Programmable Controller

CS1D Duplex System

- Design Hot Swap-able Redundant Systems
- Improve development productivity with FB, ST, and SFC

CS1D brings greater development productivity and reliability to systems requir

Monitoring and control at water and sewage plants

Avoid loss and manage outcomes

- 24/7/365 operation is required.
- Recovery costs are high in case of system failure.
- Environmental risks or material losses can be incurred.

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

Omron offers advanced duplex PLC for risk management in your system

Adding redundancy in the system is an effective step to reduce risk.
In order to meet customers' needs for system reliability, Omron has packed its proven duplex PLC technology into the CS Series, providing highly reliable PLC systems.

The advanced CS1D Duplex System supports the IEC 61131-3 programming languages, ST and SFC. You can flexibly combine different languages. FBs allow you to reuse and share programs, which will help improve development productivity.
In addition, the high-capacity CPU unit provides sufficient program capacity (400K steps) and data memory (832K words) and offers a flexible environment that supports structured and modular programming.

ing redundancy

Monitoring and control of air conditioning and lighting in tunnels

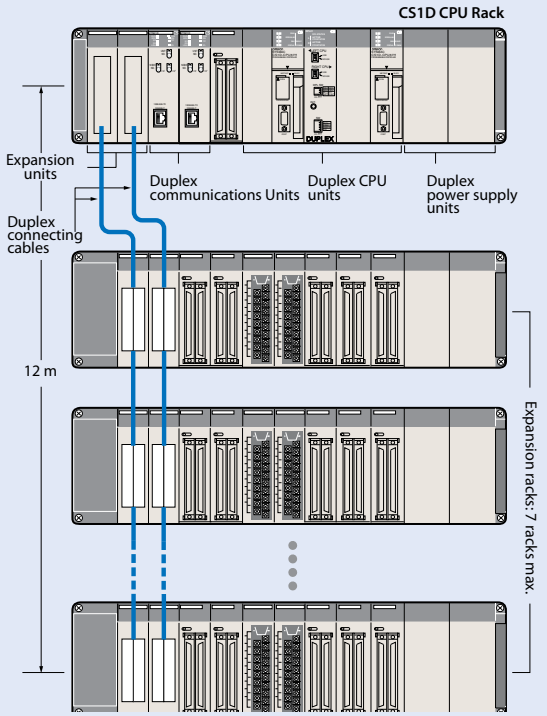
Monitoring and control of air conditioning and lighting in underground utility tunnels

Programmable Controller
CS1D DUPLEX SYSTEM

Flexible configuration to suit your system requirements

Choose the level of redundancy needed

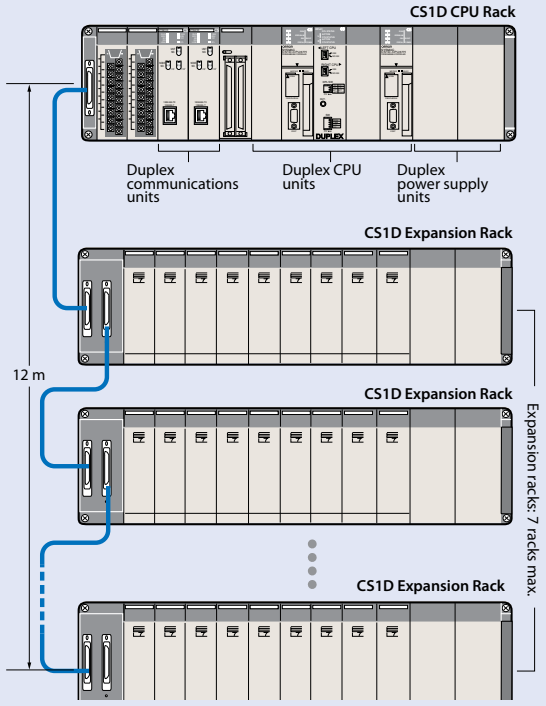
Omron offers a diverse range of duplex system configurations to match your system requirements. In addition to dual CPU units and power supply units, you can use dual communications units (Controller Link or Ethernet) and expansion cables.

