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Find the *OMRON C200HW-PD024* at our website: *Click HERE*

The Solution for Sustained Productivity Gains in Manufacturing

Our CS1 and CS1D duplex controllers deliver superior control performance, flexible communications and connectivity, powerful information management, extensive maintenance functionality . . . all in an enhanced design and development environment. These controllers can integrate logic, motion, drives and process in one system.



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CS1 Rack System

- Ultra fast processing speed: basic instruction execution as fast as 20 ns
- Large local digital I/O capacity of 5120 points
- Up to 640 analog input/output points for process applications
- Extensive instruction set solves most control tasks in a minimum of steps
- Large built-in data memory up to 448 kwords
- Program memory up to 250 ksteps (1 MB)
- Use Compact Flash Memory Cards for up to 64 MB of removable data storage for backup and data logging
- E-mail using Internet (SMTP protocol)
- Supports a wide variety of communication platforms: open fieldbus Ethernet, DeviceNet and Profibus-DP and proprietary Controller Link and CompoBus/S
- Fully forward and backward compatible with popular C200H platform
- Protocol Macro function creates custom serial communication sequences

CS1D Duplex System

- Delivers hot standby for CPU and power supplies
- Offers on-line replacement (hot swapping) of CPU, power supplies, communications units, basic and special I/O modules for a quick recovery from equipment failures
- Get duplex communications and loop-back capability with Controller Link network
- Up to 500 function blocks, such as control blocks (for PID and other calculations) and operation blocks (for dead time and other calculations), can be combined in response to a wide range of applications
- Fast PID operation execution provides flexibility for multi-loop control
- A wide range of calculation functions includes floating point calculations, character string processing, and PID calculations with auto tuning
- Structured programming supports multitask and variable programming

Paving the Way for Advances in Productivity

High-Speed Throughput and Easily Expandable Data Exchange

Omron's combination of high-speed throughput and easily expandable data exchange ensure your investment in CS1 systems today will continue to yield exceptional production results. Every aspect demands less time from programmers and operators.

- **All communications modules contain Omron's unique FINS message routing and formatting tools** for fast, expandable, and transparent exchange of data regardless of network type
- **Over 150 different I/O**, communication and special function modules available
- **High-density I/O modules shorten installation time** and increase accuracy with pre-terminated cables and wire terminal or relay terminal blocks
- **Open fieldbus systems** like DeviceNet and Profibus-DP allow the addition of another 10,000 remote I/O points
- **Seamlessly combine continuous-path motion control** or point-to-point positioning with high-speed sequencing operations using special function I/O modules
- **Protocol Macro creates custom serial communication sequences** eliminating trial-and-error development of handshaking scripts
- **Fast 20 ns per instruction processing** speeds help efficiently manage all the data



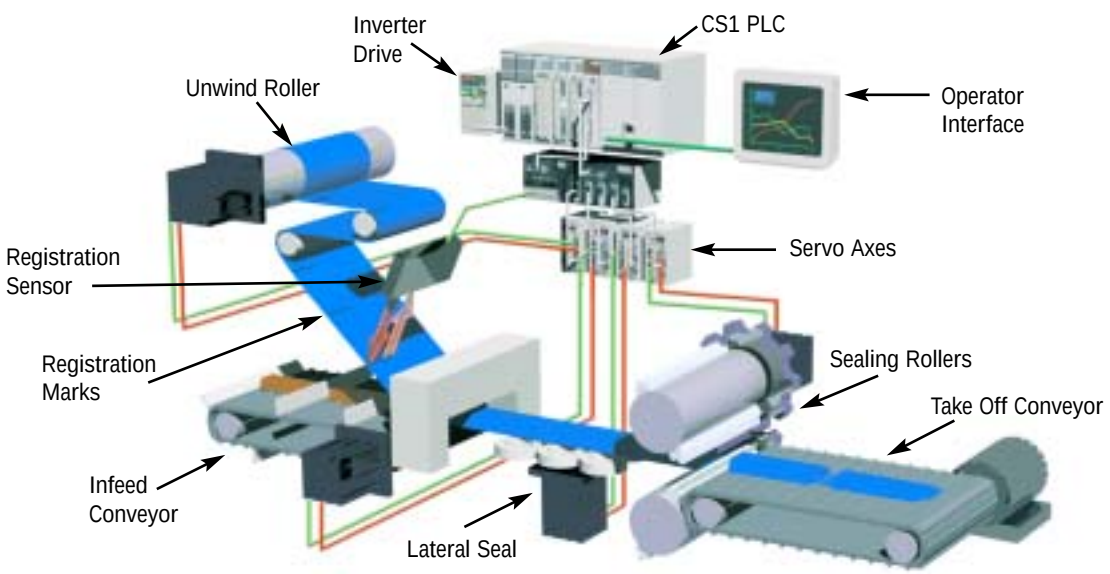
High-Speed Control for Converting and Bag Forming

