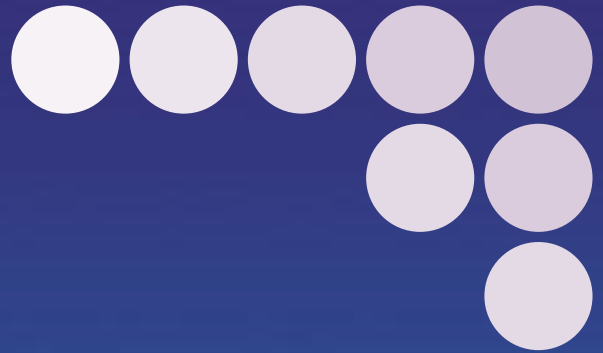New!

OMRON

Programmable Controllers

SYSMAC CS1D DUPLEX SYSTEM

Introducing the Duplex CPU, Dual I/O Expansion System!

realizing

Failures occur in any system, but the effects of those failures can be alleviated.

- The system cannot be stopped during 24-h/day operation.
- Recovery costs are very high if the system goes down.
- If the system stops unexpectedly, there is a possibility
  for a disastrous incident, such as the leakage of a toxic substance.

In systems like these that demand high reliability,
it is important to implement risk-management
to prepare for hypothetical problems.

OMRON Duplex PLCs are used for risk management in the system.

Adding redundancy in the system is an effective step
to reduce risk.

To respond to customer's needs regarding system
reliability, OMRON applied its proven duplex PLC
technology to the CS Series to provide
a highly reliable PLC System.

These PLC Systems have redundant vital components
(such as CPUs, power supplies, networks,
and expansion cables), while retaining the CS1-series
functions and capabilities that are suitable for
a wide variety of applications.

Programmable Controllers

SYSMAC CS1D DUPLEX SYSTEM

2

3

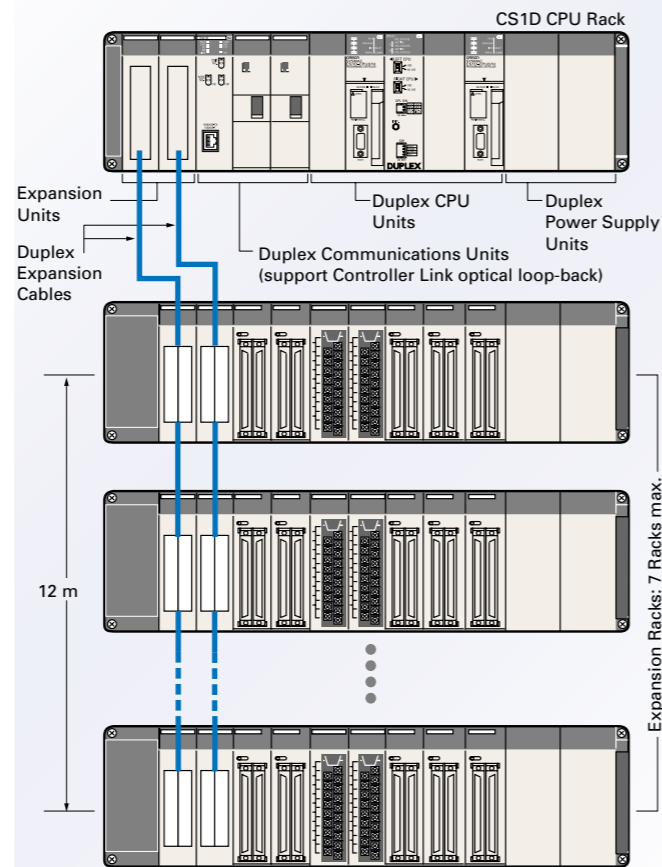# With the CS1D, you can select from a variety of redundant systems.

In addition to duplexed CPU Units and Power Supply Units, the customer can duplex other components, such as Communications Units (Controller Link or Ethernet) and Expansion Cables, to match the system requirements and provide a diverse range of duplex system configurations.

NEW

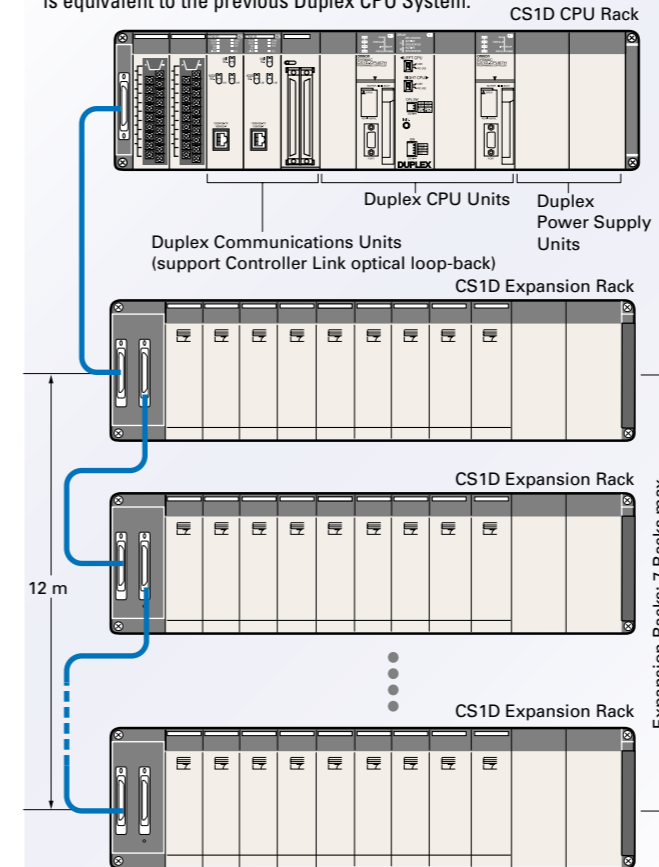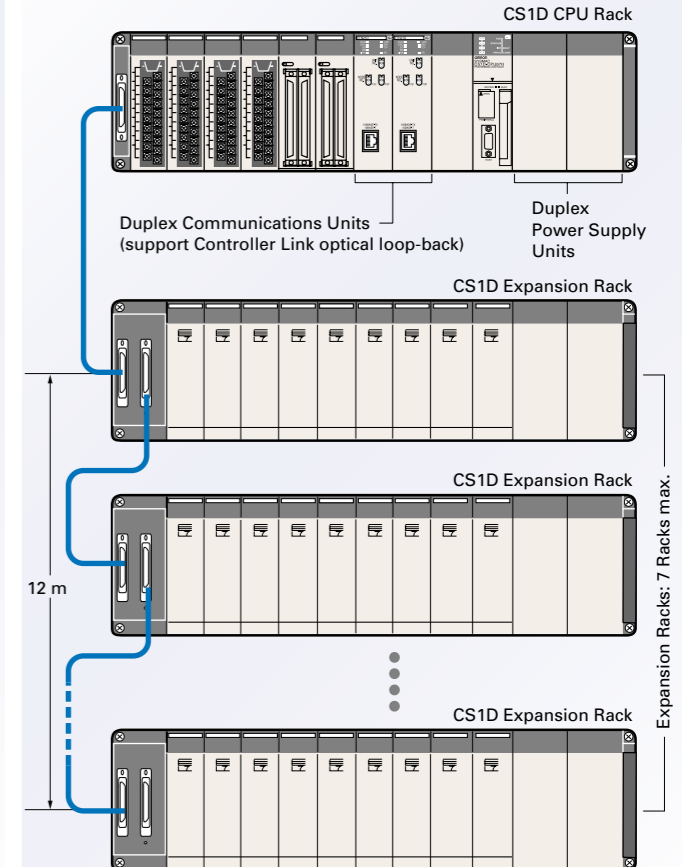| System name	SYSTEM 1 — Duplex CPU, Dual I/O Expansion System	SYSTEM 2 — Duplex CPU, Single I/O Expansion System	SYSTEM 3 — Single-CPU System
	The entire system can be duplexed, including a Duplex CPU System, Expansion System, and Expansion Cables, for superior redundancy and maintainability.	The main system components (such as the CPU Units, Power Supply Units, and Communications Units) can be duplexed and a Programming Device can be used to replace the Units during operation. This system is equivalent to the previous Duplex CPU System.	This system is ideal when you want to improve network redundancy and replace a Power Supply Unit or other Units online. The CPU Unit cannot be duplexed.

Configuration

Note: Requires CS1D CPU Units with unit version 1.3 or later.

Duplex		SYSTEM 1	SYSTEM 2	SYSTEM 3
Duplex	CPU Units	○	○	×
	Expansion Cables	○	×	×
	Power Supply Units	○	○	○
	Communications Units — Controller Link	○ (Supports optical loop-back.)	○ (Supports optical loop-back.)	○ (Supports optical loop-back.)
	Communications Units — Ethernet	○	○	○
Online operation	Unit replacement	○ •CPU Units •Power Supply Units •Duplex Units •I/O Expansion Units •Basic I/O Units (can be replaced without a Programming Device) •Special I/O Units (can be replaced without a Programming Device) •CPU Bus Units (can be replaced without a Programming Device)	○ •CPU Units •Power Supply Units •Basic I/O Units (See note.) •Special I/O Units (See note.) •CPU Bus Units (See note.) **Note**: A Programming Device is required to replace these Units.	○ •Power Supply Units •Basic I/O Units (See note.) •Special I/O Units (See note.) •CPU Bus Units (See note.) **Note**: A Programming Device is required to replace these Units.
	Adding Units or Backplanes	○ (Requires CS1D CPU Units with unit version 1.3 or later.) •Basic I/O Units •Special I/O Units •Expansion Backplanes	○ (Requires CS1D CPU Units with unit version 1.3 or later.) •Basic I/O Units •Special I/O Units (See note 3.)	× —
Long-distance Expansion System		×	○	○
Amount of I/O memory shared between CPU Units		All of the CPU Unit's data areas (shared real-time)	All of the CPU Unit's data areas (shared real-time)	—
Switching time	CPU Unit	Within one CPU Unit cycle (within 0.5 ms min.) (See note 1.)	Within one CPU Unit cycle (within 0.5 ms min.) (See note 1.)	—
	Communications Unit (reference value)	Within approx. 900 ms (See note 2.)	Within approx. 900 ms (See note 2.)	Within approx. 900 ms (See note 2.)
Details		Page 14	Page 18	Page 24

Note 1: Depends upon the timing when the CPU Units are switched.
2: This value is for Duplex Controller Link Units. The value depends on the timing when the Units are switched.

Note 3: Expansion Backplanes cannot be added.

Labels in diagrams:
- CS1D CPU Rack
- Expansion Units
- Duplex Expansion Cables
- Duplex CPU Units
- Duplex Communications Units (support Controller Link optical loop-back)
- Duplex Power Supply Units
- CS1D Expansion Rack
- Expansion Racks: 7 Racks max.
- 12 m

Programmable Controllers
SYSMAC CS1D DUPLEX SYSTEM
The CS1D supports a variety of network configurations.

Ethernet can be duplexed as well as Controller Link, which both have a proven track record in FA applications.
In addition, a variety of networks are available for lower-level I/O, including DeviceNet, CompoNet, and the MECHATROLINK-II Motion Controller network. Both DeviceNet and CompoNet are open networks that boast a proven track record with the CS1 Series.

Ethernet

Ethernet is a general-purpose network used globally in a wide range of factory and office environments. Supports message service between PLCs or between a computer and PLC. In a duplex system, transmission paths can be set as primary and secondary paths, and Communications Units can be duplexed as well.

Ethernet Primary Network

Secondary Network

Automatically selects a functioning Unit and communications path.

FINS messages

By duplexing Communications Units, communications will continue even if one Unit fails.

OMRON PLC Network
Controller Link

A Controller Link network supports high-volume data links and message service between PLCs and between computers and PLCs. In a duplex system, redundancy can be added by duplexing Communications Units and using optical cable loop-back.

Communications continue even if an error occurs in one of the Communications Units.

Communications continue using a loop-back even if a line is broken.

Communications continue.

Controller Link (Optical)

Multi-vendor Network for Sensors and Actuators
CompoNet

CompoNet is a multi-vendor compatible network that can provide excellent bit-level control of 1,000 I/O points in about 1.0 ms. CompoNet supports message communications as well as sensor and actuator-level control. The maintenance information in each slave can be managed to use for preventive maintenance of the equipment.

Information useful for equipment maintenance can be collected.

Open Multi-vendor Network
DeviceNet

DeviceNet is a multi-vendor network. DeviceNet features superb environmental resistance and is used in all kinds of processes in the FA environment. The maintenance information in each slave can be managed and accessed from the host through message service.

Information useful for equipment maintenance can be collected.
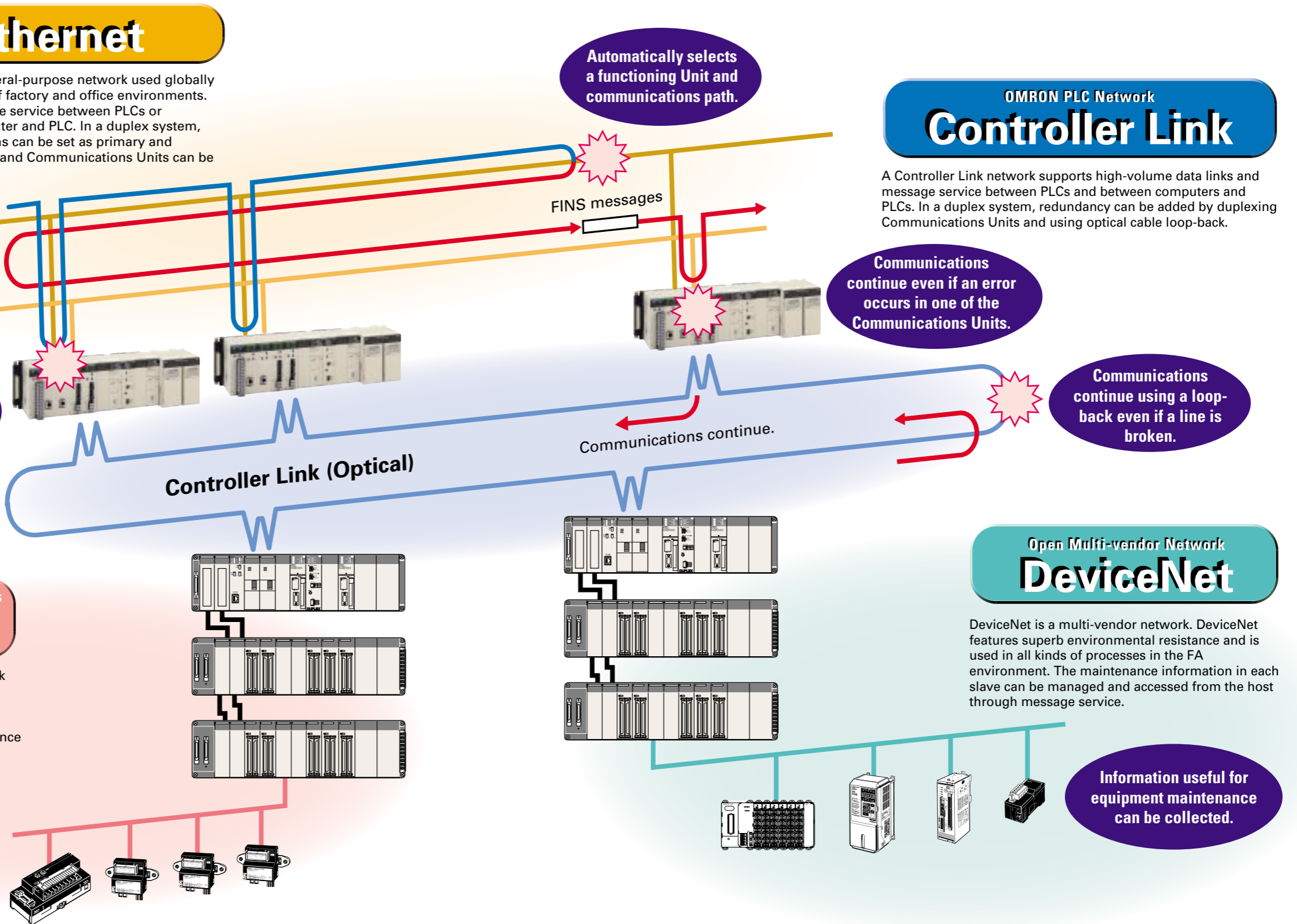
With the CS1D, a highly reliable system can be introduced easily.

Of course, the standard CS-series PLC resources can be used as-is,
and a CS1D Duplex System can be set up and used easily,
even by users setting up a duplex system for the first time.

Duplexing CPU Units is Easy!

In OMRON's proprietary hot-standby method, all data is shared simultaneously.

- If an error occurs in the active CPU Unit, a switching program is not needed in the standby CPU Unit!
- CPU Unit operation switches smoothly. Switching time is short, so operation can continue without bumps.

Standby Active → Active Error

OMRON's proprietary hot-standby method

Inputs
Standby Active Error occurs in active CPU Unit.
Synchronized
Outputs

→

Inputs
Active Stop
Error
Smoothly switched.
Outputs

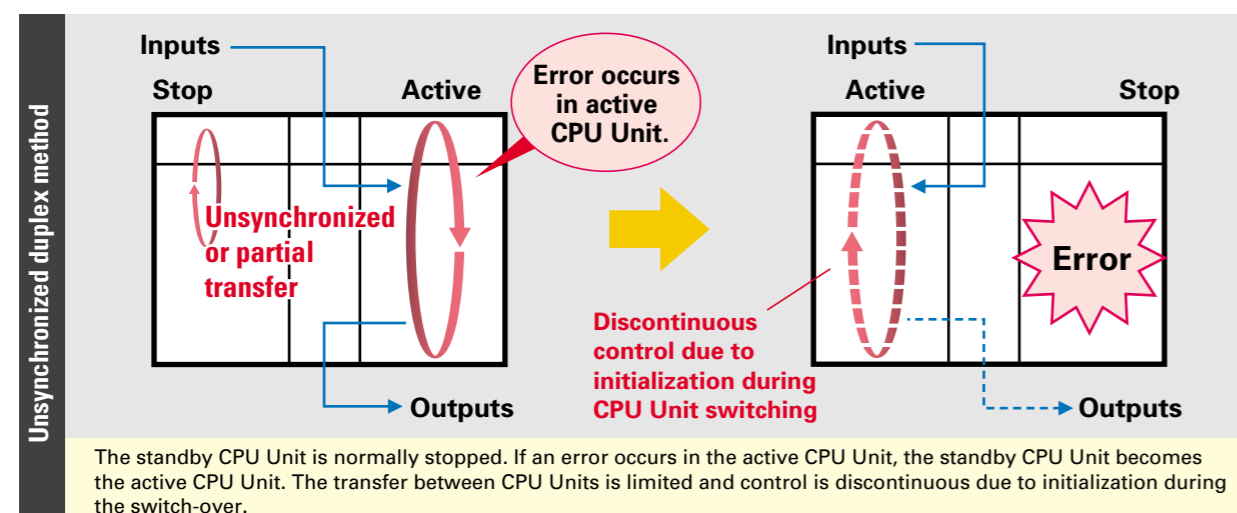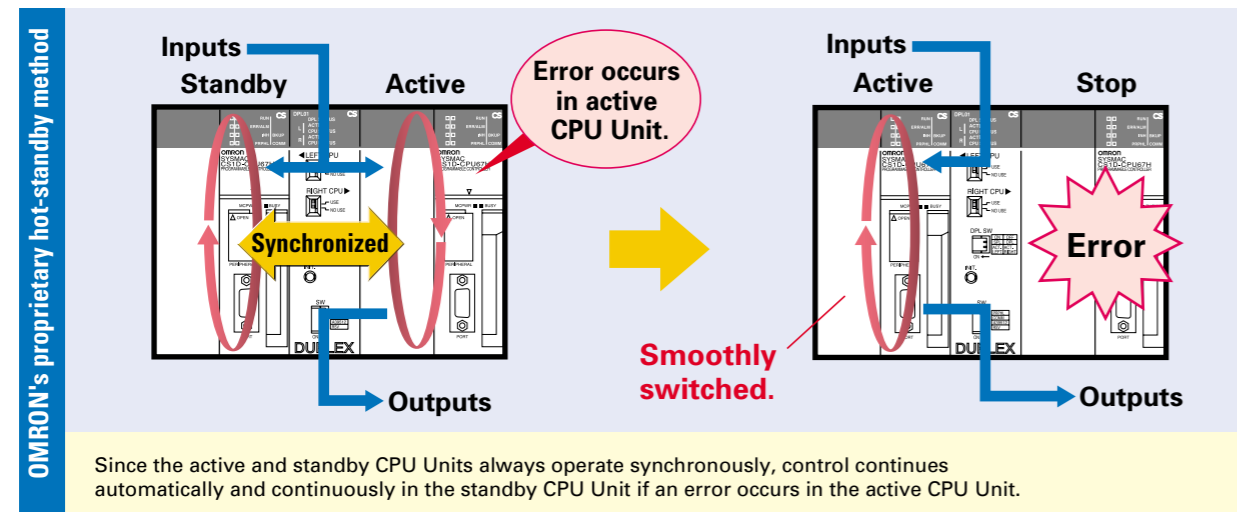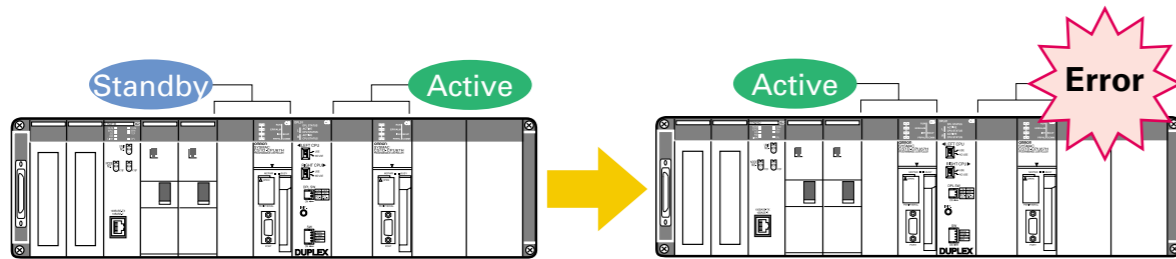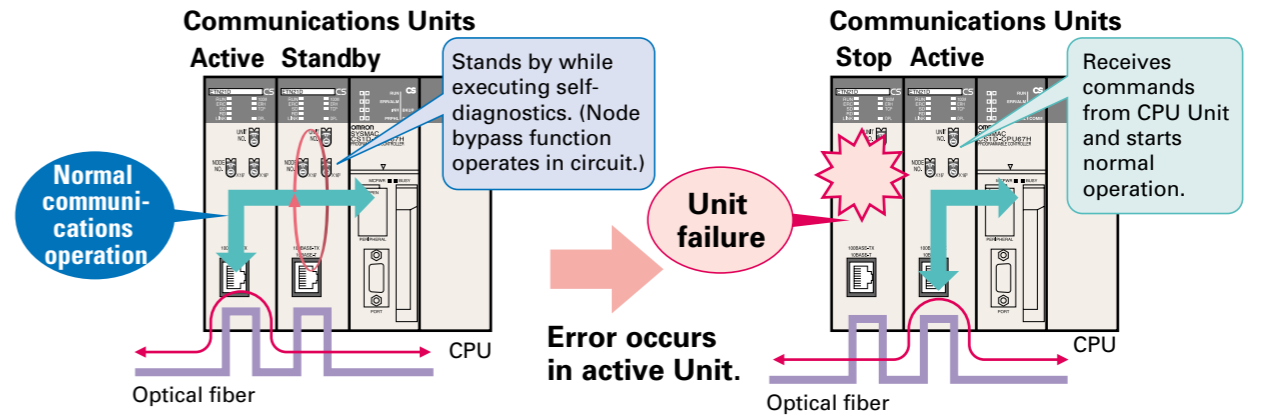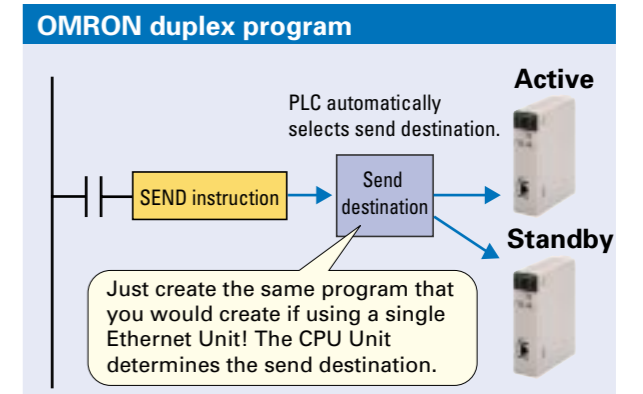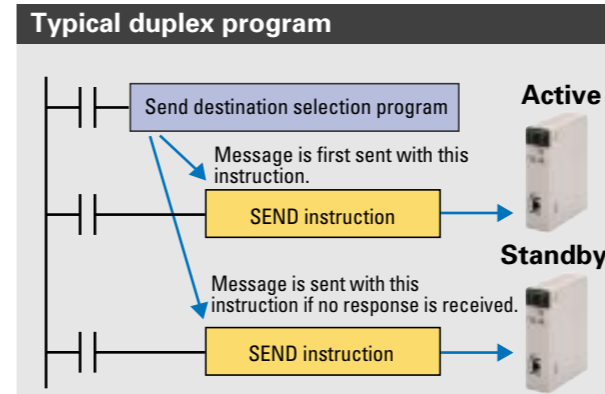Since the active and standby CPU Units always operate synchronously, control continues automatically and continuously in the standby CPU Unit if an error occurs in the active CPU Unit.

