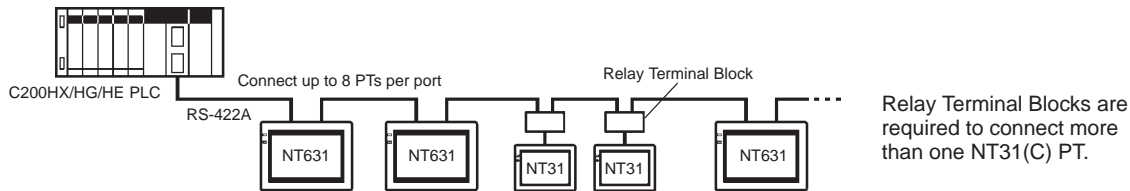
Product	Specifications		Model
NT631 Programmable Terminals	TFT color	Body color: Beige	NT631C-ST151-EV2
		Body color: Black	NT631C-ST151B-EV2
	STN color	Body color: Beige	NT631C-ST141-EV2
		Body color: Black	NT631C-ST141B-EV2
	EL	Body color: Beige	NT631-ST211-EV2
		Body color: Black	NT631-ST211B-EV2
NT31 Programmable Terminals	STN color	Body color: Beige	NT31C-ST141-EV2
		Body color: Black	NT31C-ST141B-EV2
	STN black and white	Body color: Beige	NT31-ST121-EV2
		Body color: Black	NT31-ST121B-EV2
Support Software	English	Windows 98, NT, 2000, Me, XP, Vista or 7, CD-ROM **Note:** Except for Windows XP 64-bit version.	NT-ZJCAT1-EV4
	Memory Unit for screen transfers+	For both NT631 and NT31	NT-MF261
Cables	Screen transfers	IBM PC/AT or compatible	XW2Z-S002
	Printer	To print hard copies of screens	NT-CNT121
Options	DeviceNet Interface Unit		NT-DRT21
	Non-reflective Protective Sheets (display area only)	For NT631C/NT631 (5 sheets)	NT610-KBA04
		For NT31C/NT31 (5 sheets)	NT30-KBA04
	Chemical-resistive Cover (silicon cover)	For NT631C/NT631	NT625-KBA01
		For NT31C/NT31	NT30-KBA01
	Backlight Unit	For NT631C-ST151☐	NT631C-CFL01
		For NT631C-ST141☐	NT631C-CFL02
		For NT31C/31	NT31C-CFL01
	Bar Code Reader	Refer to the Bar Code Reader catalog.	V520-RH21-6

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

Additional Models

■ I/O Blocks

I/O Blocks connect to High-density I/O Units, Mixed I/O Units, and Normal I/O Units.

G70A I/O Blocks

G70A I/O Blocks provide16 contact input or 16 contact output points in a compact package (234 x 75 x 64 mm). They mount to DIN track to save installation/maintenance time.

G7VC Output Blocks

G7VC Output Blocks provide 16 output points in a compact package (192 x 58 x 38.5 mm). A rotating front cover provides easy access to terminals for simplified maintenance and increased safety.

Connecting to High-density I/O Units

C200H-ID215
C200H-OD215
C200H-MD215

G79 Connecting Cable

G70A I/O Block*

G7VC Output Block
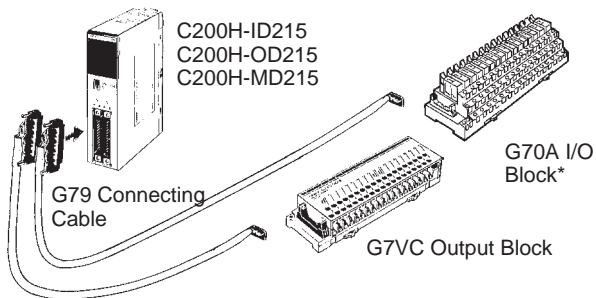
Connecting to Group-2 I/O Units

C200H-ID216
C200H-ID217
C200H-OD218
C200H-OD219

II

I

IV

III

G79-I or G79-O Connecting Cable

G70A I/O Block*

G7VC Output Block
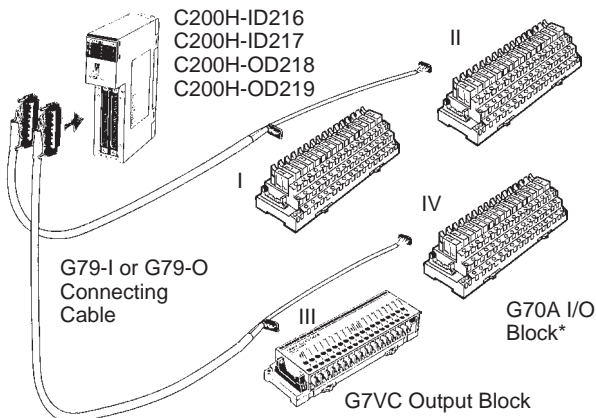
Note: I to IV indicate connector numbers.