High-function Motion Control Advantages

- Control up to 4 axes of motion from a single rack-mount module
- Powerful motion control functionality includes cam profiling, electronic gearbox, registration and multi-axis synchronization
- Reduce panel size and simplify wiring
- Eliminates the need for separate communications link between a PLC and stand-alone motion controller
- Real-time sharing of information

Fully Integrated Solution

- Omron E3M-V registration mark sensor detects marks at 50 ms
- Multi-loop temperature controller modules mounted to the PLC rack deliver accurate PID control for fast recovery of sealing temperature
- Touch screen NS-series HMI monitors and controls process activity and can be used to modify programs for the PLC
- Compact 3G3MV series inverter drives provide basic conveyor and speed control; for precise torque control to reduce stretching in rewound materials use 3G3PV inverter



Critical Processes Command Constant Vigilance

High Reliability is Key

- Ideal for process intensive applications
- Back up power supplies and CPUs *and* communications units
- Eliminate unexpected downtime in many process applications, especially in the middle of the process, which can be extremely costly
- Use CS1D with a Loop Control Board (CS1D-LCB05D) and process control modules
- Provide the reliability for process control applications in these industries:

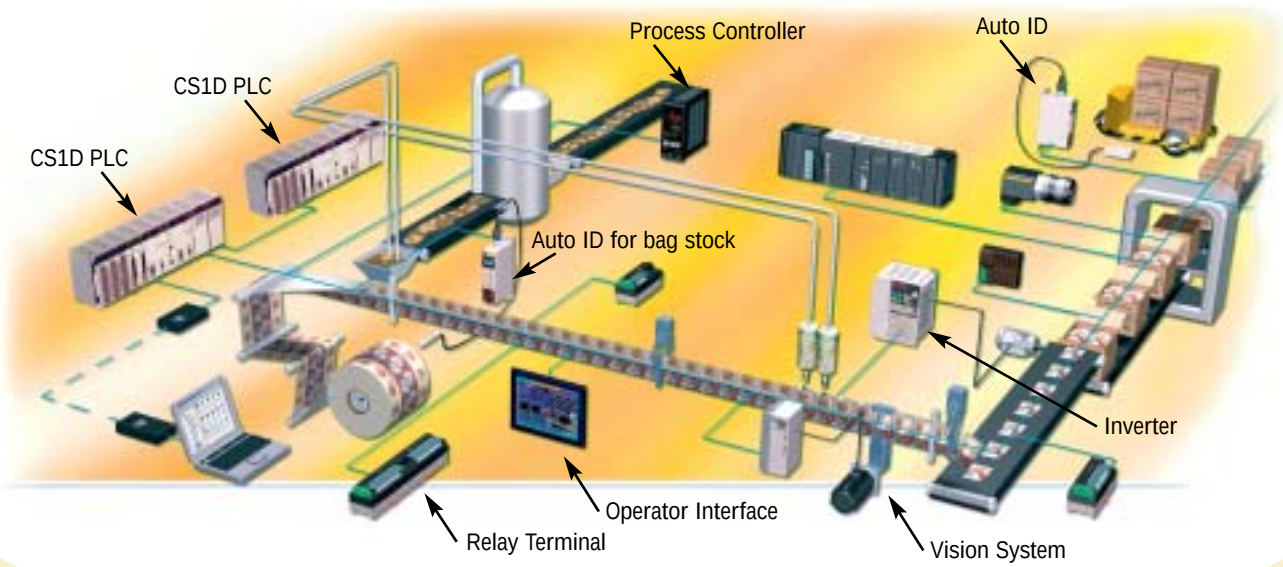
Semiconductor
Food and Beverage
Petrochemicals
Marine Vessel
Water / Wastewater Treatment
Corrections