System name			SYSTEM1 Duplex CPU, Dual I/O Expansion System
Configuration			Cables connecting between a duplex CPU system and expansion systems are also duplexed. This fully duplexed system offers superior redundancy and maintainability.  *The CS1D CPU Unit must be version 1.3 or later.
Unit that can be duplexed	CPU unit		Yes
	Power supply unit		Yes
	Communications unit	Controller Link (Optical ring)	Yes
		Ethernet	Yes
	Expansion cable		Yes
Replacing or adding unit during power supply	Replacing unit	CPU unit	Yes (Can be replaced without a programming device)
		Power supply unit	Yes (Can be replaced without a programming device)
		Duplex unit	Yes (Can be replaced without a programming device)
		I/O expansion unit	Yes (Can be replaced without a programming device)
		Basic I/O unit	Yes (Can be replaced without a programming device)*1
		Special I/O unit	Yes (Can be replaced without a programming device)*1
		CPU bus unit	Yes (Can be replaced without a programming device)*1
	Adding unit or backplane	Basic I/O unit	Yes
		Special I/O unit	Yes
		Expansion backplane	Yes
Long-distance expansion system			No
Details			Page 14

*1. Enable the *Removal/Addition of Units without a Programming Device* function in the PLC Setup.
*2. The unit must be version 1.2 or later.
*3. Enable the *Unit Removal without a Programming Device* function in the PLC Setup to remove the unit without a programming device.

SYSTEM2 Duplex CPU, Single I/O Expansion System

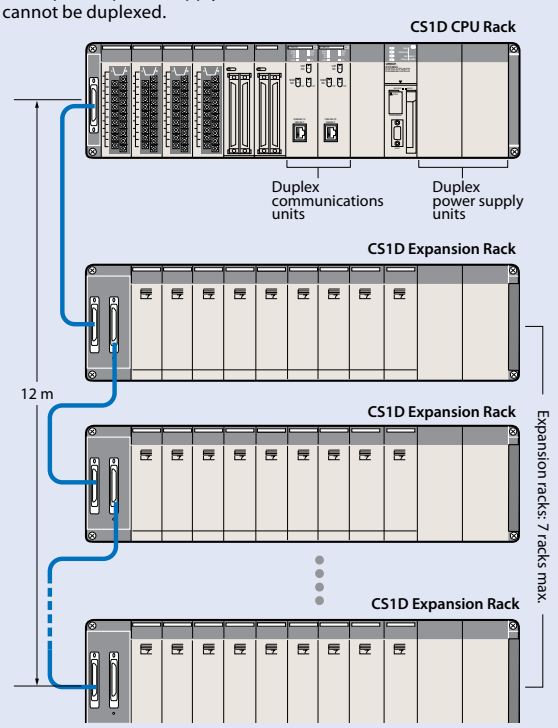
The main system components (CPU units, power supply units, and communications units) can be duplexed. Units can be replaced during operation using a programming device.



Yes
Yes
Yes
Yes
No
Yes (Can be replaced without a programming device)
Yes (Can be replaced without a programming device)
No
No
Yes (Can be replaced using a programming device)*2,*3
Yes (Can be replaced using a programming device)*2,*3
Yes (Can be replaced using a programming device)*2,*3
Yes
Yes
No
Yes
Page 18

SYSTEM3 Single 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.



No
Yes
Yes
Yes
No
No
Yes (Can be replaced without a programming device)
No
No
Yes (Can be replaced using a programming device)
Yes (Can be replaced using a programming device)
Yes (Can be replaced using a programming device)
No
No
No
Yes
Page 24