Connecting to I/O Units Equipped with Connectors

C200H-OD215
C200H-MD215

G70A-ZOC16-3 I/O Block with Relays

G79 Connecting Cable (1:1)
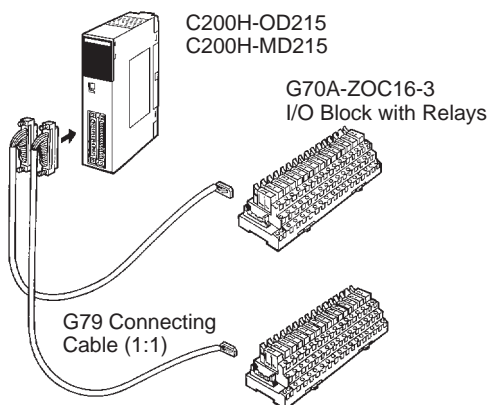
■ G72C/G72C-V I/O Terminals

I/O Terminals are connected as Slaves in Remote I/O Systems to provide for special wiring needs via wiring blocks. Compactness in the right shape is provided by a choice between flat terminals (182 x 85 x 45 mm) and vertical terminals (202 x 45 x 63 mm).

C200H-RM201 Remote I/O Master Unit

G72C-VID16
G72C-VOD16

G72C-ID16
G72C-OD16

G71-OD16

G70A-ZOC16-3

Valve wiring block (Not sold by OMRON
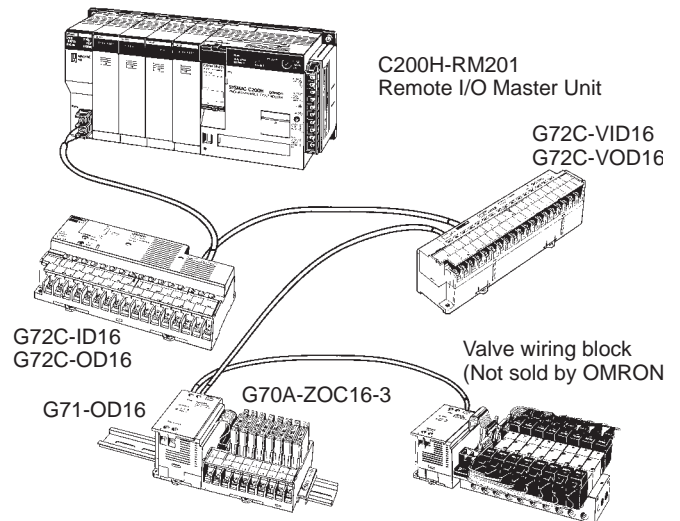
Note: 1. Ask your OMRON dealer for more information concerning OMRON I/O Blocks and I/O Terminals.
2. Discontinuation models are contained.

■ M7F Digital Display

One-touch Connection to the PLC through a Connector

The M7F is a compact display merely 50 mm in length, with character heights of 14 mm and 25 mm and display colors of red and green. Greater efficiency has been achieved through one-touch wiring to the PLC via a connector.

One-to-one Connection by Cable with Connector
C200H-OD215 High-density I/O Unit or C200H-MD215 Mixed I/O Unit (treated as Special I/O Units)

M7F

G79 Connecting Cable (1:1)
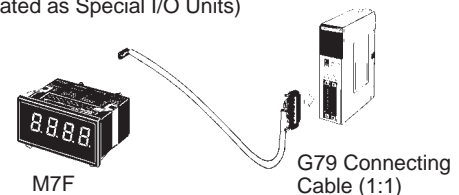
One-to-two Connection by Cable with Connector
C200H-OD218 or C200H-OD219 Group 2 High-density I/O Units

M7F

M7F

G79-O Connecting Cable (1:2)
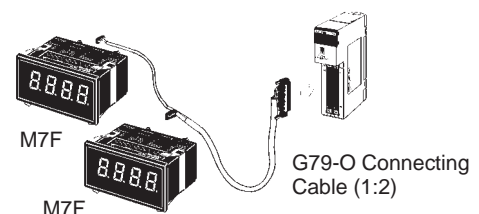
Additional Models

■ Connector-Terminal Conversion Units and Cables

Easily Convert between Connectors and Terminal Blocks to Simplify Control Wiring

XW2B

Only 45 mm wide, the XW2B connects directly to PLC I/O Units via special cables to simplify connection. Snap onto DIN Track or mount via screws. Easy in-panel mounting.