Unsynchronized duplex method

Inputs
Stop Active Error occurs in active CPU Unit.
Unsynchronized or partial transfer
Outputs

→

Inputs
Active Stop
Error
Discontinuous control due to initialization during CPU Unit switching
Outputs

The standby CPU Unit is normally stopped. If an error occurs in the active CPU Unit, the standby CPU Unit becomes the active CPU Unit. The transfer between CPU Units is limited and control is discontinuous due to initialization during the switch-over.

Duplexing Communications Units is Easy!

The CPU Unit automatically selects the normally functioning Communications Unit.

- Even if an error occurs in a Communications Unit, there is no effect on the CPU Unit or other Units because the Communications Unit is switched automatically.
- When an error occurs, it is not necessary to use a complex switching program or special data link area for duplexing!

Communications Units
Active Standby
Normal communications operation
Stands by while executing self-diagnostics. (Node bypass function operates in circuit.)
CPU
Optical fiber

Unit failure →

Error occurs in active Unit.

Communications Units
Stop Active
Receives commands from CPU Unit and starts normal operation.
CPU
Optical fiber

When Ethernet Units are used, complex switching programs for message communications can be simplified.

Typical duplex program

Send destination selection program — Active

Message is first sent with this instruction.
SEND instruction →
Standby

Message is sent with this instruction if no response is received.
SEND instruction

OMRON duplex program

PLC automatically selects send destination. — Active

SEND instruction → Send destination → Standby

Just create the same program that you would create if using a single Ethernet Unit! The CPU Unit determines the send destination.

When using a Controller Link Unit, data link area allocations can be configured without waste.

Typical duplex program

A program was needed to select the normal data link area.

For active Unit — Active

For standby Unit — Standby

OMRON duplex program

Link destination — Active

Standby

The Duplex Controller Link Units share the data links! The CPU Units selects the normally functioning Unit.
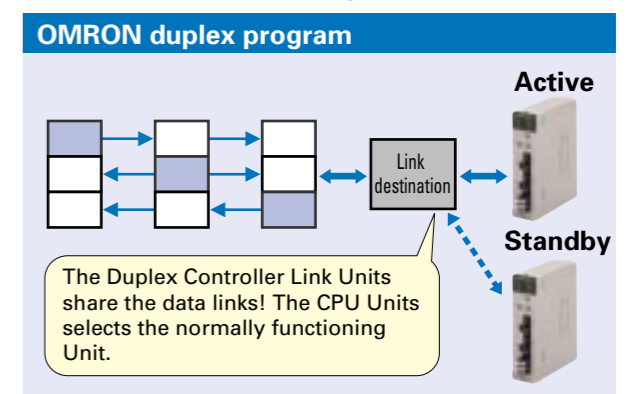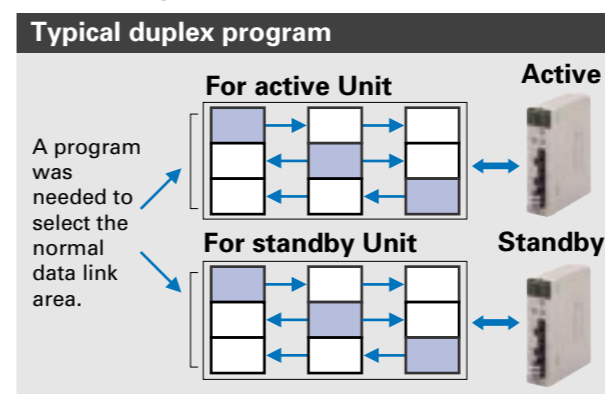
SYSMAC CS1D DUPLEX SYSTEM New Release! The Ultimate Duplex "Dual I/O Expansion" System

The newly released Duplex CPU, Dual I/O Expansion system draws attention in the maintenance field! This system answers the needs of users who want to make improvements and add functions without stopping the equipment. This strengthens the proven CS1D Duplex System even more.
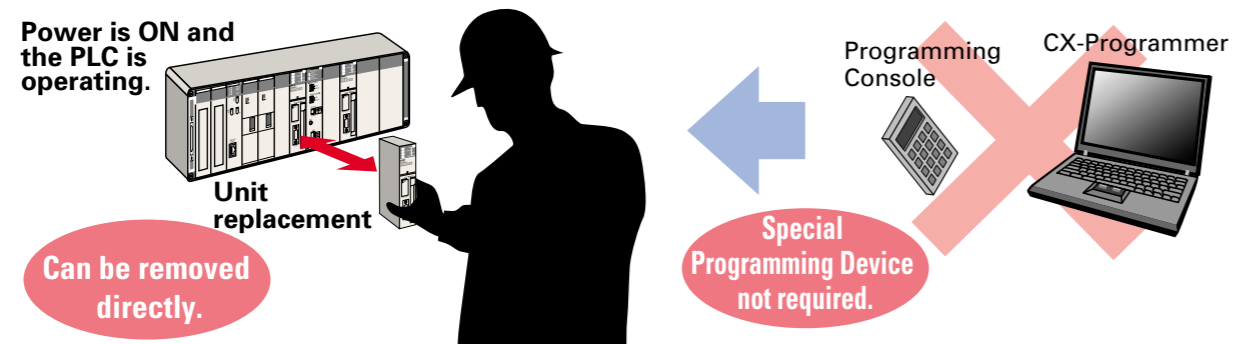
The functions in this section are supported only in a Duplex CPU, Dual I/O Expansion System.

Equipped with New Functions for Maintenance!

Special Programming Devices and Displays are not required for Online Unit Replacement.

- A computer is not needed for onsite operations!
- Units can be replaced without knowing Programming Device procedures!

Power is ON and the PLC is operating.

Unit replacement

Can be removed directly.

Programming Console

CX-Programmer

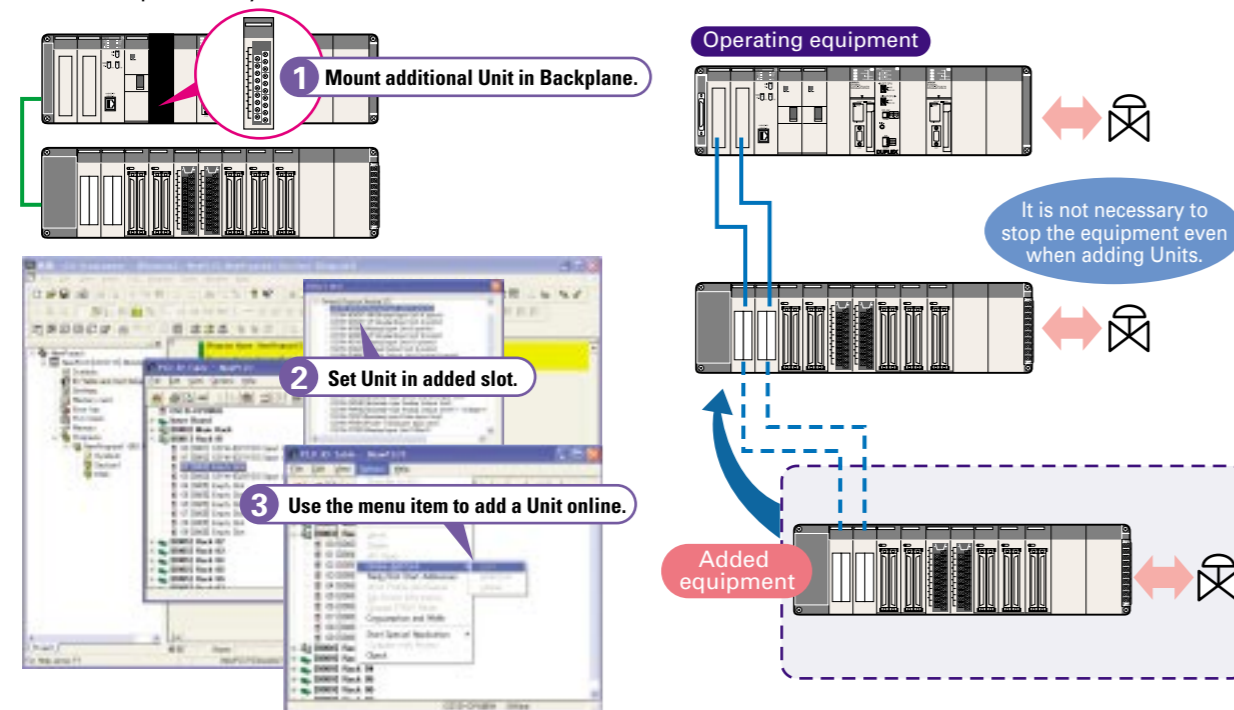Special Programming Device not required.

Units and Expansion Backplanes can be added online.

- Functions can be added easily after the system has started operating, even if the system cannot be turned OFF or stopped.
- Adjustments and improvements can be easily made when setting up new systems without turning OFF the power.

While online, a Unit can be added easily to an empty slot. (This function is supported in Duplex CPU Single I/O Expansion Systems and Duplex CPU Dual I/O Expansion Systems.)

In addition, an Expansion Backplane as well as its mounted Units can be added easily.

1 Mount additional Unit in Backplane.

2 Set Unit in added slot.

3 Use the menu item to add a Unit online.

Operating equipment

It is not necessary to stop the equipment even when adding Units.

Added equipment

Even Stronger Redundancy!

Expansion Cables can be duplexed and Units can be replaced Online.

By duplexing the Expansion Units and Expansion Cables, the Expansion Cables are duplexed and can be replaced during operation. In addition, cable disconnections are monitored so failures can be located easily.

Duplexed Expansion Units

Expansion bus operates independently.

Duplex expansion bus restarts.

Error

Faulty Unit

Expansion Unit replaced.

Duplexed Expansion Units

Expansion bus operates independently.

Duplex expansion bus restarts.
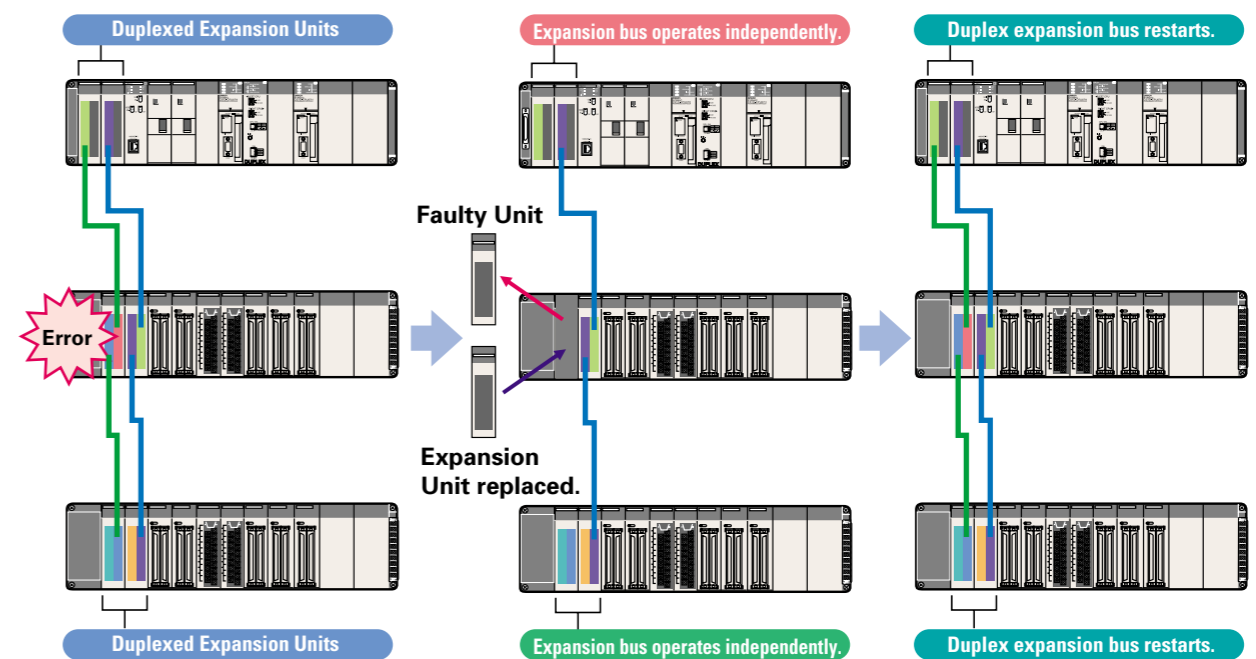
Duplex Units can be replaced online.

Standby

Active

Operating individually

Standby

Duplex operation restarts.

Error

Faulty Unit

Duplex Unit replaced.
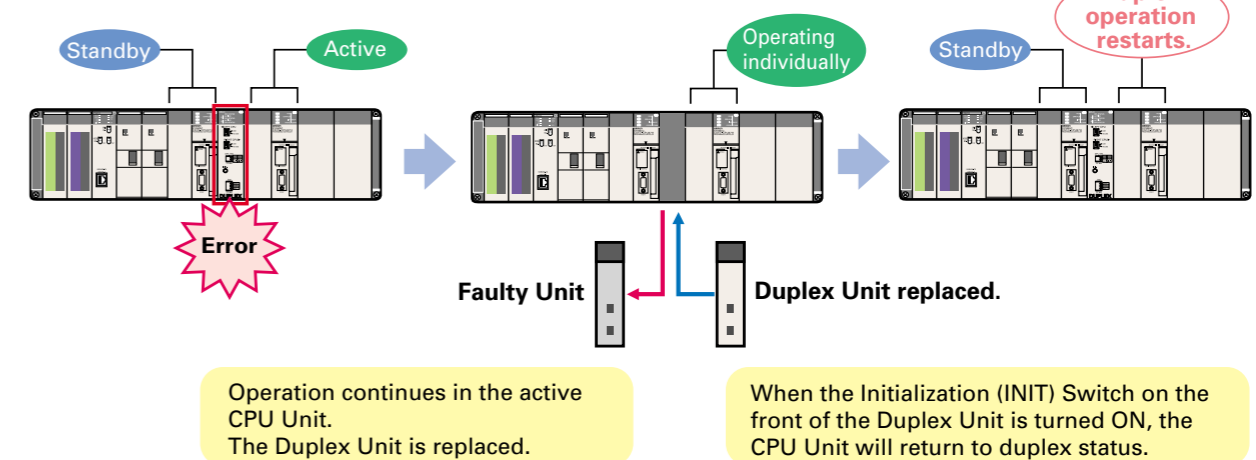
Operation continues in the active CPU Unit.
The Duplex Unit is replaced.

When the Initialization (INIT) Switch on the front of the Duplex Unit is turned ON, the CPU Unit will return to duplex status.

SYSMAC CS1D DUPLEX SYSTEM

PLC-based Process Control System for Full-scale Process Control

A PLC-based Duplex Process Control System That Achieves High Reliability

A variety of system configurations can be created, such as a Duplex CPU System using a CS1D Process-control CPU Unit with a built-in Loop Control Board (LCB) function or a Single CPU System using a Loop Control Board mounted in the CS1D CPU Unit's Inner Board slot. These configurations can provide the reliability of DCS process control functions while retaining the openness and cost performance of a general-purpose PLC base.

Loop control engine

**Loop Control (LCB)
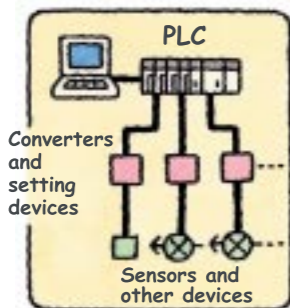Section: CX-Process Tool**

Sequence control engine

CPU Section: CX-Programmer

A Process Control System can be built based on PLCs, breaking the image of traditional process controllers. A system configuration can be created to match the applications and customer's system requirements.
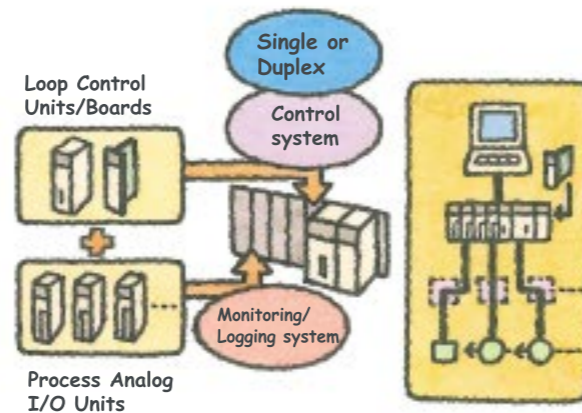
Previous System Issues

Initial costs are high because a large-scale system must be used.

PLC-based Process Control Solution

Down-sizing

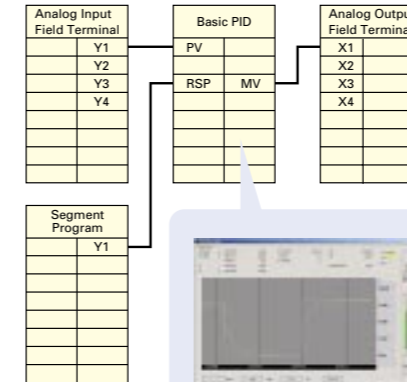**Using the PLC base saves cost, space, and time.**

Existing DCS

Over-spec

PLC

Converters and setting devices

Sensors and other devices

Loop Control Units/Boards

Single or Duplex

Control system

Monitoring/ Logging system

Process Analog I/O Units

Reduce the Total Cost of Ownership from Initial Costs to Operating Costs. A PLC-based Process Control System Answers the Customer's Needs.
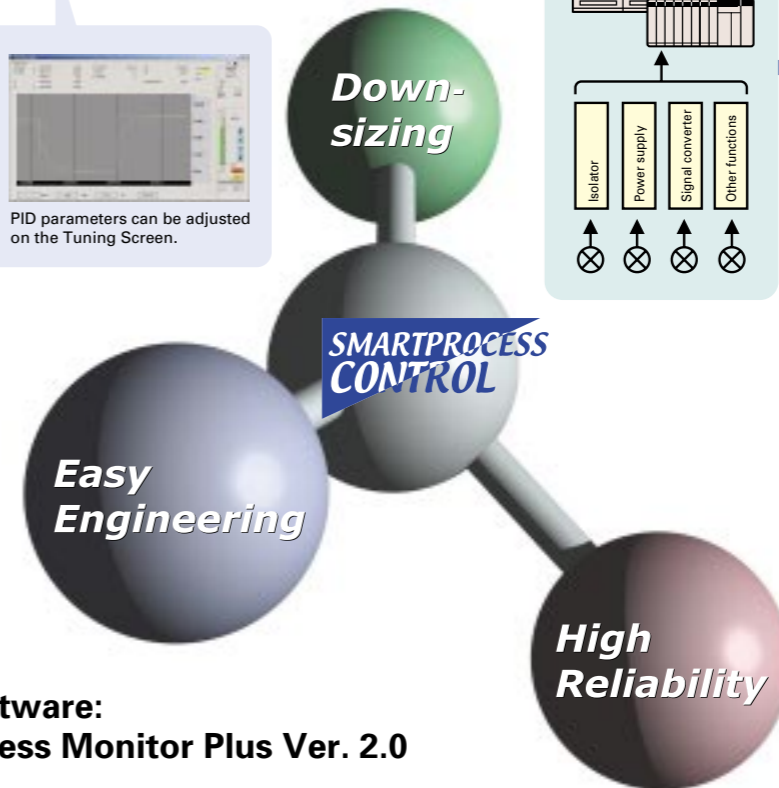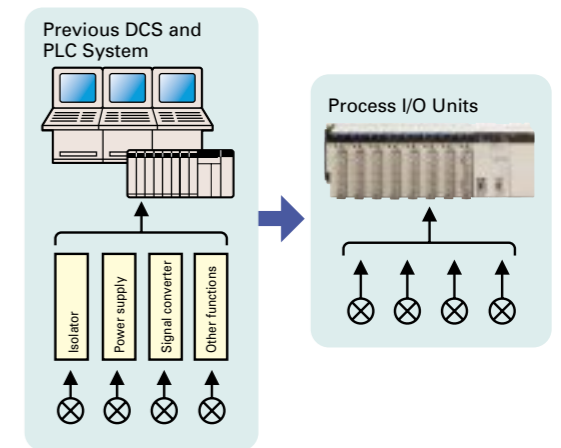
Engineering: CX-Process Tool

Loop control programs can be created easily with function block programming.

Combine function blocks and use the mouse to connect them.

Analog Input Field Terminal		Basic PID		Analog Output Field Terminal	
Y1		PV		X1	
Y2				X2	
Y3		RSP	MV	X3	
Y4				X4	

Segment Program
Y1

PID parameters can be adjusted on the Tuning Screen.

Input/Output: Process I/O Units

Functions such as isolator, power supply, and signal converter functions are implemented in these Analog I/O Units. Since functions such as process value alarms, rate-of-change calculations, and square-root calculations are built into the Units, significant cost and space savings can be realized compared to the previous system.

Previous DCS and PLC System

Process I/O Units

Isolator | Power supply | Signal converter | Other functions

Down-sizing

SMARTPROCESS CONTROL

Easy Engineering

High Reliability

HMI Software: CX-Process Monitor Plus Ver. 2.0

The CX-Process Monitor Plus is Windows-based software that receives data from function blocks in the Loop Controller, and monitors the data in screens such as Control Screens (onsite instrument images), Trend Screens, and Graphics Screens. The screens can be configured simply by selecting tags.

Trend Screen

Overview Screen
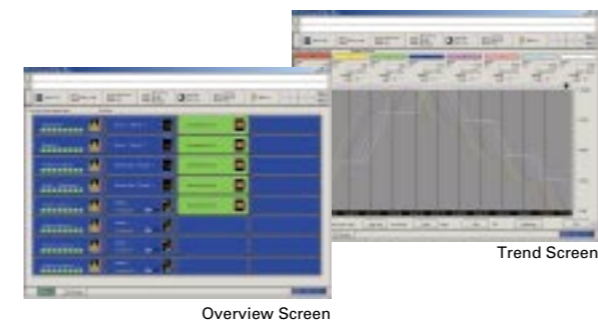
Duplex System: SYSMAC CS1D

Loop control programs can be duplexed, not just sequence control programs. The CS1D Duplex System can provide a solution to risk management in process applications that require high reliability.