- **Perform maintenance without downtime in these industries**
  Critical processes such as boiler control or lighting control cannot be shut down for maintenance. Omron's CS1D allows hot-swapping of I/O modules without the need to cut power or stop the PLC's program functions.
- **Communications interface keeps operating**
  In many cases, controller-to-controller communication is vitally important to the process. Not all manufacturers provide redundant Controller Link capabilities found in Omron's CS1D. If one module faults, the second one will take over immediately.



Integrate Process, Motion, Sequencing and Supply Chain Management with One System

From ingredient blending through finished product to packaging and boxing for shipping, Omron's CS1D delivers uninterruptible control to sustain productivity. We can also prepare your operation for increasing pressure from food, beverage and drug safety regulators for ingredient tracking from your supply chain. Omron offers unique asset tracking solutions for the CS1D that consolidate production functionality with plant/lot/date coding operations. Radio frequency identification controller modules and bar code readers are easily integrated into the same control system used to produce the goods in the first place. When goods ship out, complete records of plant/lot/date and the ingredients can be transmitted to front office systems for archiving.



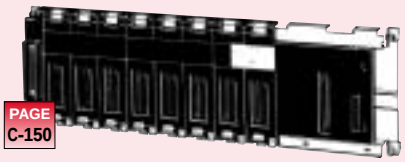
CPU Rack



PAGE C-11

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

CPU Rack



PAGE C-150

CS1W-BC□□2
(2, 3, 5, 8 or 10 slots)
NOTE: Expansion is not possible for 2-slot Backplanes. These Backplanes are for CS1 modules only. Use a CS1W-BC□□3 Backplane for C200H modules.

Serial Communications Board



PAGE C-151

CS1W-SCB21-V1
CS1W-SCB41-V1

CPUs



PAGE C-150

CS1H-CPU□□H
CS1G-CPU□□H

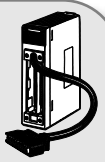
Power Supplies



PAGE C-150

C200HW-PA204/PA204R/
PA204S/PA209R/PD024

I/O Control



PAGE C-150

CS1W-IC102

NOTE: C200H modules cannot be mounted on the Long-distance Expansion Racks.

Long-distance Expansion Connecting Cable



PAGE C-153

CV500-CN□□2

I/O Interface



PAGE C-152

CS1W-II102

Terminating Resistor



CV500-TER01
(Two provided with CS1W-IC102)

PAGE C-222

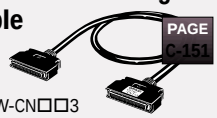
Memory Card



PAGE C-150

HMC-EF172/372/672

CS1 I/O Connecting Cable



PAGE C-151

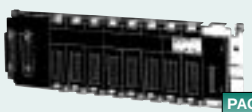
CS1W-CN□□3
(30 or 70 cm; 2, 3, 5, 10, or 12 m)

CS1 Expansion I/O Rack



PAGE C-152

CS1 Expansion Backplane



PAGE C-152

CS1W-BI□□2
(3, 5, 8 or 10 slots)
NOTE: These Expansion Backplanes are for CS1 modules only. Use a CS1-B1□□3 Backplane for C200H modules.