XW2Z

A special cable for easy connection between PLC I/O Units and Connector-Terminal Conversion Units

XW2C

Only 50 mm wide, the XW2C connects directly to 32- or 64-point I/O Units via special cables to reduce wiring trouble. Snap onto DIN Track or mount via screws. Equipped with power common terminal for I/O devices.

Connection Examples

32-point PLC I/O Units with Connectors

C200H-ID215
C200H-OD215
C200H-MD115
C200H-MD215
C200H-MD501
C200H-ID501
C200H-OD501

XW2Z-□□□A
Connecting Cable

XW2B-20G□

I/O Units with Terminal Blocks

XW2Z-□□□F
Cable with Loose
Crimp Connectors

XW2B-20G□

32-point I/O Units with Connectors (Group-2 Slaves)

64-point I/O Units with Connectors (Group-2 Slaves)

C200H-ID216
C200H-OD218
C200H-ID217
C200H-OD219
C200H-ID111
C200H-OD21B

XW2B-40G□

Connecting Cables

For 32-point I/O Units with Connectors: XW2Z-□□□A

Note: The G79-□C (Cable for G7TC) cannot be used for the XW2C.
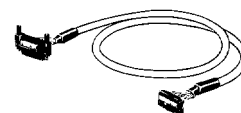
For 32-point I/O Units with Connectors (Group-2 Slaves) or

64-point I/O Units with Connectors : XW2Z-□□□B
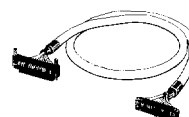
For 32-point Input Units with Connectors (Group-2 Slaves) or

64-point Input Units with Connectors : XW2Z-□□□D

Note: The G79-1□C-□ (Cable for G7TC) cannot be used for the XW2C.
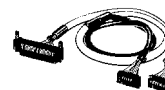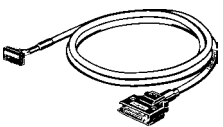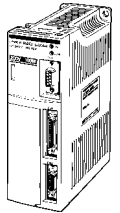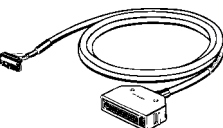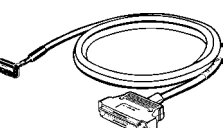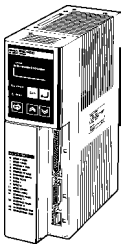
Cable with Loose Crimp Connectors (20 connections) : XW2Z-□□□F

Connection Examples

32-point I/O Units with Connectors

C200H-ID215
C200H-MD115
C200H-MD215
C200H-MD501
C200H-ID501

XW2Z-□□□A
Connecting Cable

XW2C-20G5-IN16

32-point Input Units with Connectors (Group-2 Slaves)

64-point Input Units with Connectors (Group-2 Slaves)

C200H-ID216
C200H-ID217
C200H-ID111
C200H-ID218
C200H-ID219

XW2Z-□□□D
Connecting Cable

XW2C-20G5-IN16
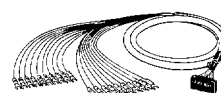
■ XW2B Servo Relay Units

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

Servo Driver
Connecting Cables

Servo Drivers

Position Control Units

Position Control Unit
Connecting Cables

Servo Relay Units

U-series Connecting Cables	U-series Servo Drivers
XW2Z-□□□J-B1	R88D-UP□□□
XW2Z-□□□J-B4	R88D-UT□□□H
XW2Z-□□□J-B5	R88D-UEP□□□

Position Control Units	Position Control Unit Connecting Cables	Servo Relay Units
C200H-NC112 (1 axis)	XW2Z-□□□J-A1	
	XW2Z-□□□J-A4 (For R88D-UEP□ only)	XW2B-20J6-1B
C200HW-NC113 (2 axes)	XW2Z-□□□J-A6	
	XW2Z-□□□J-A8 (For R88D-UEP□ only)	

M-series Connecting Cables	M-series Servo Drivers
XW2Z-□□□J-B2	R88D-MT□□□

Position Control Units	Position Control Unit Connecting Cables	Servo Relay Units
C200H-NC211 (2 axes)	XW2Z-□□□J-A2	
	XW2Z-□□□J-A5 (For R88D-UEP□ only)	XW2B-40J6-2B
C200HW-NC213 (2 axes) C200HW-NC413 (4 axes)	XW2Z-□□□J-A7	
	XW2Z-□□□J-A9 (For R88D-UEP□ only)	

H-series Connecting Cables	H-series Servo Drivers
XW2Z-□□□J-B3	R88D-H□□□

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