Programmable Controllers
SYSMAC CS1D DUPLEX SYSTEM

System Configuration

Basic System Configurations

SYSTEM 1 | CS1D Duplex CPU, Dual I/O Expansion System

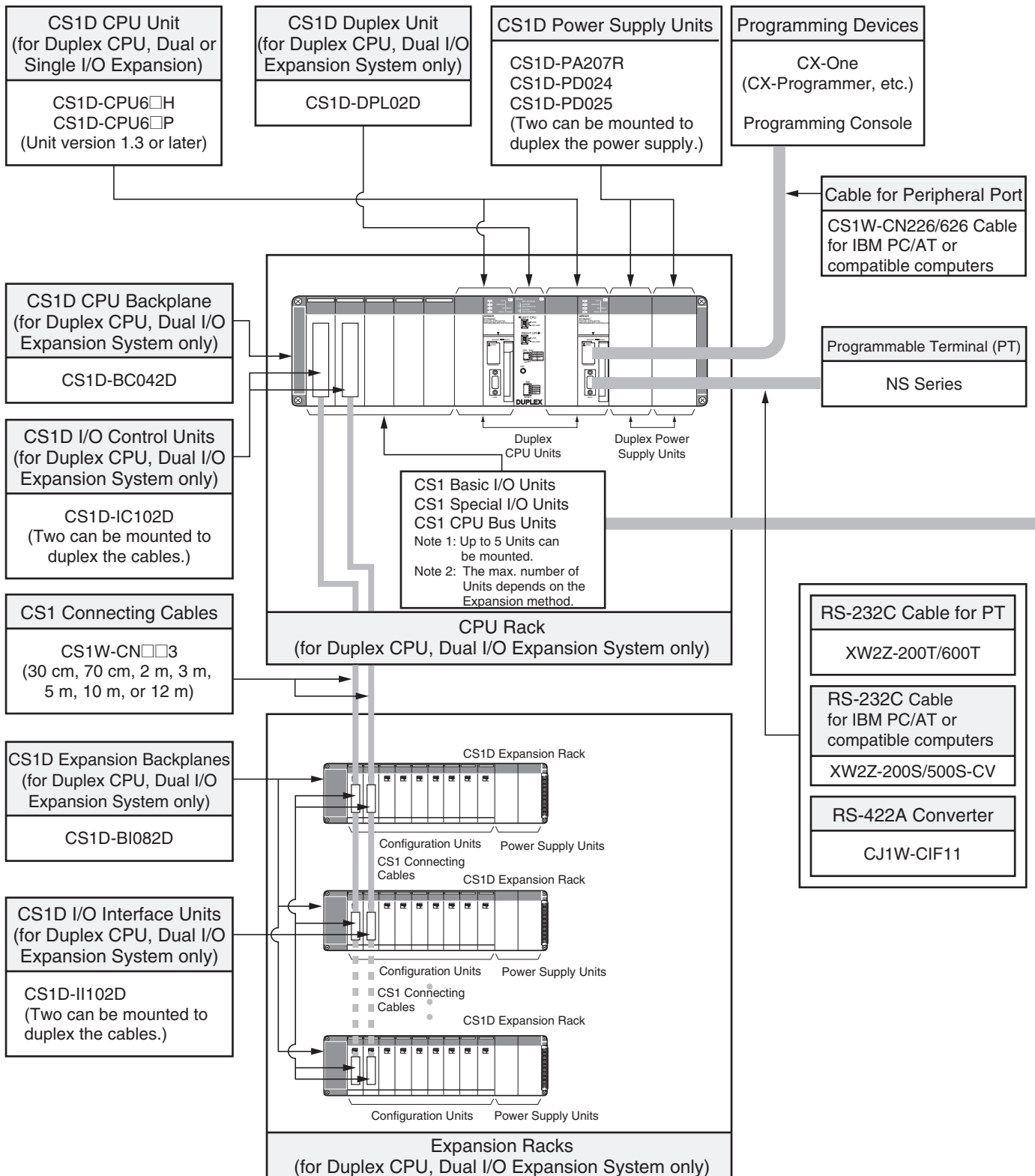| CS1D CPU Unit (for Duplex CPU, Dual or Single I/O Expansion)

CS1D-CPU6☐H
CS1D-CPU6☐P
(Unit version 1.3 or later) |

| CS1D Duplex Unit (for Duplex CPU, Dual I/O Expansion System only)

CS1D-DPL02D |

| CS1D Power Supply Units

CS1D-PA207R
CS1D-PD024
CS1D-PD025
(Two can be mounted to duplex the power supply.) |

| Programming Devices

CX-One
(CX-Programmer, etc.)

Programming Console |

| Cable for Peripheral Port

CS1W-CN226/626 Cable for IBM PC/AT or compatible computers |

| CS1D CPU Backplane (for Duplex CPU, Dual I/O Expansion System only)

CS1D-BC042D |

| CS1D I/O Control Units (for Duplex CPU, Dual I/O Expansion System only)

CS1D-IC102D
(Two can be mounted to duplex the cables.) |

| CS1 Connecting Cables

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

| CS1D Expansion Backplanes (for Duplex CPU, Dual I/O Expansion System only)

CS1D-BI082D |

| CS1D I/O Interface Units (for Duplex CPU, Dual I/O Expansion System only)

CS1D-II102D
(Two can be mounted to duplex the cables.) |

Duplex CPU Units
Duplex Power Supply Units

CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units
Note 1: Up to 5 Units can be mounted.
Note 2: The max. number of Units depends on the Expansion method.

CPU Rack
(for Duplex CPU, Dual I/O Expansion System only)

CS1D Expansion Rack

Configuration Units | Power Supply Units
CS1 Connecting Cables

CS1D Expansion Rack

Configuration Units | Power Supply Units
CS1 Connecting Cables

CS1D Expansion Rack

Configuration Units | Power Supply Units

Expansion Racks
(for Duplex CPU, Dual I/O Expansion System only)

| Programmable Terminal (PT)

NS Series |

| RS-232C Cable for PT

XW2Z-200T/600T |

| RS-232C Cable for IBM PC/AT or compatible computers

XW2Z-200S/500S-CV |

| RS-422A Converter

CJ1W-CIF11 |

Configuration Units

Basic I/O Units				
8 I/O points	**16 I/O points**	**32 I/O points**	**64 I/O points**	**96 I/O points**
Input Units				
---	• DC Input Units CS1W-ID211 • AC Input Units CS1W-IA111 CS1W-IA211	• DC Input Units CS1W-ID231	• DC Input Units CS1W-ID261	• DC Input Units CS1W-ID291
Output Units				
• Triac Output Units CS1W-OA201 • Relay Output Units (independent commons) CS1W-OC201	• Transistor Output Units CS1W-OD21□ • Triac Output Units CS1W-OA211 • Relay Output Units CS1W-OC211	• Transistor Output Units CS1W-OD23□	• Transistor Output Units CS1W-OD26□	• Transistor Output Units CS1W-OD29□
I/O Units				
---	---	---	32 inputs and 32 outputs • DC Input/Transistor Output Units CS1W-MD26□ • TTL I/O Units CS1W-MD561	48 inputs and 48 outputs • DC Input/Transistor Output Units CS1W-MD29□
Other Units				
• Safety Relay Units CS1W-SF200	• Interrupt Input Units CS1W-INT01 • High-speed Input Units CS1W-IDP01	B7A Interface Units • 32 inputs CS1W-B7A12 • 32 outputs CS1W-B7A02 • 16 inputs and 16 outputs CS1W-B7A21	B7A Interface Units • 32 inputs and 32 outputs CS1W-B7A22	---

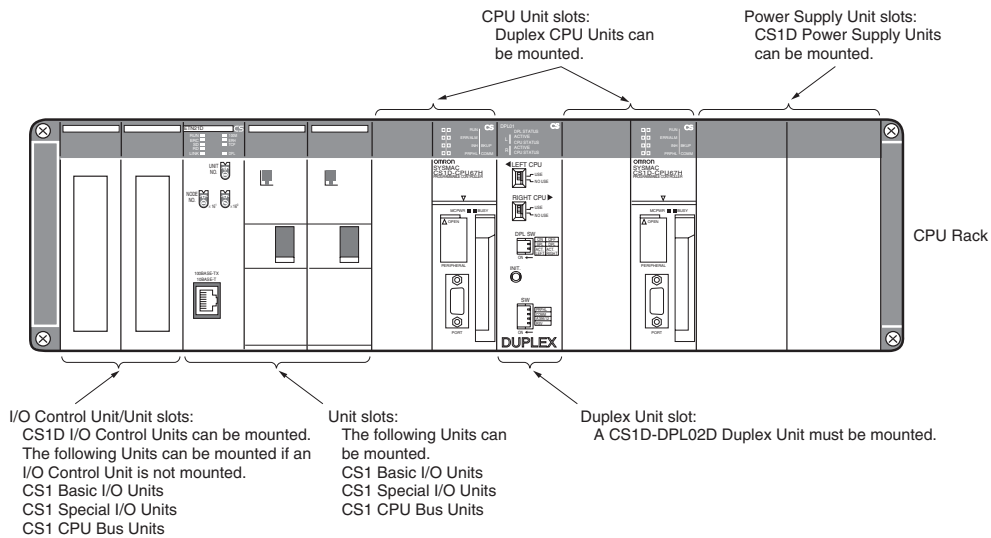| Special I/O Units, CPU Bus Units, and Inner Boards			
Temperature Sensor Input Units (Process Analog I/O Units) • CS1W-PTS□□ Analog Input Units • Analog Input Units CS1W-AD041 CS1W-AD081-V1 CS1W-AD161 • Process Analog Input Units such as Isolated-type DC Input Units CS1W-PDC□□ CS1W-PTW01 CS1W-PTR0□ Analog Output Units • Analog Output Units CS1W-DA041 CS1W-DA081V CS1W-DA081C • Isolated-type Analog Output Units (Process Analog I/O Units) CS1W-PMV01 CS1W-PMV02 Analog I/O Units • CS1W-MAD44 Isolated-type Pulse Input Unit (Process Analog I/O Unit) • CS1W-PPS01 Loop Control Unit • CS1W-LC001	• High-speed Counter Units CS1W-CT021 CS1W-CT041 • Position Control Units CS1W-NC1□3 CS1W-NC2□3 CS1W-NC4□3 • Customizable Counter Units CS1W-HCP22-V1 CS1W-HCA□2-V1 CS1W-HIO01-V1 • MECHATROLINK-II-compatible Position Control Units CS1W-NCF71 • Motion Control Units CS1W-MC221-V1 CS1W-MC421-V1 • MECHATROLINK-II-compatible Motion Control Units CS1W-MCH71	• Serial Communications Units CS1W-SCU21-V1 CS1W-SCU31-V1 • Controller Link Units CS1W-CLK21-V1 CS1W-CLK12-V1 CS1W-CLK52-V1 • Ethernet Units CS1W-ETN01 CS1W-ETN21 CS1W-ETN21D • SYSMAC LINK Units CS1W-SLK11 CS1W-SLK21 • FL-Net Units CS1W-FLN02 CS1W-FLN22 • DeviceNet Units CS1W-DRM21-V1 • CompoNet Master Units CS1W-CRM21	• ID Sensor U Units CS1W-V600C11 CS1W-V600C12 • GPIB Interface Units CS1W-GPI01 • High-speed Data Storage Units CS1W-SPU01 CS1W-SPU02

Basic System

Basic System

SYSTEM 1 | CS1D Duplex CPU, Dual I/O Expansion System

The entire system, including the expansion cables, can be duplexed for the most advanced redundancy and maintenance functions.

The CPU Unit's version must be unit version 1.3 or later.

■ CPU Rack

System Configuration

CPU Unit slots:
Duplex CPU Units can be mounted.

Power Supply Unit slots:
CS1D Power Supply Units can be mounted.

CPU Rack

I/O Control Unit/Unit slots:
CS1D I/O Control Units can be mounted.
The following Units can be mounted if an I/O Control Unit is not mounted.
CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units

Unit slots:
The following Units can be mounted.
CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units

Duplex Unit slot:
A CS1D-DPL02D Duplex Unit must be mounted.

List of Required Devices

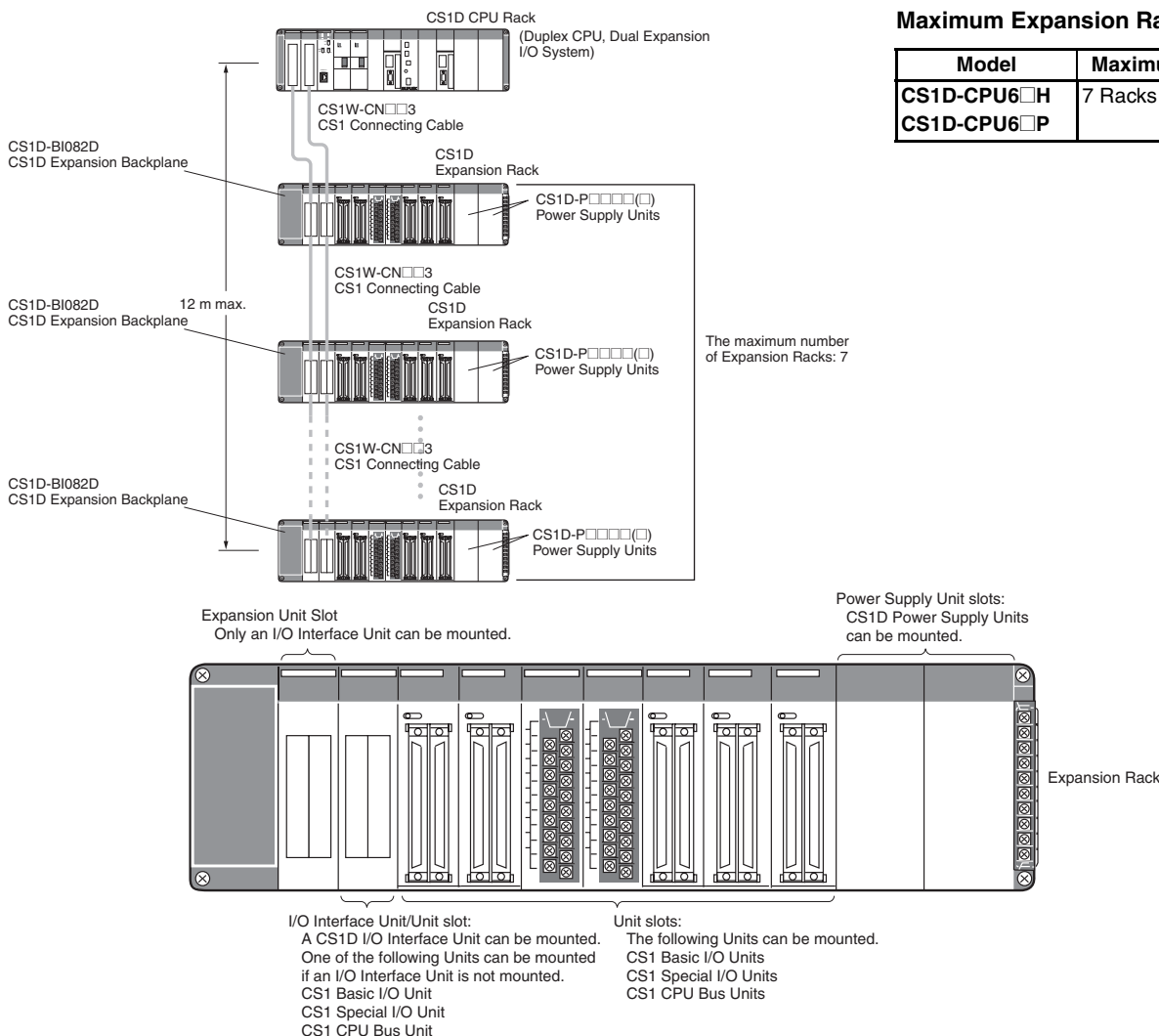| Rack	Unit name		Number required
CPU Rack	CS1D-BC042D CPU Backplane (for Duplex CPU Dual I/O Expansion Systems)		1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit		2 Units (Just 1 Unit can also be used.)
	CS1D-CPU6□H/CS1D-CPU6□P CPU Unit		2 Units
	CS1D-DPL02D Duplex Unit (for Duplex CPU Dual I/O Expansion Systems)		1 Unit
	CS1D-IC102D I/O Control Unit (for Duplex CPU Dual I/O Expansion Systems)		Required only when there is an I/O Expansion System. Two Units are required for a Dual I/O Expansion System, and just one Unit is required for a Single I/O Expansion System.
	Maximum number of I/O Units	Dual I/O Expansion System	3 Units
		Single I/O Expansion System	4 Units
		No I/O Expansion	5 Units

Limitations on the System Configuration

Note: 1. C200H-series Units cannot be used in either the CPU Rack or Expansion Racks.
2. The CPU Units do not support FB or ST programming.
3. CPU Units with unit version 1.3 or later can be used.

■ Dual I/O Expansion Racks

The Dual I/O Expansion System has a duplexed expansion bus and supports online replacement of a Duplex Unit, online replacement of Units without a Programming Device, and online addition of I/O Units and Expansion Backplanes. (These functions are supported by the Duplex CPU Dual I/O Expansion System only.) Special I/O Control Units and I/O Interface Units are used in the Dual I/O Expansion System. The expansion bus can be set to either single or dual operation.

System Configuration Diagram

Maximum Expansion Racks

Model	Maximum No. of Racks
CS1D-CPU6□H CS1D-CPU6□P	7 Racks

CS1D CPU Rack
(Duplex CPU, Dual Expansion I/O System)

CS1W-CN□□3
CS1 Connecting Cable

CS1D-BI082D
CS1D Expansion Backplane

CS1D Expansion Rack

CS1D-P□□□□(□)
Power Supply Units

CS1W-CN□□3
CS1 Connecting Cable

CS1D-BI082D
CS1D Expansion Backplane

12 m max.

CS1D Expansion Rack

CS1D-P□□□□(□)
Power Supply Units

The maximum number of Expansion Racks: 7

CS1W-CN□□3
CS1 Connecting Cable

CS1D-BI082D
CS1D Expansion Backplane

CS1D Expansion Rack

CS1D-P□□□□(□)
Power Supply Units

Expansion Unit Slot
Only an I/O Interface Unit can be mounted.

Power Supply Unit slots:
CS1D Power Supply Units can be mounted.

Expansion Rack

I/O Interface Unit/Unit slot:
A CS1D I/O Interface Unit can be mounted.
One of the following Units can be mounted if an I/O Interface Unit is not mounted.
CS1 Basic I/O Unit
CS1 Special I/O Unit
CS1 CPU Bus Unit

Unit slots:
The following Units can be mounted.
CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units

List of Required Devices

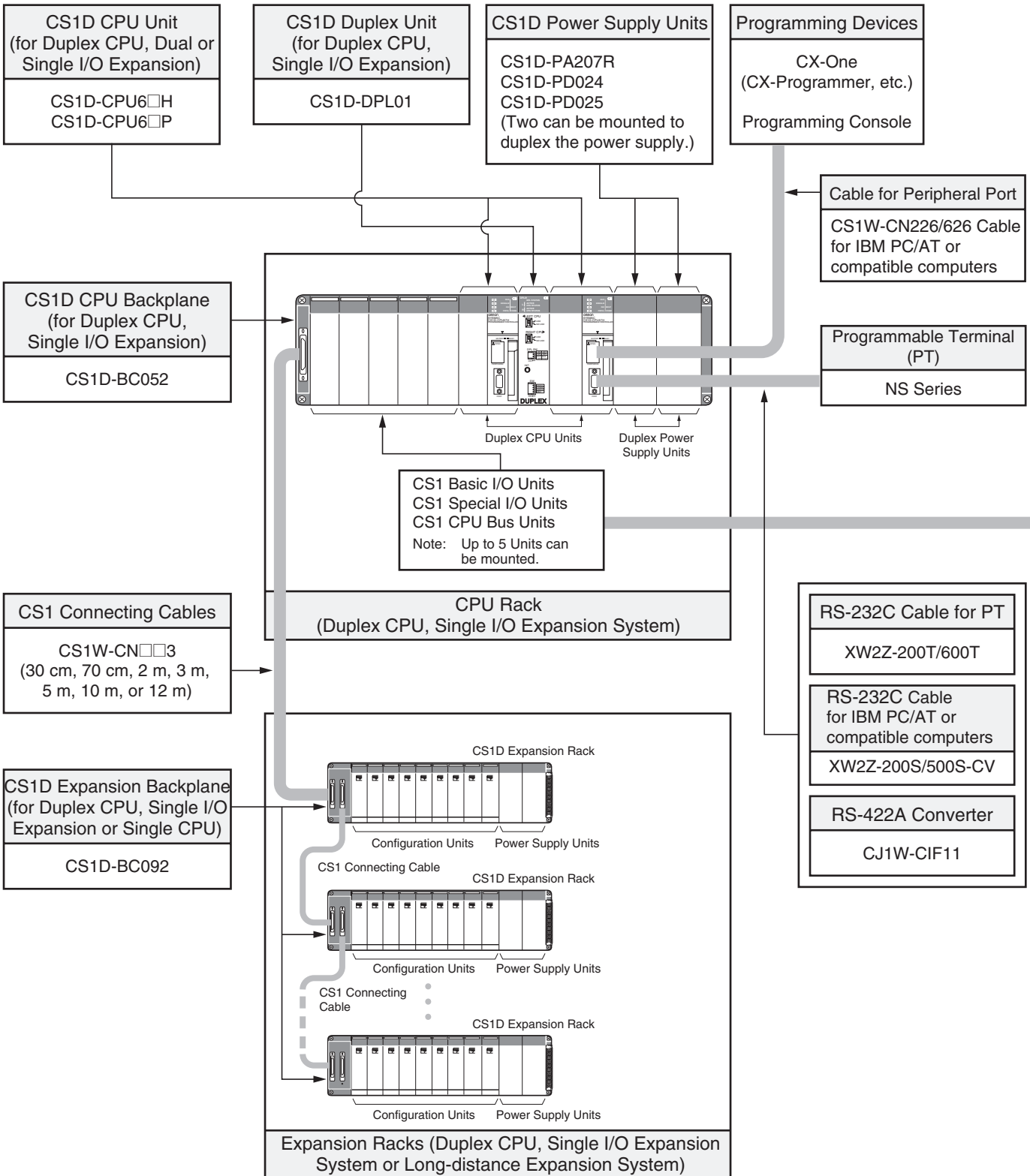| Rack	Unit name		Number required
CPU Rack	CS1D-IC102D I/O Control Unit (for Duplex CPU Dual I/O Expansion Systems)		Two Units are required for a Dual I/O Expansion System, and just one Unit is required for a Single I/O Expansion System.
	Maximum number of I/O Units	Dual I/O Expansion System	3 Units
		Single I/O Expansion System	4 Units

Rack	Unit name		Number required
Expansion Rack	CS1D-BI082D Expansion Backplane (for Duplex CPU Dual I/O Expansion Systems)		1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit		2 Units (Just 1 Unit can also be used.)
	CS1D-II102D I/O Interface Unit (for Duplex CPU Dual I/O Expansion Systems)		Two Units are required for a Dual I/O Expansion System, and just one Unit is required for a Single I/O Expansion System.
	Maximum number of I/O Units	Dual I/O Expansion System	7 Units
		Single I/O Expansion System	8 Units

Limitations on the System Configuration

Note: 1. Dual I/O Expansion cannot be used in a Duplex CPU Single I/O Expansion System or Single CPU System.
2. The number of I/O Units that can be mounted in the Backplanes depends on the expansion method being used.

Basic System

SYSTEM 2   CS1D Duplex CPU, Single I/O Expansion System

CS1D CPU Unit (for Duplex CPU, Dual or Single I/O Expansion)	CS1D Duplex Unit (for Duplex CPU, Single I/O Expansion)	CS1D Power Supply Units	Programming Devices
CS1D-CPU6☐H CS1D-CPU6☐P	CS1D-DPL01	CS1D-PA207R CS1D-PD024 CS1D-PD025 (Two can be mounted to duplex the power supply.)	CX-One (CX-Programmer, etc.) Programming Console

Cable for Peripheral Port

CS1W-CN226/626 Cable for IBM PC/AT or compatible computers

CS1D CPU Backplane (for Duplex CPU, Single I/O Expansion)

CS1D-BC052

Programmable Terminal (PT)

NS Series

Duplex CPU Units

Duplex Power Supply Units

CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units
Note: Up to 5 Units can be mounted.