Power Supplies



C200HW-PA204/
PA204S/
PA209R/
PD024

PAGE C-150

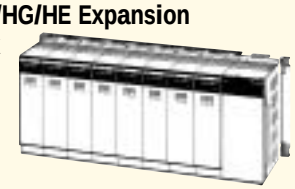
CS1 to C200H I/O Connecting Cable



PAGE C-151

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

C200HX/HG/HE Expansion I/O Rack



PAGE C-152

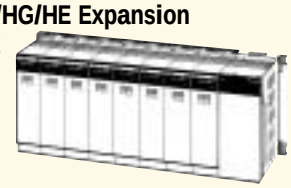
C200H I/O Connecting Cable



PAGE C-153

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

C200HX/HG/HE Expansion I/O Rack



PAGE C-152

C200HX/HG/HE Expansion I/O Backplane



PAGE C-152

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

Power Supplies



C200HW-PA204/
PA204S/
PA209R/
PD024

PAGE C-152

CS1 CPU Bus Modules

Serial Communications



PAGE C-143

CS1W-SCU21-V1

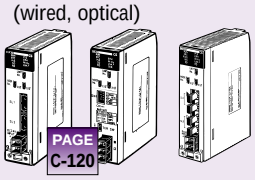
Ethernet



PAGE C-116

CS1W-ETN21

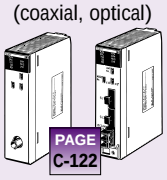
Controller Link (wired, optical)



PAGE C-120

CS1W-CLK21-V1/12-V1/52-V1

SYSMAC Link (coaxial, optical)



PAGE C-122

CS1W-SLK21/SLK11

DeviceNet



PAGE C-124

CS1W-DRM21

Basic I/O Modules

CS1 and C200H Basic I/O Modules



16 pts
Input Module
CS1W-ID211



32 pts
Input Module
CS1W-ID231



64 pts
Input Module
CS1W-ID261



96 pts
Input Module
CS1W-ID291



16 pts
Output Module
CS1W-OD21☐



32 pts
Output Module
CS1W-OD23☐



64 pts
Output Module
CS1W-OD26☐



96 pts
Output Module
CS1W-OD29☐



32 inputs/32 outputs
I/O Module
CS1W-MD26☐



48 inputs/48 outputs
I/O Module
CS1W-MD29☐



16 pts
AC Input
CS1W-IA111/211



8 pts
Triac Output
CS1W-OA201



16 pts
Triac Output
CS1W-OA211



8 pts (independent)
Relay Output
CS1W-OC201



16 pts
Relay Output
CS1W-OC211



32 inputs/32 outputs
TTL I/O
CS1W-MD561

Interrupt Input

Interrupt function supported on CPU rack only. (Two modules mountable on CPU rack.)

C200H Interupt Input module can also be used.



16 pts
CS1W-INT01

Analog Timer



C200H-TM001

B7A Interface



16 pts
C200H-B7A11/01



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

High-Speed Input



16 pts
CS1W-IDP01

Safety Relay



CS1W-SF200

Special I/O Modules

CS1 Special I/O Modules



Process I/O
CS1W-P☐☐☐



Analog Input
CS1W-AD041/
AD081-V1



Analog Output
CS1W-DA041/
DA08V/DA08C



Analog I/O
CS1W-MAD44



Position Control
CS1W-NC☐☐☐



Motion Control
CS1W-MC221/
MC421
CS1W-MCH71



High-speed Counter
CS1W-CT021/041
CS1W-CTS21



Customizable Counter
CS1W-HCP22/
HCA22/HIO01



RFID Sensor
CS1W-V600-
C11/C12

C200H Special I/O Modules



Temperature Sensor Input
C200H-TS☐☐☐



Temperature Control
C200H-TC☐☐☐
C200H-TV☐☐☐



Process Control
C200H-PID0☐



Fuzzy Logic*
C200H-FZ001



Cam Positioner*
C200H-CP114



Position Control*
C200HW-NC☐☐☐



2-axis Motion Control*
C200H-MC221



RFID Sensor*
C200H-IDS☐☐



ASCII/Basic*
C200H-ASC☐☐

Voice
C200H-OV001

DeviceNet (CompoBus/D) I/O Link
C200HW-DRT21

CompoBus/S Master
C200HW-SRM21-V1

PC Link
C200H-LK401

Profibus-DP Master
C200HW-PRM21

Profibus-DP Slave
C200HW-PRT21

High-speed Counter*
C200H-CT☐☐☐

*There are restrictions in data transfers with the CPU module for bit and DM area specifications for the C200H Special I/O modules marked with, as well as in data transfers programmed from these modules. Refer to CS-Series PLC Operation manuals for details.