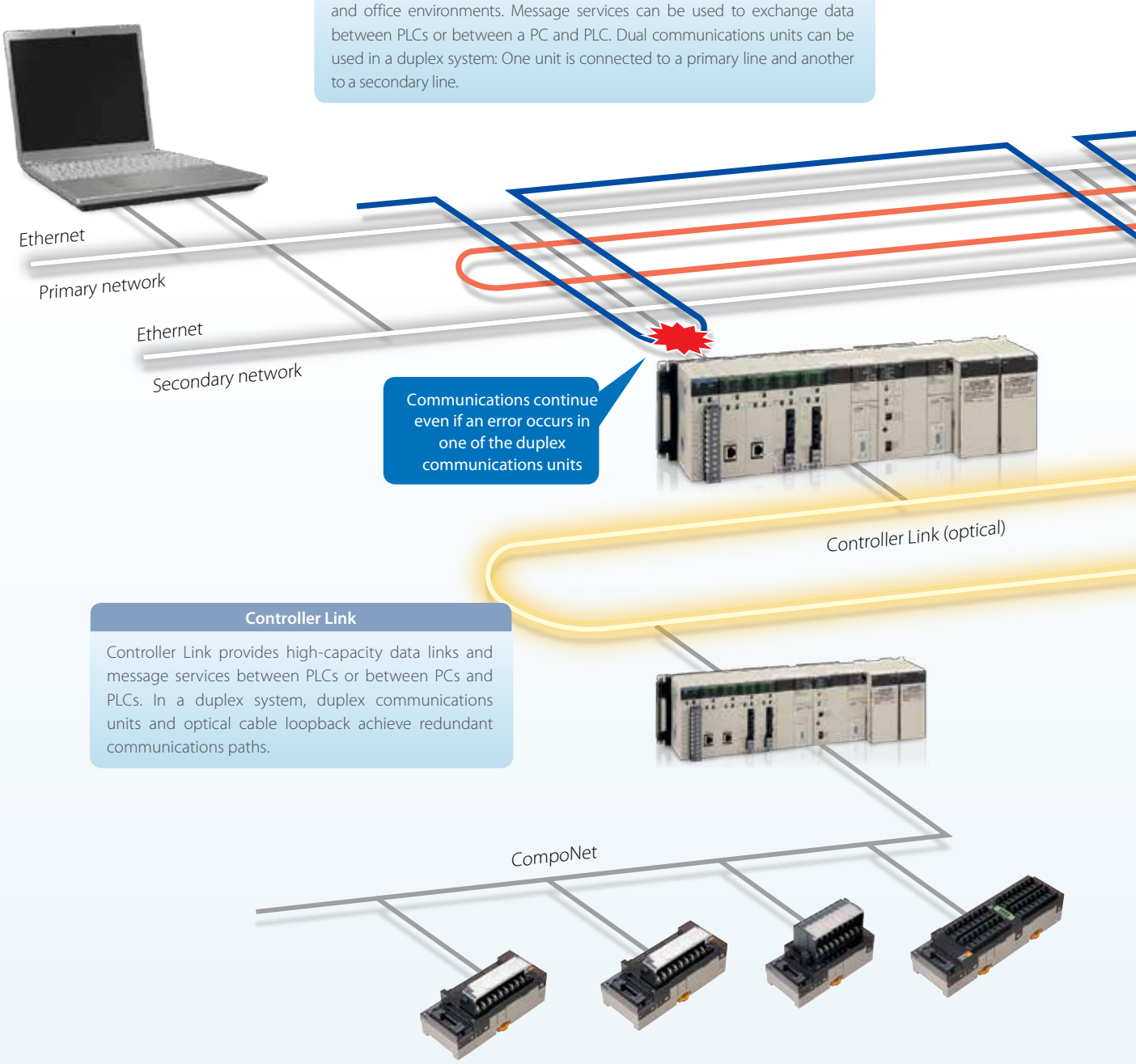
Supports a variety of network configurations

Redundant communications can be created via Ethernet and Controller Link which is widely used in FA applications.

A variety of networks are available at the I/O level, including open networks DeviceNet and CompoNet with a proven track record in the CS1 Series.