CPU Rack
(Duplex CPU, Single I/O Expansion System)

RS-232C Cable for PT

XW2Z-200T/600T

CS1 Connecting Cables

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

RS-232C Cable for IBM PC/AT or compatible computers

XW2Z-200S/500S-CV

CS1D Expansion Rack

Configuration Units   Power Supply Units

CS1D Expansion Backplane (for Duplex CPU, Single I/O Expansion or Single CPU)

CS1D-BC092

CS1 Connecting Cable

CS1D Expansion Rack

Configuration Units   Power Supply Units

RS-422A Converter

CJ1W-CIF11

CS1 Connecting Cable

CS1D Expansion Rack

Configuration Units   Power Supply Units

Expansion Racks (Duplex CPU, Single I/O Expansion System or Long-distance Expansion System)

Configuration Units

Basic I/O Units				
8 I/O points	**16 I/O points**	**32 I/O points**	**64 I/O points**	**96 I/O points**
Input Units				
---	• DC Input Units CS1W-ID211 • AC Input Units CS1W-IA111 CS1W-IA211	• DC Input Units CS1W-ID231	• DC Input Units CS1W-ID261	• DC Input Units CS1W-ID291
Output Units				
• Triac Output Units CS1W-OA201 • Relay Output Units (independent commons) CS1W-OC201	• Transistor Output Units CS1W-OD21□ • Triac Output Units CS1W-OA211 • Relay Output Units CS1W-OC211	• Transistor Output Units CS1W-OD23□	• Transistor Output Units CS1W-OD26□	• Transistor Output Units CS1W-OD29□
I/O Units				
---	---	---	32 inputs and 32 outputs • DC Input/Transistor Output Units CS1W-MD26□ • TTL I/O Units CS1W-MD561	48 inputs and 48 outputs • DC Input/Transistor Output Units CS1W-MD29□
Other Units				
• Safety Relay Units CS1W-SF200	• Interrupt Input Units CS1W-INT01 • High-speed Input Units CS1W-IDP01	B7A Interface Units • 32 inputs CS1W-B7A12 • 32 outputs CS1W-B7A02 • 16 inputs and 16 outputs CS1W-B7A21	B7A Interface Units • 32 inputs and 32 outputs CS1W-B7A22	---

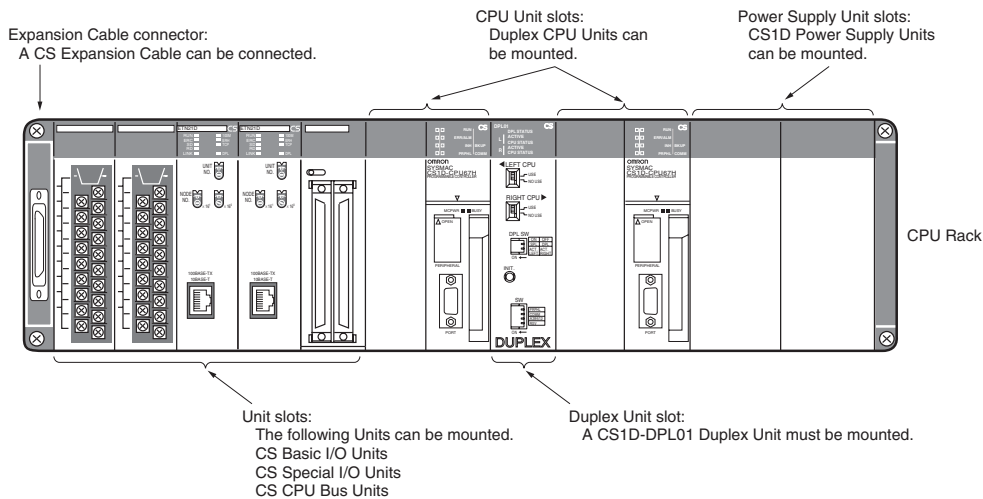| Special I/O Units, CPU Bus Units, and Inner Boards			
Temperature Sensor Input Units (Process Analog I/O Units) • CS1W-PTS□□ Analog Input Units • Analog Input Units CS1W-AD041 CS1W-AD081-V1 CS1W-AD161 • Process Analog Input Units such as Isolated-type DC Input Units CS1W-PDC□□ CS1W-PTW01 CS1W-PTR0□ Analog Output Units • Analog Output Units CS1W-DA041 CS1W-DA081V CS1W-DA081C • Isolated-type Analog Output Units (Process Analog I/O Units) CS1W-PMV01 CS1W-PMV02 Analog I/O Units • CS1W-MAD44 Isolated-type Pulse Input Unit (Process Analog I/O Unit) • CS1W-PPS01 Loop Control Unit • CS1W-LC001	• High-speed Counter Units CS1W-CT021 CS1W-CT041 • Position Control Units CS1W-NC1□3 CS1W-NC2□3 CS1W-NC4□3 • Customizable Counter Units CS1W-HCP22-V1 CS1W-HCA□2-V1 CS1W-HIO01-V1 • MECHATROLINK-II-compatible Position Control Units CS1W-NCF71 • Motion Control Units CS1W-MC221-V1 CS1W-MC421-V1 • MECHATROLINK-II-compatible Motion Control Units CS1W-MCH71	• Serial Communications Units CS1W-SCU21-V1 CS1W-SCU31-V1 • Controller Link Units CS1W-CLK21-V1 CS1W-CLK12-V1 CS1W-CLK52-V1 • Ethernet Units CS1W-ETN01 CS1W-ETN21 CS1W-ETN21D • SYSMAC LINK Units CS1W-SLK11 CS1W-SLK21 • FL-Net Units CS1W-FLN02 CS1W-FLN22 • DeviceNet Units CS1W-DRM21-V1 • CompoNet Master Units CS1W-CRM21	• ID Sensor U Units CS1W-V600C11 CS1W-V600C12 • GPIB Interface Units CS1W-GPI01 • High-speed Data Storage Units CS1W-SPU01 CS1W-SPU02

Basic System

| SYSTEM 2 | CS1D Duplex CPU, Single I/O Expansion System |

The main system components can be duplexed, such as the CPU Unit, Power Supply Unit, and Communications Unit. Units can be replaced online using a Programming Device. This system is equivalent to the previous CS1D Duplex CPU System.

■ CPU Rack

System Configuration

Expansion Cable connector:
A CS Expansion Cable can be connected.

CPU Unit slots:
Duplex CPU Units can be mounted.

Power Supply Unit slots:
CS1D Power Supply Units can be mounted.

CPU Rack

Unit slots:
The following Units can be mounted.
CS Basic I/O Units
CS Special I/O Units
CS CPU Bus Units

Duplex Unit slot:
A CS1D-DPL01 Duplex Unit must be mounted.

List of Required Devices

Rack	Unit name	Number required
CPU Rack	CS1D-BC052D CPU Backplane (for Duplex CPU Single I/O Expansion Systems)	1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit	2 Units (Just 1 Unit can also be used.)
	CS1D-CPU6□H/CS1D-CPU6□P CPU Unit	2 Units
	CS1D-DPL01 Duplex Unit (for Duplex CPU Single I/O Expansion Systems)	1 Unit
	Maximum number of Configuration Units	5 Units

Limitations on the System Configuration

Note: 1. C200H-series Units cannot be used in either the CPU Rack or Expansion Racks.

2. The CPU Units do not support FB or ST programming.

■ Single I/O Expansion Racks

Like the CS1-series PLCs, it is possible to connect Expansion Racks and expand the PLC system just by connecting Expansion Cables. The Duplex CPU Single I/O Expansion System supports the same functions as Single CPU System. Special I/O Control Units and I/O Interface Units are not required.

System Configuration Diagram

Maximum Expansion Racks

Model	Maximum No. of Racks
CS1D-CPU6□H CS1D-CPU6□P	7 Racks

List of Required Devices

Rack		Unit name	Number required
CPU Rack	Maximum number of Configuration Units	Duplex CPU, Single I/O Expansion System	5 Units
		Single CPU System	8 Units

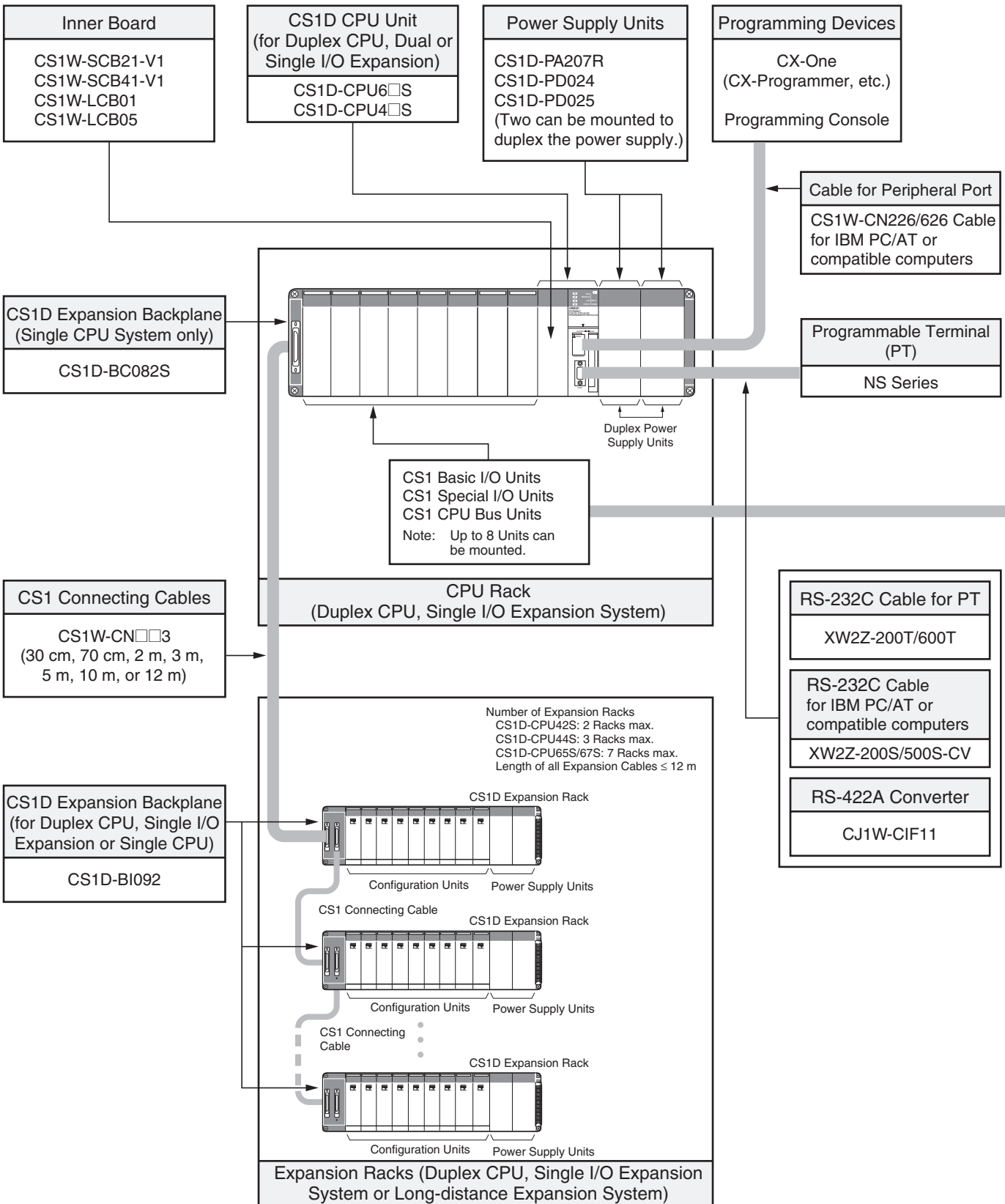| Rack	Unit name	Number required
Expansion Rack	CS1D-BI092 Expansion Backplane (for Duplex CPU Single I/O Expansion Systems or Single CPU Systems)	1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit	2 Units (Just 1 Unit can also be used.)
	Maximum number of I/O Units (Duplex CPU Single I/O Expansion System or Single CPU System)	9 Units

Limitations on the System Configuration

Note: 1. These Racks cannot be used in a Duplex CPU Dual I/O Expansion System.

2. The following functions cannot be used: Duplex Expansion Cables, Online replacement of a Duplex Unit, Online replacement of Units without a Programming Device, and Online addition of I/O Units and Expansion Backplanes. If any of these functions are required, a Duplex CPU, Dual I/O Expansion System must be used.

■ CS1D Long-distance Expansion Racks

A Long-distance Expansion System can connect a Rack at a distance of up to 50 m. The Long-distance Expansion System functions can be used in the Duplex CPU Single I/O Expansion System and Single CPU System. Special I/O Control Units and I/O Interface Units are used.

System Configuration Diagram

Maximum Expansion Racks

Model	Maximum No. of Racks
CS1D-CPU6□H CS1D-CPU6□P	7 Racks

CS1W-IC102 I/O Control Unit (See note.)
CS1D CPU Rack (Single CPU System or Duplex CPU System)
CV500-CN□□2 CV-series Connecting Cable

CS1D-BI092 CS1D Expansion Backplane
CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
CV500-CN□□2 CV-series Connecting Cable
CS1D-P□□□□(□) Power Supply Units

CS1D-BI092 CS1D Expansion Backplane
CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
CV500-CN□□2 CV-series Connecting Cable

50 m

CS1D-BI092 CS1D Expansion Backplane
CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
CV500-CN□□2 CV-series Connecting Cable

CS1D-BI092 CS1D Expansion Backplane
CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
Terminator

CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
CS1D-P□□□□(□) Power Supply Units
CV500-CN□□2 CV-series Connecting Cable

CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
50 m
CV500-CN□□2 CV-series Connecting Cable

CS1W-II102 I/O Interface Unit
CS1D Expansion Rack
Terminator

The maximum number of Expansion Racks: 7 (In two levels)

Note: If even one CV500-CN□□2 Cable for Long-distance Expansion is used in the PLC system, an I/O Control Unit is required in the source CS1 Rack.

Expansion Cable connector: Connect the Expansion Unit Interface Cables.

Power Supply Unit slots: CS1D Power Supply Units can be mounted.

Expansion Rack

Expansion Unit Slot Only an Expansion Unit can be mounted.

I/O Unit slots: The following Units can be mounted.
CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units

List of Required Devices

Rack	Unit name		Number required
CPU Rack	CS1D-IC102 I/O Control Unit (for Duplex CPU Single I/O Expansion Systems and Single CPU Systems)		1 Unit
	Maximum number of Configuration Units	Duplex CPU Single I/O Expansion System	4 Units
		Single CPU System	7 Units

Rack	Unit name	Number required
Expansion Rack	CS1D-BI092 Expansion Backplane (for Duplex CPU Single I/O Expansion Systems or Single CPU Systems)	1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit	2 Units (Just 1 Unit can also be used.)
	CS1W-II102 I/O Interface Unit (for Duplex CPU Single I/O Expansion Systems or Single CPU Systems)	1 Unit
	Maximum number of Configuration Units	8 Units

Limitations on the System Configuration

Note: 1. These Racks cannot be used in a Duplex CPU Dual I/O Expansion System.

2. The following functions cannot be used: Duplex Expansion Cables, Online replacement of a Duplex Unit, Online replacement of Units without a Programming Device, and Online addition of I/O Units and Expansion Backplanes. If any of these functions are required, a Duplex CPU, Dual I/O Expansion System must be used.

MEMO

Basic System

SYSTEM 3 | CS1D Single CPU System

Inner Board

CS1W-SCB21-V1
CS1W-SCB41-V1
CS1W-LCB01
CS1W-LCB05

CS1D CPU Unit
(for Duplex CPU, Dual or Single I/O Expansion)

CS1D-CPU6□S
CS1D-CPU4□S

Power Supply Units

CS1D-PA207R
CS1D-PD024
CS1D-PD025
(Two can be mounted to duplex the power supply.)

Programming Devices

CX-One
(CX-Programmer, etc.)

Programming Console

Cable for Peripheral Port

CS1W-CN226/626 Cable for IBM PC/AT or compatible computers

CS1D Expansion Backplane
(Single CPU System only)

CS1D-BC082S

Programmable Terminal (PT)

NS Series

Duplex Power Supply Units

CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units
Note: Up to 8 Units can be mounted.

CPU Rack
(Duplex CPU, Single I/O Expansion System)

CS1 Connecting Cables

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

RS-232C Cable for PT

XW2Z-200T/600T

RS-232C Cable
for IBM PC/AT or compatible computers

XW2Z-200S/500S-CV

RS-422A Converter

CJ1W-CIF11

Number of Expansion Racks
CS1D-CPU42S: 2 Racks max.
CS1D-CPU44S: 3 Racks max.
CS1D-CPU65S/67S: 7 Racks max.
Length of all Expansion Cables ≤ 12 m

CS1D Expansion Rack

CS1D Expansion Backplane
(for Duplex CPU, Single I/O Expansion or Single CPU)

CS1D-BI092

Configuration Units   Power Supply Units

CS1 Connecting Cable

CS1D Expansion Rack

Configuration Units   Power Supply Units

CS1 Connecting Cable

CS1D Expansion Rack

Configuration Units   Power Supply Units

Expansion Racks (Duplex CPU, Single I/O Expansion System or Long-distance Expansion System)

Configuration Units

Basic I/O Units				
8 I/O points	**16 I/O points**	**32 I/O points**	**64 I/O points**	**96 I/O points**
Input Units				
---	• DC Input Units CS1W-ID211 • AC Input Units CS1W-IA111 CS1W-IA211	• DC Input Units CS1W-ID231	• DC Input Units CS1W-ID261	• DC Input Units CS1W-ID291
Output Units				
• Triac Output Units CS1W-OA201 • Relay Output Units (independent commons) CS1W-OC201	• Transistor Output Units CS1W-OD21□ • Triac Output Units CS1W-OA211 • Relay Output Units CS1W-OC211	• Transistor Output Units CS1W-OD23□	• Transistor Output Units CS1W-OD26□	• Transistor Output Units CS1W-OD29□
I/O Units				
---	---	---	32 inputs and 32 outputs • DC Input/Transistor Output Units CS1W-MD26□ • TTL I/O Units CS1W-MD561	48 inputs and 48 outputs • DC Input/Transistor Output Units CS1W-MD29□
Other Units				
• Safety Relay Units CS1W-SF200	• Interrupt Input Units CS1W-INT01 • High-speed Input Units CS1W-IDP01	B7A Interface Units • 32 inputs CS1W-B7A12 • 32 outputs CS1W-B7A02 • 16 inputs and 16 outputs CS1W-B7A21	B7A Interface Units • 32 inputs and 32 outputs CS1W-B7A22	---

Special I/O Units, CPU Bus Units, and Inner Boards			
Temperature Sensor Input Units (Process Analog I/O Units) • CS1W-PTS□□ Analog Input Units • Analog Input Units CS1W-AD041 CS1W-AD081-V1 CS1W-AD161 • Process Analog Input Units such as Isolated-type DC Input Units CS1W-PDC□□ CS1W-PTW01 CS1W-PTR0□ Analog Output Units • Analog Output Units CS1W-DA041 CS1W-DA081V CS1W-DA081C • Isolated-type Analog Output Units (Process Analog I/O Units) CS1W-PMV01 CS1W-PMV02 Analog I/O Units • CS1W-MAD44 Isolated-type Pulse Input Unit (Process Analog I/O Unit) • CS1W-PPS01 Loop Control Unit • CS1W-LC001 Loop Control Boards • CS1W-LCB01 • CS1W-LCB05	• High-speed Counter Units CS1W-CT021 CS1W-CT041 • Position Control Units CS1W-NC1□3 CS1W-NC2□3 CS1W-NC4□3 • Customizable Counter Units CS1W-HCP22-V1 CS1W-HCA□2-V1 CS1W-HIO01-V1 • MECHATROLINK-II-compatible Position Control Units CS1W-NCF71 • Motion Control Units CS1W-MC221-V1 CS1W-MC421-V1 • MECHATROLINK-II-compatible Motion Control Units CS1W-MCH71	• Serial Communications Boards CS1W-SCB21-V1 CS1W-SCB41-V1 • Serial Communications Units CS1W-SCU21-V1 CS1W-SCU31-V1 • Controller Link Units CS1W-CLK21-V1 CS1W-CLK12-V1 CS1W-CLK52-V1 • Ethernet Units CS1W-ETN01 CS1W-ETN21 CS1W-ETN21D • SYSMAC LINK Units CS1W-SLK11 CS1W-SLK21 • FL-Net Units CS1W-FLN02 CS1W-FLN22 • DeviceNet Units CS1W-DRM21-V1 • CompoNet Master Units CS1W-CRM21	• ID Sensor U Units CS1W-V600C11 CS1W-V600C12 • GPIB Interface Units CS1W-GPI01 • High-speed Data Storage Units CS1W-SPU01 CS1W-SPU02

Basic System

SYSTEM 3	CS1D Single CPU System

This system configuration is ideal when you want to replace a Power Supply Unit or other Units online or improve redundancy in the Communications section. There are no changes in particular from the earlier Single CPU System.

■ CPU Rack

System Configuration Diagram

Expansion Cable connector:
A CS Expansion Cable can be connected.

Power Supply Unit slots:
CS1D Power Supply Units can be mounted.

CPU Rack

I/O Unit slots:
The following Units can be mounted.
CS1 Basic I/O Units
CS1 Special I/O Units
CS1 CPU Bus Units

CPU Unit slots:
A CPU Unit that supports online I/O Unit replacement can be mounted.
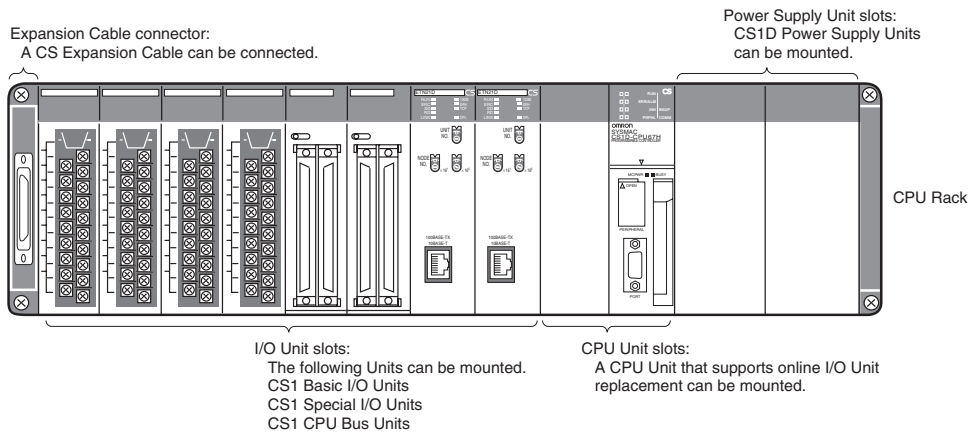
List of Required Devices

Rack	Unit name	Number required
CPU Rack	CS1D-BC082S CPU Backplane (for Single CPU Systems)	1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit	2 Units (Just 1 Unit can also be used.)
	CS1D-CPU6□S/CS1D-CPU4□S CPU Unit	1 Unit
	Maximum number of Configuration Units	8 Units

Limitations on the System Configuration

Note: 1. C200H-series Units cannot be used in either the CPU Rack or Expansion Racks.

2. The CPU Units do not support FB or ST programming.

■ Single I/O Expansion Racks

Like the CS1-series PLCs, it is possible to connect Expansion Racks and expand the PLC system just by connecting Expansion Cables. The Single CPU System supports the same functions as Duplex CPU Single I/O Expansion System. Special I/O Control Units and I/O Interface Units are not required.

System Configuration Diagram

Maximum Expansion Racks

Model	Maximum No. of Racks
CS1D-CPU6□S	7 Racks
CS1D-CPU44S	3 Racks
CS1D-CPU42S	2 Racks

List of Required Devices

Rack		Unit name	Number required
CPU Rack	Maximum number of Configuration Units	Duplex CPU, Single I/O Expansion System	5 Units
		Single CPU System	8 Units

Rack	Unit name	Number required
Expansion Rack	CS1D-BI092 Expansion Backplane (for Duplex CPU Single I/O Expansion Systems or Single CPU Systems)	1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit	2 Units (Just 1 Unit can also be used.)
	Maximum number of I/O Units (Duplex CPU Single I/O Expansion System or Single CPU System)	9 Units

Limitations on the System Configuration

Note: 1. These Racks cannot be used in a Duplex CPU Dual I/O Expansion System.

2. The following functions cannot be used: Duplex Expansion Cables, Online replacement of a Duplex Unit, Online replacement of Units without a Programming Device, and Online addition of I/O Units and Expansion Backplanes. If any of these functions are required, a Duplex CPU, Dual I/O Expansion System must be used.

■ CS1D Long-distance Expansion Racks

A Long-distance Expansion System can connect a Rack at a distance of up to 50 m. The Long-distance Expansion System functions can be used in the Duplex CPU Single I/O Expansion System and Single CPU System. Special I/O Control Units and I/O Interface Units are used.

System Configuration Diagram

Maximum Expansion Racks

Model	Maximum No. of Racks
CS1D-CPU6□S	7 Racks
CS1D-CPU44S	3 Racks
CS1D-CPU42S	2 Racks

Note: If even one CV500-CN□□2 Cable for Long-distance Expansion is used in the PLC system, an I/O Control Unit is required in the source CS1 Rack.
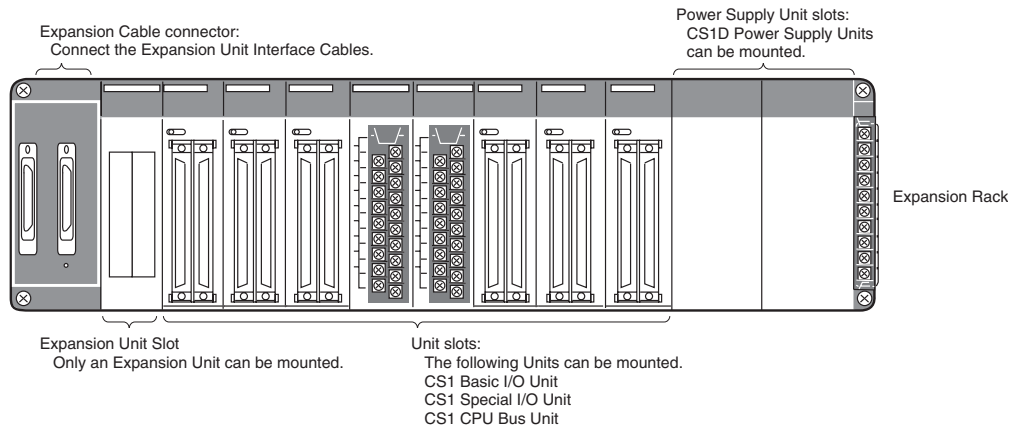
List of Required Devices

Rack	Unit name		Number required
CPU Rack	CS1W-IC102 I/O Control Unit (for Duplex CPU Single I/O Expansion Systems and Single CPU Systems)		1 Unit
	Maximum number of Configuration Units	Duplex CPU Single I/O Expansion System	4 Units
		Single CPU System	7 Units

Rack	Unit name	Number required
Expansion Rack	CS1D-BI092 Expansion Backplane (for Duplex CPU Single I/O Expansion Systems or Single CPU Systems)	1 Backplane
	CS1D-PA207R/CS1D-PD02□ Power Supply Unit	2 Units (Just 1 Unit can also be used.)
	CS1W-II102 I/O Interface Unit (for Duplex CPU Single I/O Expansion Systems or Single CPU Systems)	1 Unit
	Maximum number of Configuration Units	8 Units

Limitations on the System Configuration

Note: 1. These Racks cannot be used in a Duplex CPU Dual I/O Expansion System.