WEB These modules have been replaced by CS1W-NC, please refer to www.omron.com/oei for more information.

CPU Rack



PAGE C-12

CPU Rack



CS1D-BC052
(5 slots)

PAGE C-221

Duplex Unit



PAGE C-221

CS1D-DPL01

NOTE: This is not a PLC module, but a unit for the Duplex operation.

CPUs



PAGE C-221

CS1D-CPU65H
CS1D-CPU67H

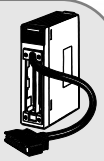
Power Supplies



PAGE C-221

CS1D-PA207R

I/O Control



PAGE C-150

CS1W-IC102

Long-distance Expansion Connecting Cable



PAGE C-153

CV500-CN□□2

I/O Interface



PAGE C-152

CS1W-II102

Terminating Resistor



CV500-TER01
(Two provided with CS1W-IC102)

PAGE C-222

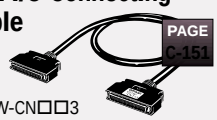
Memory Card



PAGE C-150

HMC-EF172/372/ 672
NOTE: Mount to active CPU only.

CS1 I/O Connecting Cable



PAGE C-151

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

CS1D Expansion I/O Rack



PAGE C-221

CS1D Expansion Backplane



PAGE C-221

CS1D-BI092
(9 slots)

Power Supplies



CS1D-PA207R

PAGE C-221

CS1 CPU Bus Modules

Serial Communications



PAGE C-143

CS1W-SCU21-V1

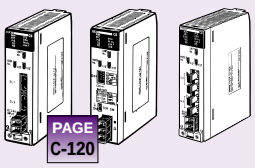
Ethernet



PAGE C-116

CS1W-ETN21

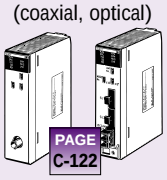
Controller Link



PAGE C-120

CS1W-CLK12-V1/CLK21-V1/52-V1

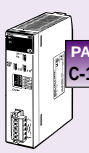
SYSMAC Link (coaxial, optical)



PAGE C-122

CS1W-SLK21/SLK11

DeviceNet



PAGE C-124

CS1W-DRM21

Basic I/O Modules

CS1 Basic I/O Modules


PAGE C-42

16 pts
Input Module
CS1W-ID211


PAGE C-42

32 pts
Input Module
CS1W-ID231


PAGE C-42

64 pts
Input Module
CS1W-ID261


PAGE C-42

96 pts
Input Module
CS1W-ID291


PAGE C-51

16 pts
Output Module
CS1W-OD21☐


PAGE C-51

32 pts
Output Module
CS1W-OD23☐


PAGE C-51

64 pts
Output Module
CS1W-OD26☐


PAGE C-51

96 pts
Output Module
CS1W-OD29☐


PAGE C-63

32 inputs/32 outputs
I/O Module
CS1W-MD26☐


PAGE C-63

48 inputs/48 outputs
I/O Module
CS1W-MD29☐


PAGE C-42

16 pts
AC Input
CS1W-IA111/211


PAGE C-52

8 pts
Triac Output
CS1W-OA201


PAGE C-52

16 pts
Triac Output
CS1W-OA211


PAGE C-51

8 pts (independent)
Relay Output
CS1W-OC201


PAGE C-51

16 pts
Relay Output
CS1W-OC211


PAGE C-63

32 inputs/32 outputs
TTL I/O
CS1W-MD561

Interrupt Input

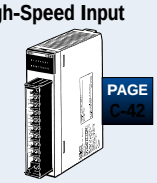
Can be used only as an ordinary input module.

NOTE: C200H Basic I/O modules cannot be used.