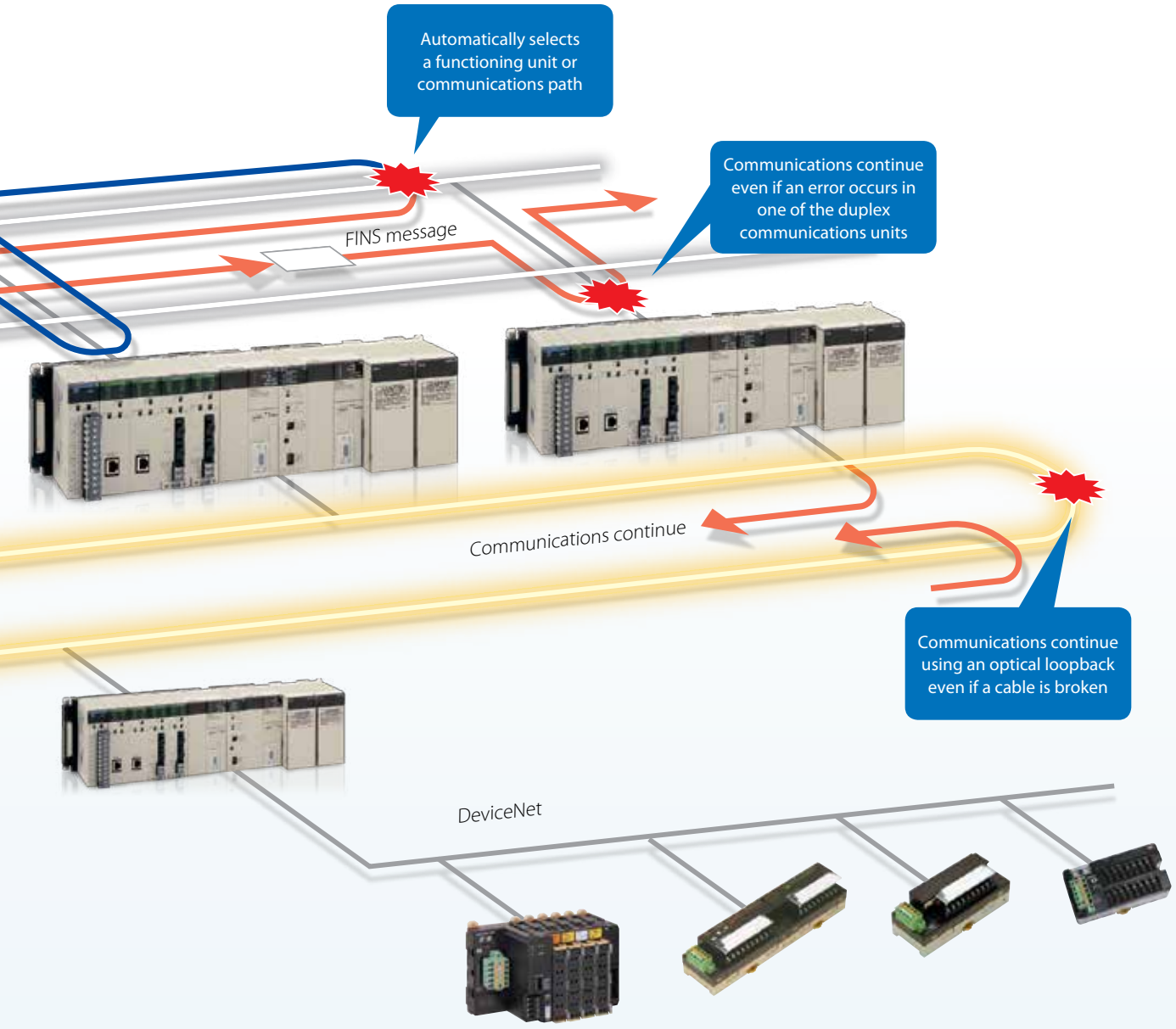
Ethernet

Ethernet is a general-purpose network used globally in a wide range of factory and office environments. Message services can be used to exchange data between PLCs or between a PC and PLC. Dual communications units can be used in a duplex system: One unit is connected to a primary line and another to a secondary line.



Controller Link

Controller Link provides high-capacity data links and message services between PLCs or between PCs and PLCs. In a duplex system, duplex communications units and optical cable loopback achieve redundant communications paths.

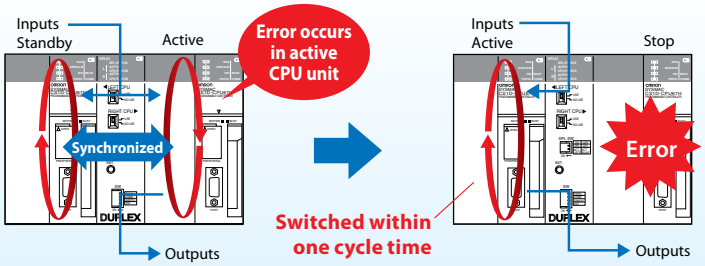

Automatically selects a functioning unit or communications path
Communications continue even if an error occurs in one of the duplex communications units
FINS message
Communications continue
Communications continue using an optical loopback even if a cable is broken
DeviceNet

Easy installation and operation of reliable systems

Easy duplexing of CPU units

All programs and data in the active CPU unit are automatically transferred to the standby CPU unit to synchronize them between CPU units.
This eliminates the need to select synchronized data or transfer individually.
When an error occurs in the active CPU unit, the standby CPU unit takes over control immediately (within one cycle time).

The active and standby CPU units always operate synchronously. If an error occurs in the active CPU unit, the standby CPU unit continues control automatically and continuously.