2. The following functions cannot be used: Duplex Expansion Cables, Online replacement of a Duplex Unit, Online replacement of Units without a Programming Device, and Online addition of I/O Units and Expansion Backplanes. If any of these functions are required, a Duplex CPU, Dual I/O Expansion System must be used.

Dimensions and Installation Procedure

(Unit: mm)

■ External Dimensions
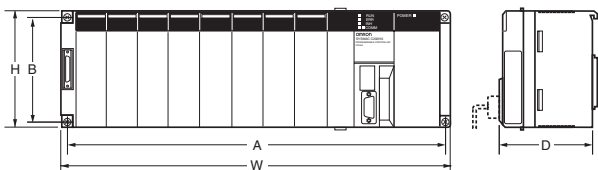
Name	Model	A	B	W	H	D
CS1D CPU Backplane	CS1D-BC042D CS1D-BC052 CS1D-BC082S	491	118	505	132	123
CS1D Expansion Backplane	CS1D-BI82D CS1D-BI092	491	118	505	132	123

■ Backplane Mounting Dimensions
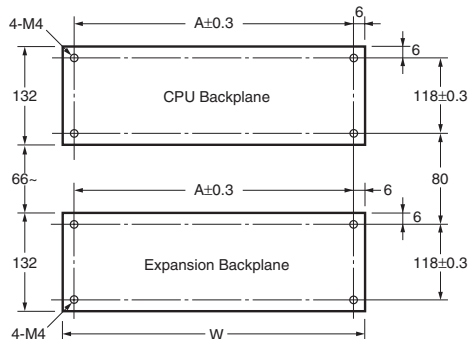
Name	Model	A	W
CS1D CPU Backplane	CS1D-BC042D	491	505
	CS1D-BC052		
	CS1D-BC082S		
CS1D Expansion Backplane	CS1D-BI082D		
	CS1D-BI092		

■ Mounting Height

The mounting height of CPU Racks and Expansion Racks is 118 to 123 mm, depending on I/O Units mounted. If Programming Devices or connecting cables are attached, the additional dimensions must be taken into account. Allow sufficient clearance in the control panel in which the PLC is mounted.

118 mm to 153 mm
180 mm to 223 mm
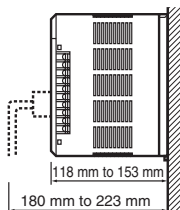
Note: When using Expansion Racks, the total length of the I/O Connecting Cables must be less than 12 m. When bending an I/O Connecting Cables, provide at least the minimum bending radius shown in the following diagrams.

CS1 Connecting Cable

R ≥ 69 mm required
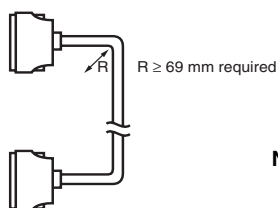
Note: Cable thickness: 8.6 mm dia.

Long-distance Expansion Rack I/O Connecting Cable

R ≥ 80 mm required
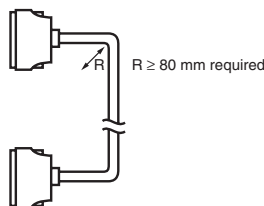
Note: Cable thickness: 10 mm dia.

General Specifications

	Specifications		
Item Power Supply Unit	CS1D-PA207R	CS1D-PD024	CS1D-PD025
Power supply voltage	100 to 120 V AC/200 to 240 V, 50/60 Hz	24 V DC	
Operating voltage range	85 to 132 V AC/170 to 264 V	19.2 to 28.8 V DC	
Power consumption	150 VA max.	40 W max.	60 W max.
Inrush current	100 to 120 V AC: 30 A max. 200 to 240 VAC: 40 A max.	30 A max.	
Power supply output capacity	5 V DC, 7 A (including the CPU Unit power supply) 26 V DC, 1.3 A Total: 35 W	5 V DC, 4.3 A (including the CPU Unit power supply) 26 V DC, 0.56 A Total: 28 W	5 V DC, 5.3 A (including the CPU Unit power supply) 26 V DC, 1.3 A Total: 40 W
Power supply output terminal	Not provided.		
RUN output (See note 1.)	Contact configuration: SPST-NO Switch capacity: 240 V AC, 2 A (resistive load) 120 V AC, 0.5 A (induction load) 24 V DC, 2 A (resistive load) 24 VDC, 2 A (induction load)	Not provided.	
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See note 2.)	20 MΩ min. (at 500 V DC) between DC external and GR terminals (See note 2.)	
Dielectric strength	Between AC external and GR terminals (See note 2.): 2,300 V AC 50/60 Hz for 1 min Leakage current: 10 mA max. Between DC external and GR terminals (See note 2.): 1,000 V AC 50/60 Hz for 1 min Leakage current: 10 mA max.	Between DC external and GR terminals (See note 2.): 1,000 V AC 50/60 Hz for 1 min Leakage current: 10 mA max.	
Noise immunity	2 kV on power supply line (conforming to IEC61000-4-4)		
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes (Time coefficient: 8 minutes × coefficient factor 10 = total time 80 minutes) (When mounted on a DIN Track: 2 to 55 Hz, acceleration of 2.9 m/s^2 in X, Y, and Z directions for 20 minutes)		
Shock resistance	147 m/s^2 3 times each in X, Y, and Z directions (according to JIS 0041)		
Ambient operating temperature	0 to 55°C		
Ambient operating humidity	10% to 90% (with no condensation)		
Atmosphere	No corrosive gases		
Ambient storage temperature	−20 to 75°C (excluding battery)		
Grounding	Less than 100 Ω		
Enclosure	Mounted in a panel.		
Weight	Each Rack: 6 kg max.		
CPU Rack dimensions (mm)	CS1D-BC052 (5 slots, Duplex CPU System) and CS1D-BI082S (8 slots, Single CPU System): 505 × 132 × 123 mm (W x H x D) (See note 2.)		

Note: 1. Supported when mounted to a Backplane.

2. Disconnect the CS1D Power Supply Unit's LG terminal from the GR terminal when testing insulation and dielectric strength. Testing the insulation and dielectric strength with the LG terminal and the GR terminals connected will damage internal circuits in the CPU Unit.

Individual Specifications
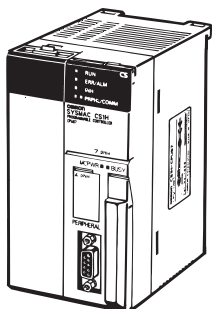
CS1D CPU Unit
(For a Duplex CPU System)
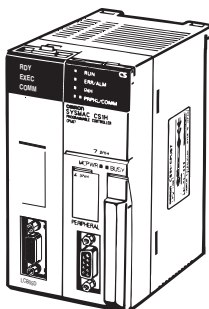
Process-control CPU Unit
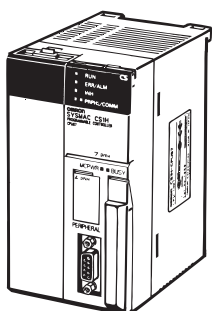
CS1D CPU Unit
(For a Single CPU System)

■ Individual Specifications

Item		CS1D CPU Unit							
		CS1D-H CPU Unit (For Duplex CPU Systems)		**Process-control CPU Unit**		**CS1D-H CPU Unit (For Single CPU Systems)**			
Model number		CS1D-CPU67H	CS1D-CPU65H	CS1D-CPU67P	CS1D-CPU65P	CS1D-CPU67S	CS1D-CPU65S	CS1D-CPU44S	CS1D-CPU42S
CPU Unit duplexing		Can be duplexed.				Cannot be duplexed.			
Number of I/O points		5,120 points						1,280 points	960 points
Number of Expansion Racks		7 max.						3 max.	2 max.
User program capacity		250 Ksteps	60 Ksteps	250 Ksteps	60 Ksteps	250 Ksteps	60 Ksteps	30 Ksteps	10 Ksteps
Data memory		448 Kwords	128 Kwords	448 Kwords	128 Kwords	448 Kwords	128 Kwords	64 Kwords	64 Kwords
	DM	32 Kwords	32 Kwords	32 Kwords	32 Kwords	32 Kwords	32 Kwords	32 Kwords	32 Kwords
	EM	32 Kwords × 13 banks	32 Kwords × 3 banks	32 Kwords × 13 banks	32 Kwords × 3 banks	32 Kwords × 13 banks	32 Kwords × 3 banks	32 Kwords × 1 bank	32 Kwords × 1 bank
LD instruction execution time		0.02 μs						0.04 μs	
Interrupt functions		Cannot be used.				Can be used.			
Loop control functions		None		Yes (Can be duplexed.)		Yes, when a Loop Control Board is installed			
Current consumption (A)	5 V	0.82 (See notes 1 and 2.)	0.82 (See notes 1 and 2.)	1.04	1.04	0.82 (See note 1.)	0.82 (See note 1.)	0.78 (See note 1.)	0.78 (See note 1.)
	24 V	---	---	---	---	---	---	---	---
Standards		UC1, N, L, CE		UC1, N, CE		UC1, N, L, CE			

Note: 1. These values include the current consumption of a connected Programming Console.

    2. NT-AL001 Link Adapters consume an additional 0.15 A each when used.

Specifications

Item		Specifications	
Control method		Stored program	
I/O control method		Cyclic scan and immediate processing are both supported.	
Programming		Ladder diagram	
Instruction length		1 to 7 steps per instruction	
Ladder instructions		Approx. 400 (3-digit function codes)	
Instruction execution times	Basic instructions	0.02 μs min.	
	Special instructions	0.04 μs min.	
Number of Tasks		288 (256 of these tasks are shared with interrupt tasks) **Note: 1.** Cyclic tasks are executed each cycle and are controlled with TKON(820) and TKOF(821) instructions. **2.** The following 4 types of interrupt tasks are supported in CS1D-CPU□□S CPU Units for Single CPU Systems. (Interrupt tasks are not supported in the CS1D-CPU□□H CPU Units, which are for Duplex CPU Systems.) Power OFF interrupt tasks: 1 max. Scheduled interrupt tasks: 2 max. I/O interrupt tasks: 32 max. External interrupt tasks: 256 max.	
Interrupt types **Note: The interrupts can be used in CS1D-CPU□□S CPU Units only.**		Scheduled Interrupts: Interrupts generated by the CPU Unit's built-in timer at regular intervals. I/O Interrupts: Interrupts from Interrupt Input Units Power OFF Interrupts: Interrupts executed when the CPU Unit's power is turned OFF. External I/O Interrupts: Interrupts from the Special I/O Units, CS-series CPU Bus Units, or the Inner Board.	
Function blocks		Not supported.	
CIO (Core I/O) Area	I/O Area	5,120: CIO 000000 to CIO 031915 (320 words from CIO 0000 to CIO 0319)	These words can be used as work words if they are not used for their specified purpose.
	Data Link Area	3,200 (200 words): CIO 10000 to CIO 119915 (words CIO 1000 to CIO 1199) Link bits are used for data links and are allocated to Units in Controller Link Systems.	
	CPU Bus Unit Area	6,400 (400 words): CIO 150000 to CIO 189915 (words CIO 1500 to CIO 1899) These words are allocated to CS1 CPU Bus Units.	
	Special I/O Unit Area	15,360 (960 words): CIO 200000 to CIO 295915 (words CIO 2000 to CIO 2959) These words are allocated to CS1 Special I/O Units.	
	Inner Board Area	1,600 (100 words): CIO 190000 to CIO 199915 (words CIO 1900 to CIO 1999) Inner Board bits can be allocated to Inner Boards.	
	SYSMAC BUS Area	800 (50 words): CIO 300000 to CIO 304915 (words CIO 3000 to CIO 3049) (Can be used as work words in the program.)	
	I/O Terminal Area	512 (32 words): CIO 310000 to CIO 313115 (words CIO 3100 to CIO 3131) (Can be used as work words in the program.)	
Work Areas	Internal I/O Area	4,800 (300 words): CIO 120000 to CIO 149915 (words CIO 1200 to CIO 1499) 37,504 (2,344 words): CIO 380000 to CIO 614315 (words CIO 3800 to CIO 6143) These bits in the CIO Area are used as work bits in programming to control program execution. They cannot be used for external I/O.	
	Work Area	8,192 bits (512 words): W00000 to W51115 (W000 to W511) These bits are used to control the programs only. (I/O from external I/O is not possible.)	
Holding Area		8,192 bits (512 words): H00000 to H51115 (H000 to H511) Holding bits are used to control the execution of the program, and maintain their ON/OFF status when the PLC is turned OFF or the operating mode is changed.	
Auxiliary Area		Read only: 7,168 bits (448 words): A00000 to A44715 (words A000 to A447) Read/write: 8,192 bits (512 words): A44800 to A95915 (words A448 to A959) Auxiliary bits are allocated for specific functions.	
Temporary Relay (TR) Area		16 bits (TR0 to TR15) Temporary bits are used to temporarily store the ON/OFF execution conditions at program branches.	
Timer Area		4,096: T0000 to T4095 (used for timers only)	
Counter Area		4,096: C0000 to C4095 (used for counters only)	
Data Memory (DM) Area		32 Kwords: D00000 to D32767 Special I/O Unit DM Area: D20000 to D29599 (100 words × 96 Units) Used to set parameters for Special I/O Units. CPU Bus Unit DM Area: D30000 to D31599 (100 words × 16 Units) Used to set parameters for CPU Bus Units. Inner Board DM Area: D32000 to D32099 Used to set parameters for Inner Boards (Single CPU Systems only). Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in the DM Area maintain their status when the PLC is turned OFF or the operating mode is changed.	
Extended Data Memory (EM) Area		32 Kwords per bank, 13 banks max.: E0_00000 to EC_32767 max. (Not available on some CPU Units.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in the EM Area maintain their status when the PLC is turned OFF or the operating mode is changed.	
Data Registers		DR0 to DR15 Used to offset the PLC memory addresses in Index Registers when addressing words indirectly. (Data registers can be set to be used independently by each task. One register is 16 bits (1 word).	
Index Registers		IR0 to IR15 Store PLC memory addresses for indirect addressing. One register is 32 bits (2 words).	

Item		Specifications
Task Flags		32 (TK0000 to TK0031) Task Flags are read-only flags that are ON when the corresponding cyclic task is executable and OFF when the corresponding task is not executable or in standby status.
Trace Memory		4,000 words (The maximum amount of data that can be traced in a data trace is 500 samples for 31 bits and 6 words.
File Memory		Memory Cards: A 30MB, 64MB, or 128MB OMRON Memory Card can be used (MS-DOS format). EM file memory: The EM Area can be converted to file memory (MS-DOS format).
Func-tions	Parallel Processing Mode	Program execution and peripheral servicing can be performed simultaneously (CS1D-CPU□□S only).
	Battery-free operation	The user program and the system's parameters are backed up automatically in flash memory, which is standard equipment.
	Constant cycle time	1 to 32,000 ms (Unit: 1 ms)
	Cycle time monitoring	Possible (Unit stops operating if the cycle is too long): 10 to 40,000 ms (Unit: 10 ms)
	I/O refreshing	Cyclic refreshing, immediate refreshing (See note 3.), refreshing with I/O REFRESH instruction
	I/O memory holding when changing operating modes	Possible (Depends on the ON/OFF status of the IOM Hold Bit in the Auxiliary Area.)
	Load OFF	All outputs on Output Units can be turned OFF.
	Input response time setting	Time constants can be set for inputs from Basic I/O Units. The time constant can be increased to reduce the influence of noise and chattering or it can be decreased to detect shorter pulses on the inputs (CS1 Basic I/O Units only).
	Startup mode setting	Supported.
	Memory Card functions	Automatically reading programs (autoboot) from the Memory Card when the power is turned ON.
		Format in which data is stored in Memory Card	User program: Program file format PLC Setup and other parameters: Data file format (binary format) I/O memory: Data file format (binary format), text format, or CSV format
		Functions for which Memory Card read/write is supported	User program instructions, Programming Devices (including Programming Consoles), Host Link computers
	Filing	Memory Card data and the EM (Extended Data Memory) Area can be handled as files.
	Debugging	Control set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed), storing location generating error when a program error occurs
	Online editing	User programs can be overwritten in program-block units when the CPU Unit is in MONITOR or PROGRAM mode. This function is not available for block programming areas.
	Program protection	Overwrite protection: Set using DIP switch. Copy protection: Password set using Programming Device.
	Error check	User-defined errors (i.e., user can define fatal errors and non-fatal errors) The FPD(269) instruction can be used to check the execution time and logic of each programming block.
	Error log	Up to 20 errors are stored in the error log. Information includes the error code, error details, and the time the error occurred.
	Serial communications	Built-in peripheral port: Programming Device (including Programming Console) connections, Host Links, NT Links Built-in RS-232C port: Programming Device (excluding Programming Console) connections, Host Links, no-protocol communications, NT Links
	Clock	Provided on all models. **Note:** Used to store the time when power is turned ON and when errors occur.
	Power OFF detection time	10 to 25 ms (not fixed)
	Power OFF detection delay time	0 to 10 ms (user-defined, default: 0 ms)
	Memory retention during power interruptions	Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of the counter Completion Flags and present values. **Note:** If the IOM Hold Bit in the Auxiliary Area is turned ON, and the PLC Setup is set to maintain the IOM Hold Bit status when power to the PLC is turned ON, the contents of the CIO Area, the Work Area, part of the Auxiliary Area, timer Completion Flags and PVs, Index Registers, and the Data Registers will be saved.
	Power OFF detection delay time	FINS commands can be sent to a computer connected via the Host Link System by executing Network Communications Instructions from the PLC.
	Remote programming and monitoring	Host Link communications can be used for remote programming and remote monitoring through a Controller Link System or Ethernet network.
	Eight-level communications (See note 1.)	Host Link communications can be used for remote programming and remote monitoring from devices on networks (Controller Link or Ethernet) across up to eight levels. (It is also possible to communicate between different kinds of networks.)
	Storing comments in CPU Unit	I/O comments can be stored in the CPU Unit in Memory Cards or EM file memory.
	Program check	Program checks are performed at the beginning of operation for items such as no END instruction and instruction errors.
	Control output signals	RUN output: The internal contacts will be ON (closed) while the CPU Unit is operating in RUN mode or MONITOR mode. These terminals are provided only on CS1D-PA207R Power Supply Units.
	Battery service life	The battery life is 5 years at an ambient temperature of 25°C, although the lifetime can be as short as 1.1 years under adverse temperature and power conditions. (Battery Set: CS1W-BAT01) (See note 2.)
	Self-diagnostics	CPU errors (watchdog timer), I/O verification errors, I/O bus errors, memory errors, and battery errors
	Other functions	Words in the Auxiliary Area store the number of power interruptions, time of the last power interruption, and total power ON time.

Note: 1. The eight-level communications capability is supported only in CS1D-CPU□□S CPU Units with unit version 2.0 or later. (Earlier unit versions and other CPU Unit models support three-level communications.)

2. Use a replacement battery that was manufactured within the last two years.

3. Immediate refreshing cannot be used in the CS1D-CPU□□H/P CPU Units. (It can be used in the CS1D-CPU□□S CPU Units.)

Functions Added by Unit Version

■ Function Supported by Unit Version

Function		CS1D-CPU□□H					CS1D-CPU□□S
CPU Unit model number		Duplex CPU, Single I/O Expansion System				Duplex CPU, Dual I/O Expansion System	Single CPU System
System	Unit version	No unit version	Ver. 1.1	Ver. 1.2	Ver. 1.3	Ver. 1.3	Ver. 2.0
Functions unique to CS1D CPU Units	Duplex CPU Units	OK	OK	OK	OK	OK	---
	Online Unit Replacement using a Programming Device	OK	OK	OK	OK	OK	OK
	Duplex Power Supply Units	OK	OK	OK	OK	OK	OK
	Duplex Controller Link Units	OK	OK	OK	OK	OK	OK
	Duplex Ethernet Units	---	OK	OK	OK	OK	OK
	Unit Removal without a Programming Device	---	---	OK	OK	OK	---
	Removal/Addition of Units without a Programming Device (See note 2.)	---	---	---	---	OK (See note 2.)	---
	Duplex Connecting Cables	---	---	---	---	OK	---
	Online Addition of Units and Backplanes	---	---	---	OK (See note 3.)	OK	---
	Online Replacement of Duplex Unit	---	---	---	OK	OK	---
Downloading and Uploading Individual Tasks		---	---	---	---	---	OK
Improved Read Protection Using Passwords		---	---	---	---	---	OK
Write Protection from FINS Commands Sent to CPU Units via Networks		---	---	---	---	---	OK
Online Network Connections without I/O Tables		---	---	---	---	---	OK
Communications through a Maximum of 8 Network Levels		---	---	---	---	---	OK
Connecting Online to PLCs via NS-series PTs		---	---	---	---	---	OK
Setting First Slot Words		---	---	---	---	---	OK (64 groups max.)
Automatic Transfers at Power ON without a Parameter File (.STD)		---	---	---	---	---	OK
Automatic Detection of I/O Allocation Method for Automatic Transfer at Power ON		---	---	---	---	---	---
Operation Start/End Times		---	OK	OK	OK	OK	OK
Automatic Allocation of Communications Ports		---	---	---	OK	OK	OK
Support of new instructions	MILH, MILR, MILC	---	---	---	---	---	OK
	= DT, <>DT, <DT, < = DT, >DT, > = DT	---	---	---	---	---	OK
	BCMP2	---	---	---	---	---	OK
	GRY	---	---	---	---	---	OK
	TPO	---	---	---	---	---	OK
	DSW, TKY, HKY, MTR, 7SEG	---	---	---	---	---	OK
	EXPLT, EGATR, ESATR, ECHRD, ECHWR	---	---	---	---	---	OK
	IORD/IOWR reading/writing to CPU Bus Units	---	---	---	---	---	OK
	PRV2	---	---	---	---	---	---

Note: 1. OK: Supported, ---: Not supported
2. The Removal/Addition of Units without a Programming Device function is supported only by CS1D CPU Units with unit version 1.3 or later and a Duplex CPU, Dual I/O Expansion System. If the Removal/Addition of Units without a Programming Device function is selected in a Duplex CPU, Single I/O Expansion System, the function operates as the earlier Unit Removal without a Programming Device function.
3. In a Duplex CPU, Single I/O Expansion System, only Basic I/O Units and Special I/O Units can be added with the Online Addition of Units and Backplanes function. The system may stop operating if an Expansion Backplane is added online.

■ Unit Versions and Programming Devices

CPU Unit	Function		CX-Programmer					Programming Console
			Ver. 3.2 or lower	Ver. 3.3	Ver. 4.0 to Ver. 6.0	Ver. 6.1	Ver. 7.0	
CS1D CPU Units for Single CPU Systems, Unit Ver. 2.0	Functions added for unit version 2.0	Using new functions	---	---	OK	OK	OK	No restrictions
		Not using new functions	---	---	OK	OK	OK	
CS1D CPU Units for Duplex CPU Systems, Unit Ver. 1.1	Functions added for unit version 1.1	Using new functions	---	---	OK	OK	OK	
		Not using new functions	OK	OK	OK	OK	OK	
CS1D CPU Units for Duplex CPU Systems, Unit Ver. 1.2	Functions added for unit version 1.2	Using new functions	---	---	OK	OK	OK	
		Not using new functions	OK	OK	OK	OK	OK	
CS1D CPU Units for Duplex CPU Systems, Unit Ver. 1.3	Functions added for unit version 1.3	Using new functions	---	---	---	---	OK (See note.)	Online addition of Units is not supported.
		Not using new functions	OK	OK	OK	OK	OK	

Note: 1. As shown above, there is no need to upgrade to CX-Programmer version 4.0 as long as the functions added for unit version 2.0 or unit version 1.1 are not used.
2. Support is planned in the next version upgrade. With CX-Programmer version 7.0, the auto update function can be used to expand the Unit's functions

Ordering Information

International Standards

- The standards indicated in the "Standards" column are those current for UL, CSA, cULus, cUL, NK, and Lloyd standards and EC Directives as of the end of October 2006. The standards are abbreviated as follows: U: UL, U1: UL Class I Division 2 Products for Hazardous Locations, C: CSA, UC: cULus, UC1: cULus Class I Division 2 Products for Hazardous Locations, CU: cUL, N: NK, L: Lloyd, and CE: ED Directives.
- Ask your OMRON representative for the conditions under which the standards were met.

EC Directives

The EC Directives applicable to PLCs include the EMC Directives and the Low Voltage Directive. OMRON complies with these directives as described below.