PAGE C-68

16 pts
CS1W-INT01

High-Speed Input


PAGE C-42

16 pts
CS1W-IDP01

Safety Relay


PAGE C-72

CS1W-SF200

Special I/O Modules

CS1 Special I/O Modules


PAGE C-82

Process I/O
CS1W-P☐☐☐


PAGE C-76

Analog Input
CS1W-AD041/
AD081-V1


PAGE C-78

Analog Output
CS1W-DA041/
DA08V/DA08C


PAGE C-80

Analog I/O
CS1W-MAD44


PAGE C-97

Position Control
CS1W-NC☐☐☐



Motion Control
CS1W-MC221/
MC421
CS1W-MCH71


PAGE C-101 C-106

High-speed Counter
CS1W-CT021/041
CS1W-CTS21


PAGE C-103

Customizable Counter
CS1W-HCP22/
HCA22/HIO01


PAGE C-107

RFID Sensor
CS1W-V600-
C11/C12

When selecting the CPU for your system you'll need to consider…

How many I/O points
Program memory storage
Data memory storage
Portable program storage options

CS1 Page C-10
CS1D Page C-208

For local Input Modules, consider…

What input voltage
How many points
Input current requirements
Are Terminal Blocks and connection cables necessary

CS1 Page C-38
CS1D Page C-209

For local Output Modules, consider…

How many points
What type of output
Are Terminal Blocks and connection cables necessary

CS1 Page C-40
CS1D Page C-210

For local Mixed I/O Modules, consider…

What input voltage
What type of output
How many I/O points
Are Terminals Blocks and connection cables necessary

CS1 Page C-41
CS1D Page C-211



CS1D

CS1

Select CS1D Duplex system if any of these features are required (in addition to your CS1 requirements) consider…

Hot standby on CPU and Power Supplies
Duplex communications with Fiber Optic Controller Link
Controller Link Loopback configuration (Fiber Optic)
On line replacement of CPU, Power Supplies, Communication Units, Basic and Special I/O

Page C-207

CS1 System

If Special I/O capabilities are required, consider…

Analog input
Analog output
Temperature controllers
PID controllers
Position control
Motion control
High-speed counter
CAM positioner
ID Sensor
Voice output
Fuzzy Logic

Page C-73

For networked communications at information, controller and field device levels, consider…

Ethernet
Controller Link
DeviceNet
Profibus-DP
CompoBus/S distributed I/O
Sysmac Link
Serial

Page C-112

Configure your system by considering…

Basic CS1 configuration
Expansion I/O racks
Calculating overall current consumption
Power supply selection
Maximum system expansion
I/O allocations
Equivalence between C200H and CS1 I/O units

Page C-149

CS1D System

If Special I/O capabilities are required, consider…

Analog input
Analog output
Position control
Motion control
High-speed counter
ID sensor

Page C-212

For networked communications at information, controller and field device levels, consider…

Ethernet
Controller Link
Sysmac Link
DeviceNet
Serial

Page C-214

Configure your system by considering…

Basic CS1D configuration
Expansion I/O racks
Calculating overall current consumption
Power supply selection
Maximum system expansion
I/O allocations
What units and peripherals can be used on a CS1D Duplex system

Page C-217

Configuring a CS1 System

This section provides tools to configure a CS1 system. Included in this section are:

Power and Expansion Selection

Tools are provided to calculate the total current consumption of a CS1 system. With this information, the proper power supply can be selected. When the number of modules or power requirements exceeds the capability of the power supplies available, I/O expansion racks solve the problem. If the number of modules in the CPU rack exceeds 10 or the current consumption is greater than the capacity of the power supply units, use the CPU and rack configuration.

I/O Allocations

In CS1 PLC systems, part of the I/O memory is allocated to basic, special I/O units and CS1 CPU bus units. This section describes in detail how each of these units is allocated in the I/O memory.

Replacing C200H I/O Units

C200H I/O units are supported in a CS1 system but new CS1 equivalent units are being introduced periodically. Included in this section is a list of C200H I/O units and its CS1 equivalent. For each unit, differences between both are described in detail.

What is the basic configuration?

A CS1 system consists of a power supply, a CPU backplane, a CPU and up to 10 basic I/O, special I/O and CS1 CPU bus units.
See page C-150.

What goes on expansion racks?