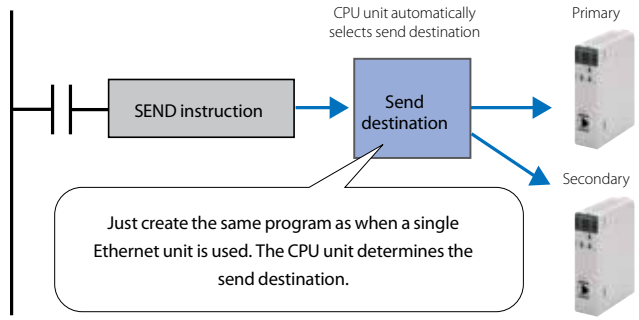


Easy duplexing of communications units

The CPU unit automatically selects the normally functioning communications unit.
There is no need for complex programming to switch when an error occurs or special data link area for duplexing.

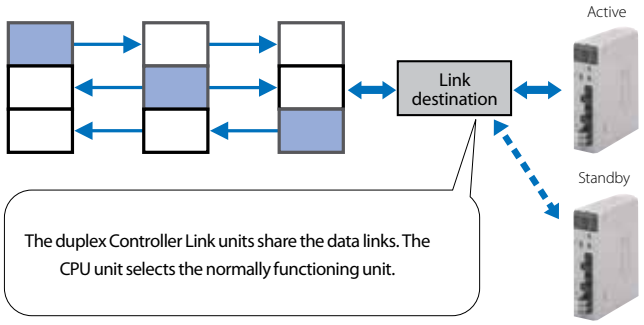
Ethernet

•Send and receive program



Controller Link

•Data link area allocation

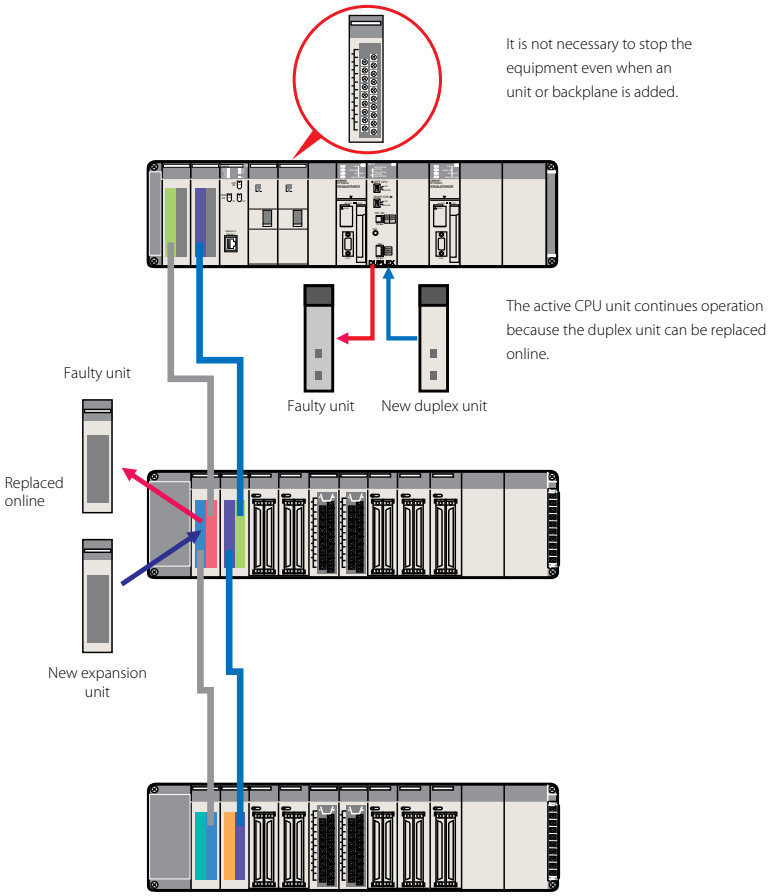


Easy duplexing of power supply units

A duplex power supply system can be configured with two power supply units connected to a CPU rack, expansion rack, or long-distance expansion rack, which prevents the system from going down due to a power supply unit error.
A power supply unit that malfunctions can be identified by flags in the AR Area of the CPU unit.