- **EMC Directives**

  Applicable Standards

EMI:	**EN61000-6-4**
	EN61131-2
EMS:	**EN61000-6-2**
	EN61131-2

  PLCs are electrical devices that are incorporated in machines and manufacturing installations. OMRON PLCs conform to the related EMC standards so that the devices and machines into which they are built can more easily conform to EMC standards. The actual PLCs have been checked for conformity to EMC standards. Whether these standards are satisfied for the actual system, however, must be checked by the customer.

  EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PLC is installed. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

Low Voltage Directive

- **Applicable Standard**

  EN61131-2

  Devices that operate at voltages from 50 to 1,000 VAC or 75 to 150 VDC must satisfy the appropriate safety requirements. With PLCs, this applies to Power Supply Units and I/O Units that operate in these voltage ranges.

  These Units have been designed to conform to EN61131-2, which is the applicable standard for PLCs.

Ordering Information

Basic System

SYSTEM 1 | CPU Rack (Duplex CPU, Dual I/O Expansion System)

The CPU Rack requires a CS1D CPU Backplane (for a Duplex CPU, Dual I/O Expansion System), one or two CS1D Power Supply Units, and two CS1D CPU Units (for a Duplex CPU, Dual I/O Expansion System or Single I/O Expansion System). When an Expansion Rack is connected, two I/O Control Units are required.

■ CS1D CPU Units

Name	Specifications						Current consumption (A)		Model	Standards
	Number of I/O points	Program capacity	Data Memory	LD execution time	Duplex CPUs	Interrupt functions	5 V system	26 V system		
CS1D CPU Unit for Duplex CPU Systems	5,120 points (7 Racks)	250 Ksteps	448 Kwords (DM: 32 Kwords, EM: 32 Kwords × 13 banks)	0.02 μs	OK	---	0.82 (See note 2.)	---	CS1D-CPU67H	UC1, N, L, CE
		60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords × 3 banks)				0.82 (See note 2.)	---	CS1D-CPU65H	

Note: 1. The interrupt functions cannot be used in a Duplex CPU, Dual I/O Expansion System.
2. NT-AL001 Link Adapters consume an additional 0.15 A each when used.

■ CS1D Process-control CPU Units

Name	Specifications		Current consumption (A)		Model	Standards
	CPU section	Loop control section	5 V system	26 V system		
CS1D Process-control CPU Unit	Equivalent to the CS1D-CPU65H	LCB05D Operation method: Function block method Number of function blocks: 500 blocks max. Minimum operation cycle: 100 ms PID control method: PID with two degrees of freedom (with autotuning function)	1.04	---	CS1D-CPU65P	UC1, N, CE
	Equivalent to the CS1D-CPU67H		1.04	---	CS1D-CPU67P	

Note: 1. The CS1W-LCB01/05 Loop Control Boards cannot be used in a CS1D-CPU□□H for Duplex CPU, Dual I/O Expansion Systems. If the system requires duplex Loop Control Boards, use the CS1D-CPU□□P Process-control CPU Units.
2. The interrupt functions cannot be used in a Duplex CPU, Dual I/O Expansion System or Duplex CPU, Single I/O Expansion System.

■ CS1D Duplex Unit

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Basic functions	Online Replacement	5 V system	26 V system		
CS1D Duplex Unit	Duplex CPU, Dual I/O Expansion System only	Duplex CPU Unit processing, error monitoring, and CPU Unit switching when error occurs	Supported	0.41	---	*NEW* CS1D-DPL02D	CE

■ CS1D Power Supply Units

Two Power Supply Units can be mounted in each Backplane (Rack) to duplex the power supplies.

When duplexing the power supplies, always use the same model of CS1D Power Supply Unit (CS1D-P□□□□).

When selecting a Power Supply Unit, verify that one Unit can satisfy the Rack's entire current consumption.

Name	Power supply voltage	Output capacity			Options		Model	Standards
		5 VDC output capacity	26 VDC output capacity	Total	24 V DC service power supply	RUN output		
AC Power Supply Unit	100 to 120 V AC or 200 to 240 V AC	7 A	1.3 A	35 W	No	Yes	CS1D-PA207R	UC1, N, L, CE
DC Power Supply Unit	24 V DC	4.3 A	0.56 A	28 W	No	No	CS1D-PD024	
		5.3 A	1.3 A	40 W			CS1D-PD025	

■ CS1D CPU Backplane

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Number of Power Supply Units	Number of I/O Units	5 V system	26 V system		
CS1D CPU Backplane	Duplex CPU, Dual I/O Expansion System only	2 Units max. (for duplex operation)	5 Units max. (including the I/O Control Units)	1.20	---	*NEW* CS1D-BC042D	CE

Note: C200H-series Units cannot be mounted.

SYSTEM 1	Expansion Racks (Dual I/O Expansion System)

Each Expansion Rack requires a CS1D Expansion Backplane (for a Duplex CPU, Dual I/O Expansion System), one or two CS1D Power Supply Units, and one or two I/O Interface Units.

■ CS1D Expansion Backplane

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Number of Power Supply Units	Number of I/O Units	5 V system	26 V system		
CS1D Expansion Backplane	Duplex CPU, Dual I/O Expansion System only	2 Units max. (for duplex operation)	9 Units max. (Slot number 0 is reserved for an I/O Interface Unit.)	1.21	---	*NEW* CS1D-BI082D	CE

Note: 1. C200H-series Units cannot be mounted.
   2. CS-series CPU Bus Units can be mounted in an Expansion Rack, but the I/O refreshing time is longer than it is when the CPU Bus Unit is mounted in the CPU Rack.

■ I/O Control Unit

When an Expansion Rack is being connected, mount the CS1D-IC102D I/O Control Unit in the left side of the CPU Backplane and connect the Connecting Cable. Two Units can be mounted to duplex the expansion bus.

Name	Specifications					Current consumption (A)		Model	Standards
	Applicable systems	Duplexing	Online Replacement	Mounting Backplane	Connecting Cable	5 V system	26 V system		
I/O Control Unit	Duplex CPU, Dual I/O Expansion System only	Supported	Supported	Expansion Backplane	CS1W-CN□□2 CS-series Connecting Cable	0.20	---	*NEW* CS1D-IC102D	CE

Note: Connecting Cables for Long-distance Racks (CV500-CN□□2) cannot be used.

■ CS1D I/O Interface Unit

When an Expansion Rack is being connected, mount the CS1D-II102D I/O Interface Unit in the left side of the CS1-series Expansion Backplane. Two Units can be mounted to duplex the expansion bus.

Name	Specifications					Current consumption (A)		Model	Standards
	Applicable systems	Duplexing	Online Replacement	Mounting Backplane	Connecting Cable	5 V system	26 V system		
CS1D I/O Interface Unit	Duplex CPU, Dual I/O Expansion System only	Supported	Supported	CPU Backplane	CS1W-CN□□2 CS-series Connecting Cable	0.22	---	*NEW* CS1D-II102D	CE

Note: Connecting Cables for Long-distance Racks cannot be used.

Basic System

SYSTEM 2	CPU Rack (Duplex CPU, Single I/O Expansion System)

The CPU Rack requires a CS1D CPU Backplane (for a Duplex CPU System), one or two CS1D Power Supply Units, and two CS1D CPU Units (for a Duplex CPU System). If the length of the Connecting Cables exceeds 12 m, a Long-distance Expansion System must be used and a Long-distance I/O Control Unit must be mounted.

■ CS1D CPU Units

Name	Specifications						Current consumption (A)		Model	Standards
	Number of I/O points	Program capacity	Data Memory	LD execution time	Duplex CPUs	Interrupt functions	5 V system	26 V system		
CS1D CPU Unit for Duplex CPU Systems	5,120 points (7 Racks)	250 Ksteps	448 Kwords (DM: 32 Kwords, EM: 32 Kwords × 13 banks)	0.02 μs	OK	---	0.82 (See note 2.)	---	CS1D-CPU67H	UC1, N, L, CE
		60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords × 3 banks)				0.82 (See note 2.)	---	CS1D-CPU65H	

Note: 1. The interrupt functions cannot be used in a Duplex CPU System.
2. NT-AL001 Link Adapters consume an additional 0.15 A each when used.

■ CS1D Process-control CPU Units

Name	Specifications		Current consumption (A)		Model	Standards
	CPU section	Loop control section	5 V system	26 V system		
CS1D Process-control CPU Unit	Equivalent to the CS1D-CPU65H	LCB05D Operation method: Function block method Number of function blocks: 500 blocks max. Minimum operation cycle: 100 ms PID control method: PID with two degrees of freedom (with autotuning function)	1.04	---	CS1D-CPU65P	UC1, N, CE
	Equivalent to the CS1D-CPU67H		1.04	---	CS1D-CPU67P	

Note: 1. The CS1W-LCB01/05 Loop Control Boards cannot be used in a CS1D-CPU□□H for Duplex CPU, Dual I/O Expansion Systems. If the system requires duplex Loop Control Boards, use the CS1D-CPU□□P Process-control CPU Units.
2. The interrupt functions cannot be used in a Duplex CPU System.

■ CS1D Duplex Unit

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Basic functions	Online Replacement	5 V system	26 V system		
CS1D Duplex Unit	Duplex CPU, Single I/O Expansion System only	Duplex CPU Unit processing, error monitoring, and CPU Unit switching when error occurs	Not supported	Total: 0.55	---	CS1D-DPL01	UC1, N, L, CE

■ CS1D Power Supply Units

Two Power Supply Units can be mounted in each Backplane (Rack) to duplex the power supplies.

When duplexing the power supplies, always use the same model of CS1D Power Supply Unit (CS1D-P□□□□).

When selecting a Power Supply Unit, verify that one Unit can satisfy the Rack's entire current consumption.

Name	Power supply voltage	Output capacity			Options		Model	Standards
		5 VDC output capacity	26 VDC output capacity	Total	24 V DC service power supply	RUN output		
AC Power Supply Unit	100 to 120 V AC or 200 to 240 V AC	7 A	1.3 A	35 W	No	Yes	CS1D-PA207R	UC1, N, L, CE
DC Power Supply Unit	24 V DC	4.3 A	0.56 A	28 W	No	No	CS1D-PD024	
		5.3 A	1.3 A	40 W			CS1D-PD025	

■ CS1D CPU Backplane

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Number of Power Supply Units	Number of I/O Units	5 V system	26 V system		
CS1D CPU Backplane	Duplex CPU, Single I/O Expansion System only	2 Units max. (for duplex operation)	5 Units max.	Total: 0.55	---	CS1D-BC052	UC1, N, L, CE

Note: C200H-series Units cannot be mounted.

SYSTEM 2	Expansion Racks (Single I/O or Long-distance Expansion System)

Each Expansion Rack requires a CS1D Expansion Backplane (for a Duplex CPU, Single I/O Expansion System), one or two CS1D Power Supply Units, and one or two I/O Interface Units. If the length of the Connecting Cables exceeds 12 m, a Long-distance Expansion System must be used and an I/O Interface Unit must be mounted.

■ CS1D Expansion Backplane

Always use the following Backplane for regular I/O expansion or long-distance expansion.

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Number of Power Supply Units	Number of I/O Units	5 V system	26 V system		
CS1D Expansion Backplane	Duplex CPU, Single I/O Expansion System only	2 Units max. (for duplex operation)	9 Units max.	0.28	---	CS1D-BI092	UC1, N, L, CE

Note: 1. C200H-series Units cannot be mounted.
2. CS-series CPU Bus Units can be mounted in an Expansion Rack, but the I/O refreshing time is longer than it is when the CPU Bus Unit is mounted in the CPU Rack.

■ I/O Control Unit

An I/O Control Unit is required only if the length of the Connecting Cables exceeds 12 m. In this case, mount an I/O Control Unit in the CPU Backplane and I/O Interface Units in the CS1 Expansion Backplanes and connect the Racks with Long-distance (CV500-CN□□2) Connecting Cables.

Name	Specifications					Current consumption (A)		Model	Standards
	Applicable systems	Duplexing	Online Replacement	Mounting Backplane	Connecting Cable	5 V system	26 V system		
I/O Control Unit	Duplex CPU, Single I/O Expansion System or Single CPU System	Not supported	Not supported	CPU Backplane	Long-distance Connecting Cable	0.92	---	CS1W-IC102	U, C, N, L, CE

■ I/O Interface Unit

An I/O Interface Unit is required only if the length of the Connecting Cables exceeds 12 m. In this case, mount I/O Interface Units in the CS1 Expansion Backplanes and connect the Racks with Long-distance (CV500-CN□□2) Connecting Cables.

Name	Specifications					Current consumption (A)		Model	Standards
	Applicable systems	Duplexing	Online Replacement	Mounting Backplane	Connecting Cable	5 V system	26 V system		
I/O Interface Unit	Duplex CPU, Single I/O Expansion System or Single CPU System	Not supported	Not supported	Expansion Backplane	Long-distance Connecting Cable	0.23	---	CS1W-II102	U, C, N, L, CE

Basic System

SYSTEM 3	CPU Rack (Single CPU System)

The CPU Rack requires a CS1D CPU Backplane (for a Single CPU System), one or two CS1D Power Supply Units, and a CS1D CPU Unit (for a Single CPU System). If the length of the Connecting Cables exceeds 12 m, a Long-distance Expansion System must be used and a Long-distance I/O Control Unit must be mounted.

■ CS1D CPU Units

Name	Specifications						Current consumption (A)		Model	Standards
	Number of I/O points	Program capacity	Data Memory	LD execution time	Duplex CPUs	Interrupt functions	5 V system	26 V system		
CS1D CPU Unit for Single CPU Systems	5,120 points (7 Racks)	250 Ksteps	448 Kwords (DM: 32 Kwords, EM: 32 Kwords × 13 banks)	0.02 μs	---	OK	0.82 (See note.)	---	CS1D-CPU67S	UC1, N, L, CE
	5,120 points (7 Racks)	60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords × 3 banks)				0.82 (See note.)	---	CS1D-CPU65S	
	1,280 points (3 Racks)	30 Ksteps	64 Kwords (DM: 32 Kwords, EM: 32 Kwords × 1 bank)	0.04 μs			0.78 (See note.)	---	CS1D-CPU44S	
	960 points (2 Racks)	10 Ksteps	64 Kwords (DM: 32 Kwords, EM: 32 Kwords × 1 bank)				0.78 (See note.)	---	CS1D-CPU42S	

Note: NT-AL001 Link Adapters consume an additional 0.15 A each when used.

■ CS1D Power Supply Units

Two Power Supply Units can be mounted in each Backplane (Rack) to duplex the power supplies.

When duplexing the power supplies, always use the same model of CS1D Power Supply Unit (CS1D-P□□□□).

When selecting a Power Supply Unit, verify that one Unit can satisfy the Rack's entire current consumption.

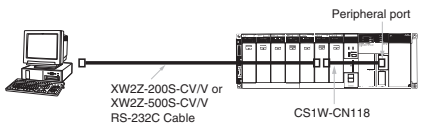| Name	Power supply voltage	Output capacity			Options		Model	Standards
		5 VDC output capacity	26 VDC output capacity	Total	24 V DC service power supply	RUN output		
AC Power Supply Unit	100 to 120 V AC or 200 to 240 V AC	7 A	1.3 A	35 W	No	Yes	CS1D-PA207R	UC1, N, L, CE
DC Power Supply Unit	24 V DC	4.3 A	0.56 A	28 W	No	No	CS1D-PD024	
		5.3 A	1.3 A	40 W			CS1D-PD025	

■ CS1D CPU Backplane

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Number of Power Supply Units	Number of I/O Units	5 V system	26 V system		
CS1D CPU Backplane	Single CPU System only	2 Units max. (for duplex operation)	8 slots max.	0.17	---	CS1D-BC082S	UC1, N, L, CE
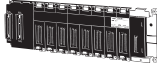
Note: C200H-series Units cannot be mounted.

SYSTEM 3	Expansion Racks (Single I/O or Long-distance Expansion System)

Each Expansion Rack requires a CS1D Expansion Backplane (for a Duplex CPU, Single I/O Expansion System), and one or two CS1D Power Supply Units. If the length of the Connecting Cables exceeds 12 m, a Long-distance Expansion System must be used and an I/O Interface Unit must be mounted.

■ CS1D Expansion Backplane

Always use the following Backplane for regular I/O expansion or long-distance expansion.

Name	Specifications			Current consumption (A)		Model	Standards
	Applicable systems	Number of Power Supply Units	Number of I/O Units	5 V system	26 V system		
CS1D Expansion Backplane	Duplex CPU, Single I/O Expansion System or Single CPU System	2 Units max. (for duplex operation)	9 Units max.	0.28	---	CS1D-BI092	UC1, N, L, CE

Note: 1. C200H-series Units cannot be mounted.

2. CS-series CPU Bus Units can be mounted in an Expansion Rack, but the I/O refreshing time is longer than it is when the CPU Bus Unit is mounted in the CPU Rack.

■ I/O Control Unit (Used for Long-distance Expansion)

An I/O Control Unit is required only if the length of the Connecting Cables exceeds 12 m. In this case, mount an I/O Control Unit in the CPU Backplane and I/O Interface Units in the CS1 Expansion Backplanes and connect the Racks with Long-distance (CV500-CN□□2) Connecting Cables.

Name	Specifications					Current consumption (A)		Model	Standards
	Applicable systems	Duplexing	Online Replacement	Mounting Backplane	Connecting Cable	5 V system	26 V system		
I/O Control Unit	Duplex CPU, Single I/O Expansion System or Single CPU System	Not supported	Not supported	CPU Backplane	Long-distance Connecting Cable	0.92	---	CS1W-IC102	U, C, N, L, CE

■ I/O Interface Unit

An I/O Interface Unit is required only if the length of the Connecting Cables exceeds 12 m. In this case, mount I/O Interface Units in the CS1 Expansion Backplanes and connect the Racks with Long-distance (CV500-CN□□2) Connecting Cables.

Name	Specifications					Current consumption (A)		Model	Standards
	Applicable systems	Duplexing	Online Replacement	Mounting Backplane	Connecting Cable	5 V system	26 V system		
I/O Interface Unit	Duplex CPU, Single I/O Expansion System or Single CPU System	Not supported	Not supported	Expansion Backplane	Long-distance Connecting Cable	0.23	---	CS1W-II102	U, C, N, L, CE

Connecting Cables (Compatible with All Systems)

Connecting Cables are always required when using Expansion Backplanes in a CS1D system.

Long-distance Connecting Cables are required only when connecting Expansion Racks at a long distance in a Duplex CPU, SIngle I/O Expansion System or Single CPU System.
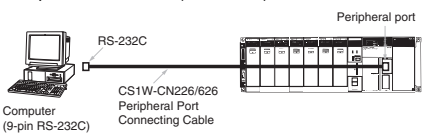
Name	Specifications			Model	Standards
	Applicable systems	Function	Cable length		
CS1-series Connecting Cables	All systems other than long-distance systems	Use to connect the expansion bus between the CPU Backplane and CS1 Expansion Backplanes	0.3 m	CS1W-CN313	N, L, CE
			0.7 m	CS1W-CN713	
			2 m	CS1W-CN223	
			3 m	CS1W-CN323	
			5 m	CS1W-CN523	
			10 m	CS1W-CN133	
			12 m	CS1W-CN133-B2	
Long-distance Connecting Cables	Duplex CPU, Single I/O Expansion Systems or Single CPU Systems (only with long-distance expansion)	In a Long-distance Expansion System, use to connect from the I/O Control Unit to an I/O Interface Unit or between I/O Interface Units.	0.3 m	CV500-CN312	
			0.6 m	CV500-CN612	
			1 m	CV500-CN122	
			2 m	CV500-CN222	
			3 m	CV500-CN322	
			5 m	CV500-CN522	
			10 m	CV500-CN132	
			20 m	CV500-CN232	
			30 m	CV500-CN332	
			40 m	CV500-CN432	
			50 m	CV500-CN532	
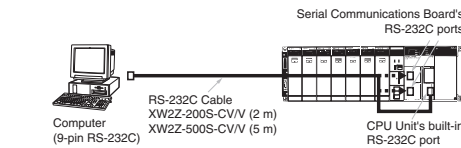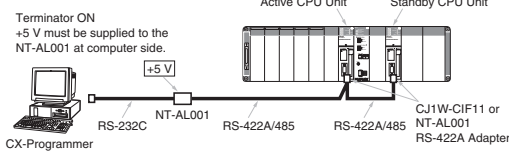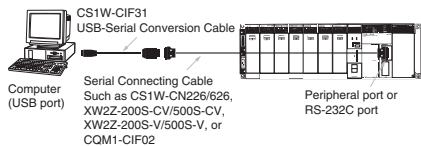
Programming Devices

■ Support Software

Name	Specifications			Model	Standards
			Media		
CX-One Ver. 2.0 FA Integrated Tool Package (Includes CX-Simulator Ver.1.□.)	CX-One is an FA Integrated Tool Package that integrates Support Software for OMRON's PLC and other Components. Operating System: Microsoft Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP CX-One version 2.0 includes CX-Programmer Ver. 7.□ and CX-Simulator Ver.1.□. For details, refer to the CX-One Introduction Guide (Cat. No. R145). **Note:** Site licenses are available for users who need to have CX-One installed on multiple computers. Contact your OMRON representative for details.	1 license	CD	CXONE-AL01C-EV2	---
			DVD	CXONE-AL01D-EV2	
		3 licenses	CD	CXONE-AL03C-EV2	
			DVD	CXONE-AL03D-EV2	
		10 licenses	CD	CXONE-AL10C-EV2	
			DVD	CXONE-AL10D-EV2	
		30 licenses	CD	CXONE-AL30C-EV2	
			DVD	CXONE-AL30D-EV2	
		50 licenses	CD	CXONE-AL50C-EV2	
			DVD	CXONE-AL50D-EV2	
	The CX-Programmer software can be purchased separately as before using the following model numbers.				
CX-Programmer Ver.7.□	Programming Support Software for PLCs Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP	1 license		WS02-CXPC1-E-V7□	---
		3 licenses		WS02-CXPC1-E03-V7□	
		10 licenses		WS02-CXPC1-E10-V7□	

■ Connecting Cables for CX-One Components (e.g. CX-Programmer)
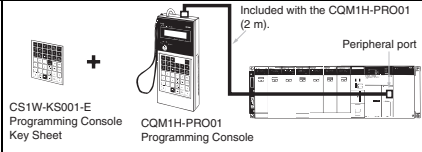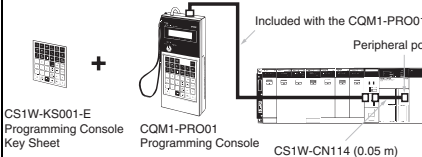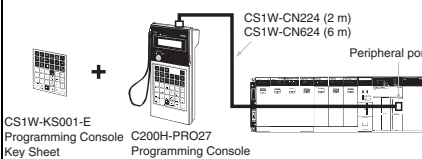
Name		Specifications				Model	Standards
		Applicable computers	Connection configuration	Cable length	Remarks		
Connecting Cables between Programming Device (computer) and peripheral port		IBM PC/AT or compatible computer (D-Sub 9-pin)	IBM PC/AT or compatible computer ↔ CS1W-CN226/626 ↔ Peripheral port of CPU Unit (See note.) Peripheral port RS-232C CS1W-CN226/626 Peripheral Port Connecting Cable Computer (9-pin RS-232C) **Note:** If the system is a Duplex CPU System, connect to the active CPU Unit.	2 m	Can be used for both peripheral bus and host link.	CS1W-CN226	CE
				6 m		CS1W-CN626	
			The following configuration can be used when using an RS-232C cable to connect to an IBM PC/AT or compatible computer. IBM PC/AT or compatible computer ↔ XW2Z-200S-CV/V or XW2Z-500S-CV/V ↔ Peripheral port of CPU Unit (See note.) Peripheral port XW2Z-200S-CV/V or XW2Z-500S-CV/V RS-232C Cable CS1W-CN118 **Note:** If the system is a Duplex CPU System, connect to the active CPU Unit.	0.1 m	Use when connecting to the peripheral port with a CXW2Z-200S-CV/V or XW2Z-500S-CV/V RS-232C Cable.	CS1W-CN118	

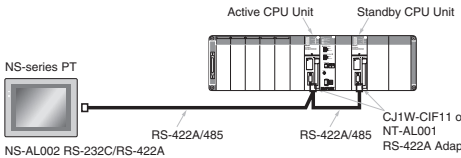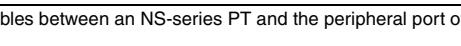| Name	Specifications				Model	Standards
	Applicable computers	Connection configuration	Cable length	Remarks		
Connecting Cables between Programming Device (computer) and RS-232C port	IBM PC/AT or compatible computer (D-Sub 9-pin)	IBM PC/AT or compatible computer ↔ XW2Z-200S-CV/V or XW2Z-500S-CV/V ↔ RS-232C port of CPU Unit (see note 1) or Serial Communications Board/Unit Serial Communications Board's RS-232C ports RS-232C Cable XW2Z-200S-CV/V (2 m) XW2Z-500S-CV/V (5 m) Computer (9-pin RS-232C) CPU Unit's built-in RS-232C port **Note: 1.** If the system is a Duplex CPU System, connect to the active CPU Unit. **2.** We recommend the following configuration if the CX-Programmer is always connected and you want to avoid switching to the other CPU Unit when an error occurs. Terminator ON +5 V must be supplied to the NT-AL001 at computer side. Active CPU Unit Standby CPU Unit +5 V RS-232C NT-AL001 RS-422A/485 RS-422A/485 CX-Programmer CJ1W-CIF11 or NT-AL001 RS-422A Adapter	2 m	Can be used for both peripheral bus and host link, and is equipped with an anti-static connector.	XW2Z-200S-CV	---
			5 m		XW2Z-500S-CV	
			2 m	Can be used for host link only. Cannot be used for peripheral bus.	XW2Z-200S-V	
			5 m		XW2Z-500S-V	
USB-Serial Conversion Cable (PC driver CD-ROM included) **Conforms to USB 1.1 Specifications.**	IBM PC/AT or compatible computer (USB port)	IBM PC/AT or compatible computer ↔ CS1W-CIF31 ↔ CS1W-CN226/626 ↔ Peripheral port of CPU Unit (See note.) CS1W-CIF31 USB-Serial Conversion Cable Computer (USB port) Serial Connecting Cable Such as CS1W-CN226/626, XW2Z-200S-CV/500S-CV, XW2Z-200S-V/500S-V, or CQM1-CIF02 Peripheral port or RS-232C port **Note:** If the system is a Duplex CPU System, connect to the active CPU Unit.	The USB-Serial Conversion Cable connects to the serial connecting cable, which connects to the PLC's peripheral port or RS-232C port.			
			0.5 m	Can be used for both peripheral bus and host link.	CS1W-CIF31	---
		IBM PC/AT or compatible computer ↔ CS1W-CIF31 ↔ XW2Z-200S-CV/500S-CV ↔ CS1W-CN118 ↔ Peripheral port of CPU Unit		Can be used for both peripheral bus and host link.		
		IBM PC/AT or compatible computer ↔ CS1W-CIF31 ↔ XW2Z-200S-V/500S-V ↔ CS1W-CN118 ↔ Peripheral port of CPU Unit		Can be used for host link only. Cannot be used for peripheral bus.		
		IBM PC/AT or compatible computer ↔ CS1W-CIF31 ↔ XW2Z-200S-CV/500S-CV ↔ CS1W-CN118 ↔ RS-232C port of CPU Unit or Serial Communications Board/Unit		Can be used for both peripheral bus and host link.		
		IBM PC/AT or compatible computer ↔ CS1W-CIF31 ↔ XW2Z-200S-V/500S-V ↔ RS-232C port of CPU Unit or Serial Communications Board/Unit		Can be used for host link only. Cannot be used for peripheral bus.		
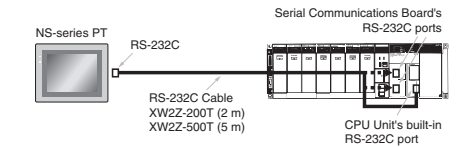
Note: Either of the serial communications modes listed in the following table can be used to connect CX-One Support Software (e.g., the CX-Programmer) to a CS1-series PLC.