The expansion rack contains a power supply, an expansion I/O backplane, basic I/O units, special I/O units and CS1 CPU bus units.

Where are ratings to calculate overall current consumption?

All the current consumption ratings for the CPU, basic I/O, special I/O and CS1 CPU bus units are collected in the tables on page C-160.

Which power supply is right?

Calculate the total current consumption of basic I/O, special I/O and CS1 CPU bus units to determine which power supply to use.

Input Voltage	100 to 240 VAC				24 VDC
Output rating	4.6 A, 5 VDC	4.6 A, 5 VDC	4.6 A, 5 VDC	9 A, 5 VDC	4.6 A, 5 VDC
Output capacity	30 W	30 W	30 W	45 W	30 W
24 VDC service power	NO	YES (0.8 A)	NO	NO	NO
RUN output contact	NO	NO	YES	YES	NO
Power supply model	C200HW-PA204	C200HW-PA204S	C200HW-PA204R	C200HW-PA209R	C200HW-PD024
See page	**C-150**	**C-150**	**C-150**	**C-150**	**C-150**

The same power supply units can be used for both CPU and expansion racks.

How many expansion racks can be used?

The CS1 system can be expanded using CS1 expansion racks, C200H expansion racks or CS1 long distance expansion racks. The maximum number of expansion racks in any CS1 system will depend on the combination of these racks.

The following table outlines all acceptable combinations.

Combination of Expansion Racks	CS1 Expansion Racks Only	CS1 and C200H Expansion Racks	CS1 Long Distance Expansion Racks	CS1 Expansion Rack and CS1 Long Distance	C200H Expansion Racks
Maximum expansion racks per CPU	7	6 (Max. three C200H expansion racks)	7	7 (one CS1 exp. rack and six long distance)	3
Maximum distance from CPU rack	12 m	12 m	50 m	50.7 m	12 m

Note: On a CS1 long distance configuration, the following units are required:
CS1W-IC102 – I/O control unit. One unit mounted on the CPU rack.
CS1W-II102 – I/O interface unit. One unit mounted on each CS1 expansion rack.
See pages C-152 to C-153 to select the appropriate I/O connecting cables.

Note: It is not possible to go from a C200H expansion rack to a CS1 expansion rack.

CPU Selection

This section describes the CPUs and memory cards for a CS1 system.

How many I/O points are needed?

Number of I/O	960	1280	5120
CPU models	CS1G-CPU42H	CS1G-CPU44H	CS1G-CPU45H
	CS1G-CPU43H		CS1G-CPU63H
			CS1H-CPU64H
			CS1H-CPU65H
			CS1H-CPU66H
			CS1H-CPU67H
See page	**C-11**	**C-11**	**C-11**

How much program memory storage is required?

Program Memory Size	CPU Models	See page
10 K steps	CS1G-CPU42H	**C-11**
20 K steps	CS1G-CPU43H	**C-11**
	CS1H-CPU63H	**C-11**
30 K steps	CS1G-CPU44H	**C-11**
	CS1H-CPU64H	**C-11**
60 K steps	CS1G-CPU45H	**C-11**
	CS1H-CPU65H	**C-11**
120 K steps	CS1H-CPU66H	**C-11**
250 K steps	CS1H-CPU67H	**C-11**

How much data memory storage is required?

Data Memory Size	64 K Words	128 K Words	256 K Words	448 K Words
CPU models	CS1G-CPU42H	CS1G-CPU45H	CS1H-CPU66H	CS1H-CPU67H
	CS1G-CPU43H	CS1H-CPU65H		
	CS1G-CPU44H			
	CS1H-CPU63H			
	CS1H-CPU64H			
See page	**C-11**	**C-11**	**C-11**	**C-11**

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

Selecting program storage options

Memory card uses:

- Download recipes
- Replace PLC program while operating
- Auto-boot the PLC upon power up

Memory Size	15 MB	30 MB	64 MB
Memory card	HMC-EF172	HMC-EF372	HMC-EF672
See page	**C-150**	**C-150**	**C-150**

Note: An adapter is available to insert the flash memory card into a computer. Go to page C-150 for details.

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