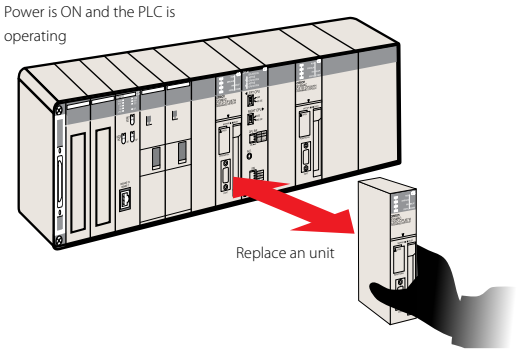
Hot swap modules while powered

The CPU unit, power supply unit, duplex unit, basic I/O unit, and special I/O unit can be replaced during operation. In addition, cable disconnections are monitored, so failures can be located easily.



Remove or add units without using a programming device

The duplex CPU, dual I/O expansion system does not require special software or an HMI to replace units online.



Automatic recovery to duplex operation

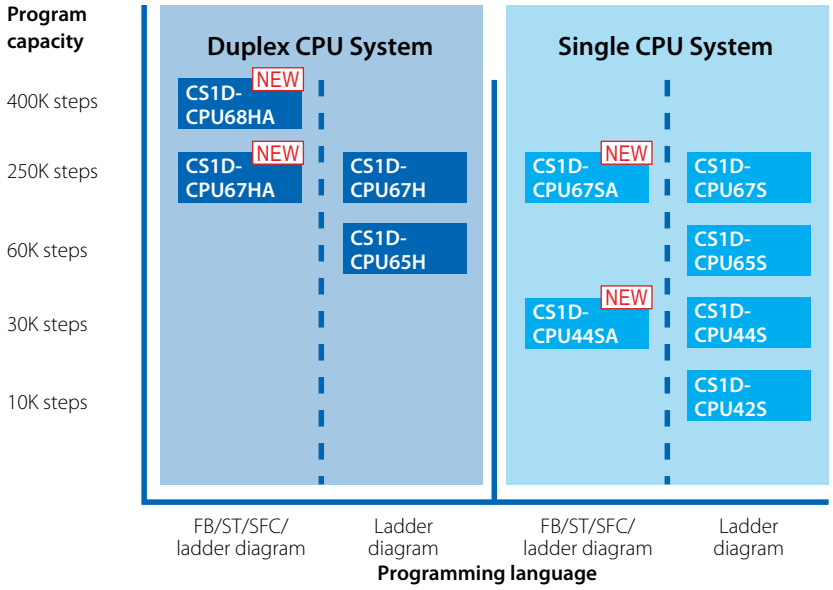
After the standby CPU unit becomes active, the stopped CPU unit can be restarted without the need for manipulation by operators and automatically returned to duplex operation.
The period during which only a single CPU unit operates is shortened, maintaining duplex operation to prepare for errors.
(Setting in PLC Setup is required. When hardware breaks down, the CPU unit is not returned to duplex operation after restart. The unit needs to be replaced.)

Improve development productivity

CPU unit with a large program capacity of 400K steps for structured and modular programming NEW

Omron offers 10 models of CPU units to suit a variety of purposes and applications, from small- to large-scale systems. By combining I/O units and special units with any CPU unit, you can configure a lean and efficient system.

The CS1D-CPU68HA has a user memory capacity of 400K steps and 25 Extended Data Memory banks. The total memory capacity is 5 MB including user program, data memory, and comment memory. It has sufficient capacity to provide flexibility in structured and modular programming and to be used for larger systems.

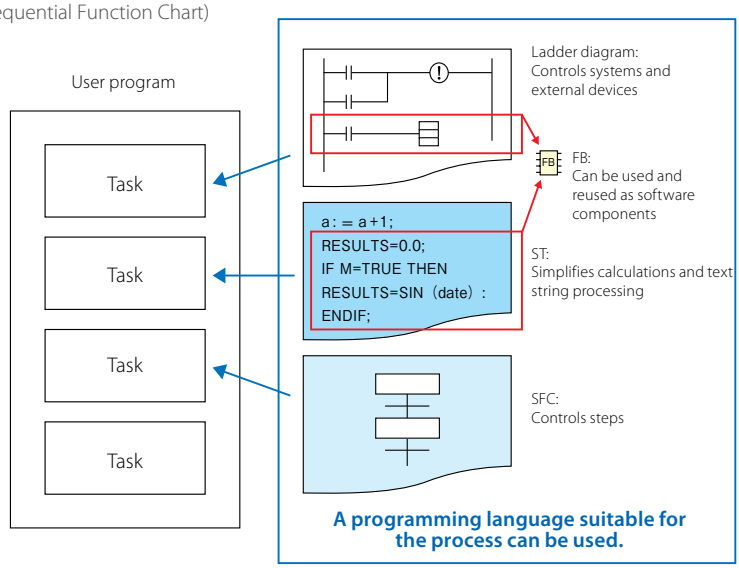


Improve development productivity by reusing and sharing programs NEW

The CPU unit supports the IEC 61131-3 programming languages: ladder diagram, ST, and SFC. FBs allow you to reuse and share programs, which will improve programming efficiency.