Serial communications mode	Features
Peripheral bus	This mode can provide high-speed communications, so this mode is normally used to connect when using CX-One component software such as the CX-Programmer. • Supports 1:1 connections only. • The Programming Device's baud rate can be detected automatically and matched.
Host Link (SYSWAY)	This is a general host computer communications protocol, which supports 1:1 and 1:N connections. • Host link operates at a slower speed than peripheral bus. • Host link supports 1:N connections as well as long-distance connections when RS-422A/RS-485 is used for a connection through a modem or optical adapter.

■ Programming Consoles

Name	Specifications	Cable model (Separate item)	Connection configuration	Model	Standards
Programming Console	Can be connected to the CPU Unit's peripheral port only (see note). Cannot be connected to the RS-232C port. A CS1W-KS001-E Programming Console Key Sheet is required (sold separately). **Note:** If the system is a Duplex CPU System, connect to the active CPU Unit.	Not required (Cable included)	CS1W-KS001-E Programming Console Key Sheet **+** CQM1H-PRO01 Programming Console — Included with the CQM1H-PRO01 (2 m). Peripheral port	CQM1H-PRO01-E	U, C, N, CE
		CS1W-CN114: 0.05 m	CS1W-KS001-E Programming Console Key Sheet **+** CQM1-PRO01 Programming Console — Included with the CQM1-PRO01. Peripheral port CS1W-CN114 (0.05 m)	CQM1-PRO01-E	
		CS1W-CN224: 2 m CS1W-CN624: 6 m	CS1W-KS001-E Programming Console Key Sheet **+** C200H-PRO27 Programming Console — CS1W-CN224 (2 m) CS1W-CN624 (6 m) Peripheral port	C200H-PRO27-E	
Programming Console Key Sheet	For the following Programming Consoles: CQM1H-PRO01, C200H-PRO27, and CQM1-PRO01			CS1W-KS001-E	CE
Programming Console Connecting Cable	For CQM1-PRO01 connection, Cable length: 0.05 m			CS1W-CN114	
	For C200H-PRO27 connection, Cable length: 2 m			CS1W-CN224	
	For C200H-PRO27 connection, Cable length: 6 m			CS1W-CN624	
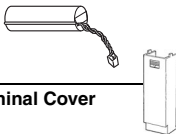
■ Connecting Cables for NS-series PTs

Name	Specifications		Model	Standards
	Connection configuration	Cable length		
Connecting Cables for NS-series PTs	Connecting Cables between an NS-series PT and the RS-232C port of CPU Unit (see note 1) or Serial Communications Board/Unit NS-series PT — RS-232C — Serial Communications Board's RS-232C ports — RS-232C Cable XW2Z-200T (2 m) XW2Z-500T (5 m) — CPU Unit's built-in RS-232C port **Note: 1.** If the system is a Duplex CPU System, connect to the active CPU Unit. **2.** We recommend the following configuration if the PT is always connected to a Duplex CPU System for monitoring.	2 m	XW2Z-200T	---
	Active CPU Unit Standby CPU Unit NS-series PT — RS-422A/485 — RS-422A/485 — CJ1W-CIF11 or NT-AL001 RS-422A Adapter NS-AL002 RS-232C/RS-422A Converter for NS-series PTs Note: The Converter is not required when connecting to a PT's RS-422A/485 port.	5 m	XW2Z-500T	
	Connecting Cables between an NS-series PT and the peripheral port of CPU Unit	2 m	XW2Z-200T-2	
		5 m	XW2Z-500T-2	

Accessories and Maintenance Parts

Name	Specifications	Model	Standards
Memory Cards	Flash Memory, 30 MB	HMC-EF372	N, L, CE
	Flash Memory, 64 MB	HMC-EF672	
	Flash Memory, 128 MB	HMC-EF183 _NEW_	
	Memory Card Adapter (Adapts to a computer's PCMCIA card slot.)	HMC-AP001	CE

Note: The HMC-EF372 and HMC-EF672 Memory Cards cannot be used with CS1G-CPU☐☐H, CS1H-CPU☐☐H, CJ1G-CPU☐☐H, or CJ1H-CPU☐☐H CPU Units with lot numbers of 020108 or earlier (manufactured 8 January 2002 or earlier), or NS7-series PTs with lot numbers of 0852 or earlier (manufactured 8 May 2002 or earlier).

Name	Specifications	Model	Standards
Battery Set	Battery for CS-series maintenance **Note: 1.** A battery is included with the CPU Unit as standard equipment. **2.** The battery life is 5 years at an ambient temperature of 25×C, although the lifetime can be as short as 1.1 years under adverse temperature and power conditions. **3.** Use a replacement battery that was manufactured within the last two years.	CS1W-BAT01	L, CE
I/O Terminal Cover	Cover for 10-pin Terminal Blocks	C200H-COV11	---
Terminal Block Cover	Short-circuit protection for 10-pin Terminal Blocks (package of 10 covers); for 8 I/O points	C200H-COV02	
	Short-circuit protection for 19-pin Terminal Blocks (package of 10 covers); for 12 I/O points	C200H-COV03	
Connector Cover	Protective cover for unused Power Supply Unit connector in CS1D Backplane	C500-COV01	
	Protective cover for unused CS-series Unit connector in Backplane	CV500-COV01	
Space Units	For unused I/O slot spaces In the CS1D-BC☐☐(S) or CS1D-BI☐☐☐ Backplanes	CS1W-SP001	
	For unused power supply slot spaces (same shape as PA207R)	CS1D-SP001	
	For unused power supply slot spaces (same shape as PD024)	CS1D-SP002	
Programming Console Mounting Bracket	Use to mount a C200H-PRO27 Programming Console in a control panel.	C200H-ATT01	
Terminator	Connect a Terminator to the last CS1D Long-distance Expansion Rack in each series (for use with the CS1W-IC102). Two Terminators are included with the CS1W-IC102 I/O Control Unit.	CV500-TER01	U, C

DIN Track Mounting Accessories

Name	Specifications	Model	Standards
DIN Track Mounting Bracket	1 set (package of 2 brackets)	C200H-DIN01	---
DIN Track	Track length: 50 cm Height: 7.3 mm	PFP-50N	
	Track length: 1 m Height: 7.3 mm	PFP-100N	
	Track length: 1 m Height: 16 mm	PFP-100N2	
End Plate	**Note:** Order in lots of 10.	PFP-M	
Spacer		PFP-S	

Configuration Units: Basic I/O Units

Basic I/O Units can be used in all of the CS1D systems: Duplex CPU Dual I/O Expansion System, Duplex CPU Single I/O Expansion System, and Single CPU System. In addition, there are no restrictions on the mounting location based on the type of expansion system being used, except for some special Units such as Interrupt Input Units.

■ Input Units

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
		Number of I/O points	Input voltage and current		5 V system	26 V system		
CS1 Basic I/O Unit	DC Input Unit	16 inputs	24 V DC, 7 mA	1 word	0.10	---	CS1W-ID211	UC1, N, L, CE
		32 inputs	24 V DC, 6 mA	2 words	0.15	---	CS1W-ID231	
		64 inputs	24 V DC, 6 mA	4 words	0.15	---	CS1W-ID261	
		96 inputs	24 V DC, approx. 5 mA	6 words	0.20	---	CS1W-ID291	U, C, N, L, CE
	AC Input Unit	16 inputs	100 to 120 V AC 100 to 120 V DC	1 word	0.11	---	CS1W-IA111	UC1, N, L, CE
		16 inputs	200 to 240 V AC	1 word	0.11	---	CS1W-IA211	UC, N, L, CE

■ Output Units

Unit type	Name	Specifications			Words required	Current consumption (A)		Model	Standards
		Number of I/O points	Switching capacity			5 V system	26 V system		
CS1 Basic I/O Unit	Relay Output Units	8 outputs	250 V AC or 24 V DC, 2 A max. Independent contacts		1 word	0.10	0.048 max.	CS1W-OC201	UC1, N, L, CE
		16 outputs	250 V AC or 24 V DC, 2 A max.		1 word	0.13	0.096 max.	CS1W-OC211	
	Transistor Output Units	16 outputs	12 to 24 V DC, 0.5 A	Sinking	1 word	0.17	---	CS1W-OD211	
			24 V DC, 0.5 A	Sourcing	1 word	0.17	---	CS1W-OD212	U, C, N, L, CE
		32 outputs	12 to 24 V DC, 0.5 A	Sinking	2 words	0.27	---	CS1W-OD231	UC1, N, L, CE
			24 V DC, 0.5 A	Sourcing	2 words	0.27	---	CS1W-OD232	U, C, N, L, CE
		64 outputs	12 to 24 V DC, 0.3 A	Sinking	4 words	0.39	---	CS1W-OD261	UC1, N, L, CE
			24 V DC, 0.3 A	Sourcing	4 words	0.39	---	CS1W-OD262	
		96 outputs	12 to 24 V DC, 0.1 A	Sinking	6 words	0.48	---	CS1W-OD291	U, C, N, L, CE
			12 to 24 V DC, 0.1 A	Sourcing	6 words	0.48	---	CS1W-OD292	
	Triac Output Units	8 outputs	250 V AC, 1.2 A max.		1 word	0.23 max.	---	CS1W-OA201	UC, N, L, CE
		16 outputs	250 V AC, 0.5 A max.		1 word	0.406 max.	---	CS1W-OA211	

■ Mixed I/O Units

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
		Number of I/O points	Input voltage and current, or Switching capacity		5 V system	26 V system		
CS1 Basic I/O Unit	DC Input/ Transistor Output Unit	32 inputs, 32 outputs	Inputs: 24 V DC, 6 mA Outputs: 0.3 A output at 12 to 24 V DC, Sinking	2 input words and 2 output words	0.27	---	CS1W-MD261	UC1, N, L, CE
		32 inputs, 32 outputs	Inputs: 24 V DC, 6 mA Outputs: 0.3 A output at 24 V DC, Sourcing		0.27	---	CS1W-MD262	U, C, N, L, CE
		48 inputs, 48 outputs	Inputs: 24 V DC, approx. 5 mA Outputs: 0.1 A output at 12 to 24 V DC, Sinking	3 input words and 3 output words	0.35	---	CS1W-MD291	
		48 inputs, 48 outputs	Inputs: 24 V DC, approx. 5 mA Outputs: 0.1 A output at 24 V DC, Sourcing		0.35	---	CS1W-MD292	
	TTL I/O Unit	32 inputs, 32 outputs	5 VDC	2 input words and 2 output words	0.27	---	CS1W-MD561	UC, N, L, CE

■ Interrupt Input Unit

Unit type	Name	Specifications					Words required	Current consumption (A)		Model	Standards
		Number of I/O points	Voltage	Current	Pulse width of input signal		External connections		5 V system	26 V system		
					ON time	OFF time						
CS1 Basic I/O Unit	Interrupt Input Unit	16 inputs	24 VDC	7 mA	0.1 ms min.	0.5 ms min.	Removable terminal block	1 word	0.10	---	CS1W-INT01	UC1, N, L, CE

Note: 1. An Interrupt Input Unit cannot be used in the CPU Rack of a Duplex CPU System. (The Interrupt Input Unit will function as a standard Input Unit.) An Interrupt Input Unit can be used in the CPU Rack of a Single CPU System to generate interrupt inputs.

2. An Interrupt Input Unit cannot be used in a CS1D Expansion Rack to generate interrupt inputs. (The Interrupt Input Unit will function as a standard Input Unit.)

■ High-speed Input Unit

Unit type	Name	Specifications					Words required	Current consumption (A)		Model	Standards
		Number of I/O points	Input voltage	Input current	Readable input signal pulse width (ON time)	External connections		5 V system	26 V system		
CS1 Basic I/O Unit	High-speed Input Unit	16 inputs	24 VDC	7 mA	0.1 ms min.	Removable terminal block	1 word	0.10	---	CS1W-IDP01	UC1, N, L, CE

■ B7A Interface Units

| Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
		Number of I/O points	Voltage and current,		5 V system	26 V system		
CS1 Basic I/O Unit	B7A Interface Unit	32 inputs	12 to 24 VDC ±10%, 20 mA min.	2 words	0.09	---	CS1W-B7A12	U, CE
		32 outputs	12 to 24 VDC ±10%, 60 mA min.	2 words	0.09	---	CS1W-B7A02	
		16 inputs and 16 outputs	12 to 24 VDC ±10%, 30 mA min.	1 input word and 1 output word	0.09	---	CS1W-B7A21	
		32 inputs and 32 outputs	12 to 24 VDC ±10%, 60 mA min.	2 input words and 2 output words	0.09	---	CS1W-B7A22	

■ Safety Relay Unit

Unit type	Name	Specifications						Words required	Current consumption (A)		Model	Standards
		Function	Power supply voltage	Number of input words	Contact type (Safety output)	Number of general inputs	External connections		5 V system	26 V system		
CS1 Basic I/O Unit	Safety Relay Unit	Emergency stop Unit	24 VDC	1 word or 2 words (Shared inputs)	Form 2A (DPST-NO)	4 inputs/common	Removable terminal block	1 word	0.10	---	CS1W-SF200	U, C, CE

Configuration Units: Special I/O Units, CPU Bus Units, and Inner Boards

Special I/O Units can be used in all of the CS1D systems: Duplex CPU Dual I/O Expansion System, Duplex CPU Single I/O Expansion System, and Single CPU System. In addition, there are no restrictions on the mounting location based on the type of expansion system being used.

■ Temperature Sensor Input Units (Process Analog I/O Units)

Unit type	Name	Specifications					Words required	Current consumption (A)		Model	Standards
		Number of inputs	Signal selection	Signal ranges	Conversion speed	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Isolated-type Thermocouple Input Units	4	4 independent	B, E, J, K, N, R, S, T, U, WRe5-26, PL II, ±100 mV	20 ms/ 4 inputs, 10 ms/ 2 inputs	Removable terminal block	1 unit number's words	0.12	0.08	CS1W-PTS11	UC1, N, CE
		4	4 independent	R, S, K, J, T, L, B	250 ms/ 4 inputs			0.25	---	CS1W-PTS51	UC1, CE
		8	8 independent	R, S, K, J, T, L, B	250 ms/ 8 inputs			0.18	0.06	CS1W-PTS55	
		4	4 independent	B, E, J, K, N, R, S, T, ±80 mV	150 ms/ 4 inputs			0.15	0.15	CS1W-PTS01-V1	
	Isolated-type Resistance Thermometer Input Units	4	4 independent	Pt100 Ω (JIS, IEC), JPt100 Ω, Pt50 Ω, Ni508.4 Ω	20 ms/ 4 inputs, 10 ms/ 2 inputs			0.12	0.07	CS1W-PTS12	UC1, N, CE
		4	4 independent	Pt100 Ω (JIS, IEC), JPt100 Ω	250 ms/ 4 inputs			0.25	---	CS1W-PTS52	UC1, CE
		8	8 independent	Pt100 Ω (JIS, IEC), JPt100 Ω	250 ms/ 8 inputs			0.18	0.06	CS1W-PTS56	
		4	4 independent	Pt100 Ω (JIS, IEC), JPt100 Ω	100 ms/ 4 inputs			0.15	0.15	CS1W-PTS02	
	Isolated-type Resistance Thermometer Input Unit (Ni508.4 Ω)	4	4 independent	Ni508.4 Ω	100 ms/ 4 inputs			0.15	0.15	CS1W-PTS03	

■ Analog Input Units

Analog Input Units

Unit type	Name	Specifications						Words required	Current consumption (A)		Model	Standards
		I/O points	Signal selection	Signal ranges	Resolution	Conversion speed	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Analog Input Units	4 inputs	4 independent	1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA	1/8,000 (Can also be set to 1/4,000.)	250 μs/input (Can also be set to 1 ms/input.)	Removable terminal block	1 unit number's words	0.12	0.09	CS1W-AD041-V1	UC1, N, CE
		8 inputs	8 independent	1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA	1/8,000 (Can also be set to 1/4,000.)	250 μs/input (Can also be set to 1 ms/input.)			0.12	0.09	CS1W-AD081-V1	
		16 inputs	16 independent				MIL connector	2 unit numbers' words	0.15	0.06	CS1W-AD161	UC1, CE
	Connector-Terminal Block Conversion Unit	For CS1W-AD161									XW2D-34G6	---
											XW2Z-200C	

Process Analog Input Units such as Isolated-type DC Input Units

Unit type	Name	Specifications				Words required	Current consumption (A)		Model	Standards
		Number of inputs	Signal ranges	Conversion speed	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Isolated-type DC Input Units	4	4 to 20 mA, 0 to 20 mA, 0 to 10 V, ±10 V, 0 to 5 V, ±5 V, 1 to 5 V, 0 to 1.25 V, ±1.25 V	20 ms/4 inputs, 10 ms/2 inputs	Removable terminal block	1 unit number's words	0.12	0.12	CS1W-PDC11	UC1, N, CE
		8	4 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V,	250 ms/ 8 inputs			0.18	0.06	CS1W-PDC55	UC1, CE
		4	4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, ±5 V, 0 to 10 V, ±10 V	100 ms/ 4 inputs			0.15	0.16	CS1W-PDC01	
	Isolated-type 2-Wire Transmitter Input Unit	4	4 to 20 mA, 1 to 5 V	100 ms/ 4 inputs			0.15	0.16	CS1W-PTW01	
	Power Transducer Input Unit	8	0 to 1 mA, ±1 mA	200 ms/ 8 inputs			0.15	0.08	CS1W-PTR01	
	DC Analog Input Unit (100 mV)	8	0 to 100 mV, ±100 mV	200 ms/ 8 inputs			0.15	0.08	CS1W-PTR02	

■ Analog Output Units

Analog Output Units

Unit type	Name	Specifications						Words required	Current consumption (A)		Model	Standards
		Number of outputs	Signal selection	Signal ranges	Resolution	Conversion speed	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Analog Output Units	4	4 independent	1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA	1/4,000	1 ms/output	Removable terminal block	1 unit number's words	0.13	0.18	CS1W-DA041	UC1, N, L, CE
		8	8 independent	1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V	1/4,000	1 ms/output			0.13	0.18	CS1W-DA08V	U, C, N, L, CE
		8	8 independent	4 to 20 mA	1/4,000	1 ms/output			0.13	0.25	CS1W-DA08C	

Isolated-type Control Output Units (Process Analog I/O Units)

Unit type	Name	Specifications					Words required	Current consumption (A)		Model	Standards
		Number of outputs	Signal selection	Signal ranges	Conversion speed	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Isolated-type Control Output Unit	4	4 independent	4 to 20 mA, 1 to 5 V	100 ms/4 outputs	Removable terminal block	1 unit number's words	0.15	0.16	CS1W-PMV01	UC1, CE
		4	4 independent	0 to 10 V, ±10 V, 0 to 5 V, ±5 V, 0 to 1V, ±1 V	40 ms/4 outputs			0.12	0.12	CS1W-PMV02	

■ Analog I/O Unit

Unit type	Name	Specifications						Words required	Current consumption (A)		Model	Standards
		I/O points	Signal selection	Signal ranges	Resolution	Conversion speed	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Analog I/O Unit	4 inputs	4 independent	1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA	1/4,000	1 ms/input	Removable terminal block	1 unit number's words	0.20	0.20	CS1W-MAD44	U, C, N, L, CE
		4 outputs		1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V	1/4,000	1 ms/output						

■ Isolated-type Pulse Input Unit (Process Analog I/O Unit)

Unit type	Name	Specifications						Words required	Current consumption (A)		Model	Standards
		Number of inputs	Input type selection	Pulse input types	Highest input rate	Accumulation conversion period	External connections		5 V system	26 V system		
CS1 Special I/O Unit	Isolated-type Pulse Input Unit	4	4 independent	Voltage input, no-voltage semiconductor input, and contact input	0 to 20,000 pulses/s or 0 to 20 pulses/s	100 ms/ 4 inputs	Removable terminal block	1 unit number's words	0.20	0.16	CS1W-PPS01	UC1, CE

■ Loop Control Boards and Loop Control Units

Unit type	Name	Specifications	Words required	Current consumption (A)		Model	Standards
				5 V system	26 V system		
CS1 Inner Board	Loop Control Boards	**LCB01** Operation method: Function block method Number of function blocks: 50 blocks max. (total control blocks and operation blocks) Minimum operation cycle: 10 ms PID control method: PID with two degrees of freedom (with autotuning function)	---	0.22 (See note 1.)	---	CS1W-LCB01	UC1, N, CE
		LCB05 Operation method: Function block method Number of function blocks: 500 blocks max. (total control blocks and operation blocks) Minimum operation cycle: 10 ms PID control method: PID with two degrees of freedom (with autotuning function)		0.22 (See note 1.)	---	CS1W-LCB05	
CS1 CPU Bus Unit	Loop Control Units	Number of control loops: 32 loops max. Number of operation blocks: 250 max.	1 unit number's words	0.36	---	CS1W-LC001	UC1, N, CE
Support Software	CX-One Ver. 2.0 FA Integrated Tool Package	CX-One version 2.0 includes CX-Process Tool Ver. 5.□ and Face Plate Auto-Builder Ver. 3.□. For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP	1 license Media: CD (See note 2.)			CXONE-AL01C-EV2	---
		The CX-Process Tool and Face Plate Auto-Builder software can also be purchased separately as before using the following model numbers.					
	CX-Process Tool Ver. 5.□	Support Software for Loop Controllers Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP	1 license			WS02-LCTC1-EV5	
	Face Plate Auto-Builder for NS-series Ver. 3.□	Screen Data Auto-builder Support Software for NS-series PTs Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP	1 license			WS02-NSFC1-EV3	
	CX-Process Monitor Plus Ver. 2.□	Monitoring Software for Loop Controllers Operating System: Microsoft Windows NT 4.0 (Service Pack 6a or higher), 2000 Prefessional (Service Pack 4 or higher), or XP Professional	1 license			WS02-LCMC1-EV2	
			3 licenses			WS02-LCMC1-JV2L03	

Note: 1. NT-AL001 Link Adapters consume an additional 0.15 A each when used.
**2.** The CX-One software is available in two media formats: CD and DVD. (For details, refer to page 43.)

■ High-speed Counter Units

Unit type	Name	Number of count channels	Encoder A and B inputs, and Z pulse input signal	Maximum count speed	Words required	Current consumption (A)		Model	Standards
						5 V system	26 V system		
CS1 Special I/O Unit	High-speed Counter Units	2	Open collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (only 1 axis for 5 V or 12 V input)	50 kcps	4 unit numbers' words	0.36	---	CS1W-CT021	UC, N, L, CE
			RS-422 line driver	500 kcps					
		4	Open collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (up to 2 axes for 5 V or 12 V input)	50 kcps		0.45	---	CS1W-CT041	
			RS-422 line driver	500 kcps					

■ Customizable Counter Units

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
					5 V system	26 V system		
CS1 Special I/O Unit	Customizable Counter Units	Two-axis pulse input Two-axis pulse output	12 DC inputs 8 transistor outputs	1 unit number's words	0.80	---	CS1W-HCP22-V1	U, C, CE
		Single-axis pulse input 1 analog input 2 analog outputs	12 DC inputs 8 transistor outputs		0.75	0.15	CS1W-HCA12-V1	
		Two-axis pulse input 2 analog outputs	12 DC inputs 8 transistor outputs		0.75	0.15	CS1W-HCA22-V1	
		---	12 DC inputs 8 transistor outputs		0.60	---	CS1W-HIO01-V1	

■ MECHATROLINK-II-compatible Position Control Unit

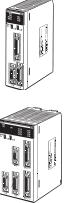| Unit type	Name	Specifications	Words required	Current consumption (A)		Model	Standards
				5 V system	26 V system		
CS1 CPU Bus Unit	Position Control Unit	MECHATROLINK-II-compatible Position Control Unit	1 unit number's words	0.36	---	CS1W-NCF71	UC1, CE
	CX-One Ver. 2.0 FA Integrated Tool Package (Includes CX-Motion-NCF Ver.1.□.)	CX-One version 2.0 includes CX-Motion-NCF Ver.1.□. For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP	1 license Media: CD (See note.)			CXONE-AL01C-EV2	---

Note: The CX-One software is available in two media formats: CD and DVD.

■ Position Control Units

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
		Number of axes	Control output interface		5 V system	26 V system		
CS1 Special I/O Unit	**Position Control Unit**	1	Pulse-train, open-collector outputs	1 unit number's words	0.25	---	CS1W-NC113	U, C, N, L, CE
		2			0.25	---	CS1W-NC213	
		4		2 unit numbers' words	0.36	---	CS1W-NC413	
		1	Pulse-train, line-driver outputs	1 unit number's words	0.25	---	CS1W-NC133	
		2			0.25	---	CS1W-NC233	
		4		2 unit numbers' words	0.36	---	CS1W-NC433	
	CX-One Ver. 2.0 FA Integrated Tool Package (Includes CX-Position Ver.2.□.)	CX-One version 2.0 includes CX-Position Ver.2.□ For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP		1 license Media: CD (See note.)			CXONE-AL01C-EV2	---
	Computer connecting cable	Shares the same cable with CX-One.						---
	Relay Unit for Single-axis Servo	For use with the CS1W-NC1□3					XW2B-20J6-1B	---
	Relay Unit for Two-axis Servo	For use with the CS1W-NC2□3/NC4□3					XW2B-40J6-2B	
	Connecting Cable for Single-axis W or U Series	For use with the CS1W-NC113		0.5 m			XW2Z-050J-A6	
				1 m			XW2Z-100J-A6	
	Connecting Cable for Two-axis W or U Series	For use with the CS1W-NC213/NC413		0.5 m			XW2Z-050J-A7	
				1 m			XW2Z-100J-A7	
	Connecting Cable for Single-axis SMARTSTEP	For use with the CS1W-NC113		0.5 m			XW2Z-050J-A8	
				1 m			XW2Z-100J-A8	
	Connecting Cable for Two-axis SMARTSTEP	For use with the CS1W-NC213/NC413		0.5 m			XW2Z-050J-A9	
				1 m			XW2Z-100J-A9	
	Connecting Cable for Single-axis W or U Series	For use with the CS1W-NC133		0.5 m			XW2Z-050J-A10	
				1 m			XW2Z-100J-A10	
	Connecting Cable for Two-axis W or U Series	For use with the CS1W-NC233/NC433		0.5 m			XW2Z-050J-A11	
				1 m			XW2Z-100J-A11	
	Connecting Cable for Single-axis SMARTSTEP	For use with the CS1W-NC133		0.5 m			XW2Z-050J-A12	
				1 m			XW2Z-100J-A12	
	Connecting Cable for Two-axis SMARTSTEP	For use with the CS1W-NC233/NC433		0.5 m			XW2Z-050J-A13	
				1 m			XW2Z-100J-A13	

Note: The CX-One software is available in two media formats: CD and DVD.

■ Motion Control Units

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
					5 V system	26 V system		
CS1 Special I/O Unit	Motion Control Units	4 axes	G-language programming, analog outputs	5 unit numbers' words	0.70 (1.00 A when a Teaching Box is connected)	---	CS1W-MC421-V1	U, C, CE
		2 axes	G-language programming, analog outputs	3 unit numbers' words	0.60 (0.80 A when a Teaching Box is connected)	---	CS1W-MC221-V1	
	CX-One Ver. 2.0 FA Integrated Tool Package	CX-One version 2.0 includes CX-Motion Ver.2.□. For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP		1 license Media: CD (See note.)			CXONE-AL01C-EV2	---
		The CX-Motion software can also be purchased separately as before using the following model number.						
	CX-Motion Ver.2.□	Support Software for Motion Control Units Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP		1 license			WS02-MCTC1-EV2	---
	Computer connecting cable	Shares the same cable with CX-One.						---
	Teaching Box	---					CVM1-PRO01-V1	CE
	Teaching Box Connecting Cable	Cable length: 2 m					CV500-CN224	L, CE
	ROM Cassette (Memory Pack)	---					CVM1-MP702-V1	CE
	MC Terminal Block Conversion Unit for 2 Axes	Simplifies I/O connector wiring.					XW2B-20J6-6	---
	MC Terminal Block Conversion Unit for 4 Axes						XW2B-40J6-7	
	MC Terminal Block Conversion Unit Cable	---					XW2Z-100J-F1	

Note: The CX-One software is available in two media formats: CD and DVD.

■ MECHATROLINK-II-compatible Motion Control Unit

Unit type	Name	Specifications	Words required	Current consumption (A)		Model	Standards
				5 V system	26 V system		
CS1 CPU Bus Unit	Motion Control Unit	MECHATROLINK-II Physical axes: 30 axes Virtual axes: 2 axes Special motion control language	1 unit number's words	0.80	---	CS1W-MCH71	UC1, CE
	CX-One Ver. 2.0 FA Integrated Tool Package (Includes CX-Motion-MCH Ver. 2.□.)	CX-One version 2.0 includes CX-Motion-MCH Ver. 2.□ For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP	1 license Media: CD (See note.)			CXONE-AL01C-EV2	---

Note: The CX-One software is available in two media formats: CD and DVD.

■ ID Sensor Units

Unit type	Name	Specifications			Words required	Current consumption (A)		Model	Standards
		Connecting ID System	Number of RW Heads	External power supply		5 V system	26 V system		
CS1 Special I/O Unit	ID Sensor Unit	V600-series RFID System (Short-distance electromagnetic coupling method) • Read/Write Head: All V600-H□□□ models • Data Carriers: All V600-D□□□□ models	1 head	Not required	1 unit number's words	0.26	0.12	CS1W-V600C11	U, UC, CU, CE
			2 heads	24 V DC	2 unit numbers' words	0.32	---	CS1W-V600C12	

■ GP-IB Interface Unit

Unit type	Name	Specifications	Words required	Current consumption (A)		Model	Standards
				5 V system	26 V system		
CS1 Special I/O Unit	GP-IB Interface Unit	Supports both Master mode and Slave mode.	1 unit number's words	0.33	---	CS1W-GPI01	UC, CE

Note: Up to 4 CS1W-GPI01 GP-IB Interface Units can be mounted (controlled by one CPU) in a CS1D CPU Backplane (CS1D-BC052 in a Duplex CPU System or CS1D-BC082S in a Single CPU System) or CS1D Expansion Backplane (CS1D-BI092). Up to 4 Units can be controlled by one CPU.

■ Serial Communications Boards/Units

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
					5 V system	26 V system		
CS1 Inner Board	Serial Communications Board	Two RS-232C ports	The following communications protocols can be selected for each port: protocol macro, host link, NT Link (1:N mode), serial gateway (see note 1), no-protocol (see note 2), or Modbus-RTU Slave (see note 3).	---	0.28 (See note 4.)	---	CS1W-SCB21-V1	U, C, N, L, CE
		One RS-232C port and one RS-422A/485 port			0.36 (See note 4.)	---	CS1W-SCB41-V1	
CS1 CPU Bus Unit	Serial Communications Unit	Two RS-232C ports		1 unit number's words	0.29 (See note 4.)	---	CS1W-SCU21-V1	
		Two RS-422A/485 ports			0.40	---	CS1W-SCU31-V1	N, L, CE
	RS-422A Converter	The RS-422A Converter converts RS-232C to RS-422A/RS-485 format.					CJ1W-CIF11	UC1, N, L, CE
	RS-232C/RS-422A Link Adapter	One RS-232C port One RS-422 terminal block					NT-AL001	---

Note: 1. The serial gateway function is supported by Serial Communications Boards and Units with unit version 1.2 or later only.

2. The Serial Communications Unit's no-protocol function is supported by Serial Communications Units with unit version 1.2 or later only. In addition the CPU Unit must be unit version 3.0 or later.

3. The Modbus-RTU Slave function is supported by Serial Communications Boards and Units with unit version 1.3 or later only.

4. NT-AL001 Link Adapters consume an additional 0.15 A each when used.

■ Ethernet Units

Unit type	Name	Specifications					Words required	Current consumption (A)		Model	Standards
		Communications cable	Communications functions	Duplexing	Units per CPU Unit			5 V system	26 V system		
CS1 CPU Bus Unit	Ethernet Units	100BASE-TX Cable	FINS communications service (TCP/IP and UDP/IP), FTP server function, socket service, mail send service, mail reception (remote command reception), auto-adjustment of PLC's internal clock, and server host name specification	Supported	Not duplexed: 4 Units Duplexed: 4 pairs, 8 Units		1 unit number's words	0.38	---	CS1D-ETN21D	UC1, N, L, CE
				Not supported	4 Units			0.38	---	CS1W-ETN21	
		10BASE-5 Cable	FINS communications service (UDP/IP), FTP server function, socket service, and mail send service					0.40	---	CS1W-ETN01	U, C, N, L, CE

■ Controller Link Units

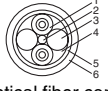| Unit type	Name	Specifications				Words required	Current consumption (A)		Model	Standards
		Communications cable	Communications type	Duplexing	Units per CPU Unit		5 V system	26 V system		
CS1 CPU Bus Unit	Controller Link Unit	Wired type, shielded twisted pair cable (See note 1.)	Data link and message communications functions	Not supported	Not duplexed: 8 Units max. Duplexed: 11 Units max. Duplexed Units: 3 pairs, 6 Units + Non-duplexed Units: 5 Units	1 unit number's words	0.33	---	CS1W-CLK21-V1	UC1, N, L, CE
	Controller Link Unit	Optical ring type, H-PCF cable (See note 2.)		Supported Supports duplex Units and cable loop-back.			0.52	---	CS1W-CLK12-V1	
	Controller Link Unit	Optical ring type, GI cable (See note 3.)					0.65	---	CS1W-CLK52-V1	
	Optical Fiber Cable (H-PCF cable) for duplex operation	H-PCF cable (length 50 cm) to connect between duplexed Controller Link Units							CS1D-CN051	---
	Controller Link Support Board, PCI Interface	Wired type, shielded twisted pair cable (See note 1.)	Data link and message communications functions	The 3G8F7-CLK□□-EV1 Controller Link Support Board includes the FinsGateway communications middleware version 3 and version 2003.					3G8F7-CLK21-EV1	CE
		H-PCF Optical type							3G8F7-CLK12-EV1	
		GI Optical type							3G8F7-CLK52-EV1	
	Relay Terminal Block for Controller Link	For wired communications (package of 5)		These components do not mount in the PLC. (They can be mounted separately on DIN Track or mounted with screws.)					CJ1W-TB101	---
	Controller Link Repeater Unit	Wired type to Wired type							CS1W-RPT01	UC1, CE
		Wired type to Optical (H-PCF) type (See note 2.)							CS1W-RPT02	
		Wired type to Optical (GI) type (See note 3.)							CS1W-RPT03	

Note: 1. Use the following special cable for shielded, twisted-pair cable.

- ESVC0.5 × 2C-13262 (Bando Electric Wire)
- ESNC0.5 × 2C-99-087B (NEC Corporation)

2. When using wired optical (H-PCF) communications, use the H-PCF Cable or H-PCF Cable with pre-attached connectors shown on page 58.
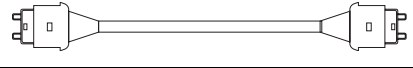
3. When using wired optical (GI) communications, use the GE Cable shown on page 59.

H-PCF Cables (For Controller Link and SYSMAC LINK)

Name	Compatibility and construction		Specifications			Model	Standards
Optical Fiber Cable	Controller Link SYSMAC LINK SYSBUS	1. One optical fiber cord 2. Tension member (plastic-coated copper wire) 3. Spacing cord (plastic cord) 4. Filler (plastic yarn or fiber cord) 5. Retaining tape (plastic) 6. Heat-resistant PVC jacket	Two-fiber Cable with tension member	Black	10 m	S3200-HCCB101	---
				Black	50 m	S3200-HCCB501	
				Black	100 m	S3200-HCCB102	
				Black	500 m	S3200-HCCB502	
				Black	1,000 m	S3200-HCCB103	
				Orange	10 m	S3200-HCCO101	
				Orange	50 m	S3200-HCCO501	
				Orange	100 m	S3200-HCCO102	
				Orange	500 m	S3200-HCCO502	
				Orange	1,000 m	S3200-HCCO103	
Optical Connectors (Crimp-cut)	Controller Link: CS1W-CLK12, 3G8F7-CLK12 CS1W-RPT02 SYSMAC LINK: CS1W-SLK11, 3G8F7-SLK11 C200HW-SLK13/14		Half-lock			S3200-COCF2571	
	Controller Link: CS1W-CLK12, 3G8F7-CLK12 CS1W-RPT02 SYSMAC LINK: 3G8F7-SLK11		Full-lock			S3200-COCF2071 (See note.)	

Note: The S3200-COCF2071 Full-lock Crimp-cut Optical Connector cannot be used with the CS1W-SLK11. Use the S3200-COCF2571 Half-lock Connector or H-PCF Optical Fiber Cable with pre-attached connectors (S3200-CN□□□-□□-□□).

H-PCF Optical Fiber Cables with Pre-attached Connectors
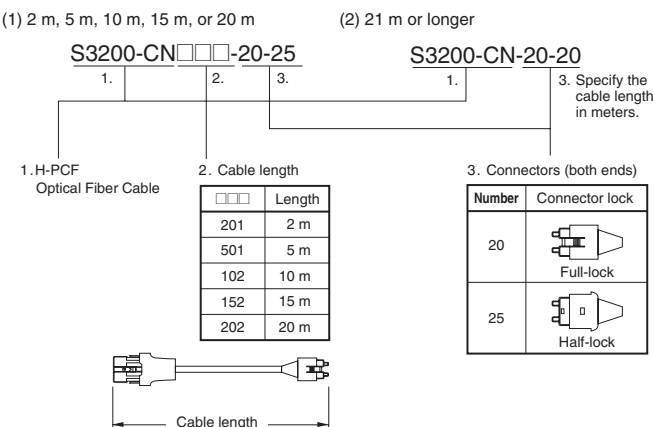## (Black Composite Cable with 2 Optical Fibers and 2 Power Supply Wires)

Applicable Units	Shape	Model	Standards
Controller Link SYSMAC LINK		S3200-CN□□□-20-20	---
		S3200-CN□□□-20-25	
		S3200-CN□□□-25-25	

Note: The pre-attached Optical Connectors are the adhesive-polished-type Connector.

Cable Length

Cables are available in lengths of 2 m, 5 m, 10 m, 15 m, 20 m, and 21 m. Contact your OMRON representative if cables longer than 21 m are required.

Model Number Guide

(1) 2 m, 5 m, 10 m, 15 m, or 20 m

S3200-CN□□□-20-25
  1.   2.   3.

(2) 21 m or longer

S3200-CN-20-20
  1.

3. Specify the cable length in meters.

1. H-PCF Optical Fiber Cable

2. Cable length

□□□	Length
201	2 m
501	5 m
102	10 m
152	15 m
202	20 m

3. Connectors (both ends)

Number	Connector lock
20	Full-lock
25	Half-lock

Cable length

Optical Connector Assembly Tool

Name	Applicable Units	Model	Maker	Standards
Optical Connector Assembly Tool (See note.)	Use for onsite assembly of Crimp-cut Connectors and hard-plastic-clad quartz optical fiber cable for optical systems such as the SYSMAC C-series SYSMAC Bus, SYSMAC LINK, and Controller Link.	CAK-0057	Sumitomo Electric Industries, Ltd.	---

- There is a risk of quality problems when using cables assembled by typical users, so we recommend purchasing cables with pre-attached connectors or having a qualified technician assemble the cables.

GI Optical Fiber Cable (For Controller Link)

A qualified technician must select, assemble, and install GI Optical Fiber Cable, so always let an optical cable specialist handle the GI cable.

Usable Optical Fiber Cable and Optical Connectors
- Optical Fiber Cable type:
  Graded Index, All Quartz Glass Fiber (GI AGF cable)
- Optical fiber structure (core/cladding diameter):
  62.5/125 μm or 50/125 μm
- Optical fiber optical characteristics:
  See the tables on the right.
- Optical connectors:
  ST connectors (IEC-874-10)

50/125 μm AGF Characteristics

Items	Minimum	Typical	Maximum	Notes		
Numerical Aperture (N.A)	---	0.21	---	---		
Transmission loss (dB)	---	---	3.0Lf	0.5 km ≤ Lf	λ = 0.8 μm region, Ta = 25°C	
			3.0Lf + 0.2	0.2 km ≤ Lf ≤ 0.5 km		
			3.0Lf + 0.4	Lf ≤ 0.2 km		
Coupling loss (dB)	---	---	1.0	λ = 0.8 μm region, 1 location		
Transmission band width (MHz·km)	500	---	---	λ = 0.85 μm (LD)		

Lf: Fiber length, Ta: Ambient temperature,
λ: Light source's measurement wavelength

62.5/125 μm AGF Characteristics

Items	Minimum	Typical	Maximum	Notes		
Numerical Aperture (N.A)	---	0.28	---	---		
Transmission loss (dB)	---	---	3.5Lf	0.5 km ≤ Lf	λ = 0.8 μm region, Ta = 25°C	
			3.5Lf + 0.2	0.2 km ≤ Lf ≤ 0.5 km		
			3.5Lf + 0.4	Lf ≤ 0.2 km		
Coupling loss (dB)	---	---	1.0	λ = 0.8 μm region, 1 location		
Transmission band width (MHz·km)	200	---	---	λ = 0.85 μm (LD)		

Lf: Fiber length, Ta: Ambient temperature,
λ: Light source's measurement wavelength

■ SYSMAC LINK Units

Unit type	Name	Specifications				Words required	Current consumption (A)		Model	Standards
		Communications cable	Communications functions	Duplexing	Units per CPU Unit		5 V system	26 V system		
CS1 CPU Bus Unit	SYSMAC LINK Unit	Coaxial (5C-2V cable)	Data link and message communications functions	Not supported	4	1 unit number's words	0.48	---	CS1W-SLK21	U, C, CE
		Optical (H-PCF cable) (See note.)					0.47	---	CS1W-SLK11	U, C, N, CE
	SYSMAC LINK Support Board, PCI interface	Coaxial (5C-2V cable)	The 3G8F7-SLK□□ SYSMAC LINK Support Board includes the FinsGateway communications middleware version 3.						3G8F7-SLK21-E	CE
		Optical (H-PCF cable) (See note.)							3G8F7-SLK11-E	
	F Adapter	---	One Adapter is included with each Coaxial-cable SYSMAC LINK Unit/Board.						C1000H-CE001	N
	F Adapter Cover	---							C1000H-COV01	---
	Terminator	---	A Terminator must be installed at each node on the ends of the network.						C1000H-TER01	N

Note: When using wired optical (H-PCF) communications, use the H-PCF Cable or H-PCF Cable with pre-attached connectors.

■ FL-net Units

Unit type	Name	Specifications				Words required	Current consumption (A)		Model	Standards
		Communications cable	Communications functions	Duplexing	Units per CPU Unit		5 V system	26 V system		
CS1 CPU Bus Unit	FL-net Unit	100BASE-TX Cable	FL-net (OPCN-2) Ver. 2 specifications	Not supported	4	1 unit number's words	0.38	---	CS1W-FLN22	UC1, CE
		10BASE-5 Cable	Data link and message communications functions		4		0.40	---	CS1W-FLN02	U, C, CE
	CX-One Ver. 2.0 FA Integrated Tool Package (Includes CX-FLnet Ver. 1.□.)	CX-One version 2.0 includes CX-FLnet Ver. 1.□. For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP				1 license Media: CD (See note.)			CXONE-AL01C-EV2	---

Note: The CX-One software is available in two media formats: CD and DVD.

■ DeviceNet Unit

Unit type	Name	Specifications				Words required	Current consumption (A)		Model	Standards
		Communications cable	Communications types	Duplexing	Units per CPU Unit		5 V system	26 V system		
CS1 CPU Bus Unit	DeviceNet Unit	Special DeviceNet cable	• Remote I/O Master communications (Fixed or user-set allocation) • Remote I/O Slave communications (Fixed or user-set allocation) • Message communications	Not supported	16	1 unit number's words	0.29	---	CS1W-DRM21-V1	UC1, N, L, CE
	CX-One Ver. 2.0 FA Integrated Tool Package (Includes CX-Integrator Ver. 2.□)	CX-One version 2.0 includes CX-Integrator Ver. 2.□. For details, refer to the CX-One Introduction Guide (Cat. No. R145). Operating System: Microsoft Windows 98 SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP				1 license Media: CD (See note.)			CXONE-AL01C-EV2	---

Note: The CX-One software is available in two media formats: CD and DVD.

■ CompoNet Unit

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
		Communications types	Maximum number of I/O points per Master		5 V system	26 V system		
CS1 Special I/O Unit	CompoNet Master Unit	• Remote I/O communications • Message communications	Word Slave: 2,048 bits (1,024 inputs and 1,024 outputs) Bit Slave: 512 bits (256 inputs and 256 outputs)	1, 2, 4, or 8 unit numbers' words (variable)	0.4	---	CS1W-CRM21	UC application submitted, CE

■ SYSMAC SPU (High-speed Data Storage Units)

Unit type	Name	Specifications		Words required	Current consumption (A)		Model	Standards
		PC Card slot	Ethernet LAN port		5 V system	26 V system		
CS1 CPU Bus Unit	SYSMAC SPU (High-speed Data Storage Unit))	1 PC Card Type II slot Insert an OMRON HMC-EF□□□ to use the Memory Card.	1 port (10/100BASE-TX)	1 unit number's words	0.56	---	CS1W-SPU01	UC1, CE
			2 ports (10/100BASE-TX)		0.70	---	CS1W-SPU02	
	SPU-Console Support Software (Ver. 1.3)	Functions: Setting the High-speed Data Storage Unit's unit settings, sampling settings, etc. (The software is required to make the High-speed Data Storage Unit's settings.) OS: Windows 2000 or XP					WS02-SPTC1-V1	---
	SYSMAC SPU Data Management Middleware Ver. 2.0	Functions: Automatically uploads collected data files from the SYSMAC SPU to the computer, and can also register the data in a database. OS: Windows 2000 or XP		1 license			WS02-EDMC1-V2	
				5 licenses			WS02-EDMC1-V2L05	
	Memory Cards	Flash memory, 128 MB		Note: A Memory Card is required to collect data.			HMC-EF183 *NEW*	N, L, CE
		Flash memory, 256 MB (especially for the SYSMAC SPU)					HMC-EF283	
		Flash memory, 512 MB (especially for the SYSMAC SPU)					HMC-EF583	
		Memory Card Adapter (for a computer's PCMCIA slot)					HMC-AP001	CE

MEMO

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