The programs in these languages and using FBs have a higher visibility than conventional ladder programs, making modification and maintenance quicker and easier. FBs, ST, and SFC can be used with the CS1D-CPU□□HA Duplex CPU System CPU Unit and CS1D-CPU□□SA Single CPU System CPU Unit.

(ST: Structured Text, FB: Function Block, SFC: Sequential Function Chart)



Reuse software assets NEW

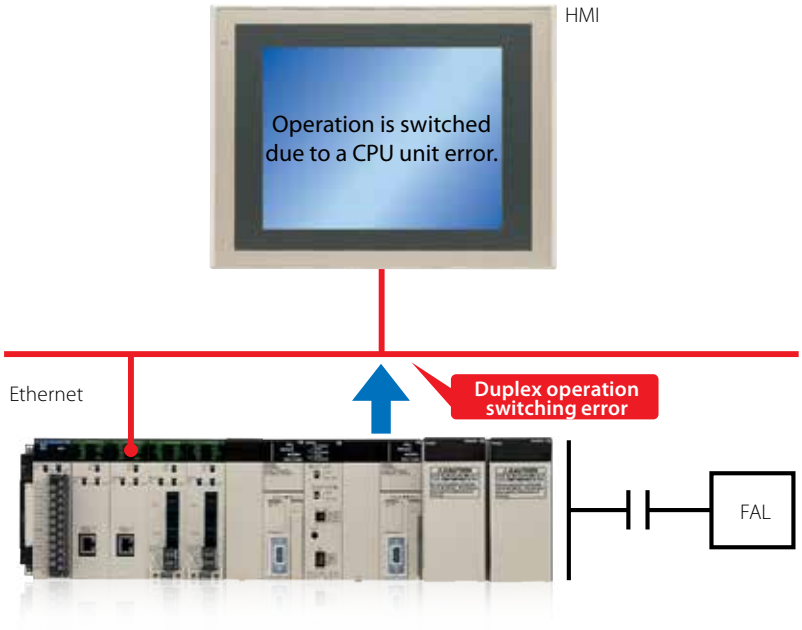
The CX-One software can be used even when the CS Series is used together with the CJ Series. Programs and data are compatible with each other, making reuse easier. The specifications of FB and ST supported by the CS1D-CPU□□HA and CS1D-CPU□□SA are compatible with those supported by the CS1H/G and CJ2 Series.

Units common to all CS Series

The same I/O units and special units can be used in both the CS1D Duplex System and CS1H/G. This enables parts required for repair and maintenance to be shared between systems, reducing the number of spare parts.

Verify errors on physical devices

The error check (FAL and FALS) instructions can be used to simulate errors. You can verify the behavior of the HMI and other devices for each error state of the duplex CPU units.



OMRON AUTOMATION AMERICAS HEADQUARTERS • Chicago, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

OMRON CANADA, INC. • HEAD OFFICE
Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron247.com

OMRON ELECTRONICS DE MEXICO • HEAD OFFICE
México DF • 52.55.59.01.43.00 • 01-800-226-6766 • mela@omron.com

OMRON ELECTRONICS DE MEXICO • SALES OFFICE
Apodaca, N.L. • 52.81.11.56.99.20 • 01-800-226-6766 • mela@omron.com

OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE
São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

OMRON ARGENTINA • SALES OFFICE
Cono Sur • 54.11.4783.5300

OTHER OMRON LATIN AMERICA SALES
54.11.4783.5300

Authorized Distributor:

Controllers & I/O
• Machine Automation Controllers (MAC) • Motion Controllers
• Programmable Logic Controllers (PLC) • Temperature Controllers • Remote I/O

Robotics
• Industrial Robots • Mobile Robots

Operator Interfaces
• Human Machine Interface (HMI)

Motion & Drives
• Machine Automation Controllers (MAC) • Motion Controllers • Servo Systems
• Frequency Inverters

Vision, Measurement & Identification
• Vision Sensors & Systems • Measurement Sensors • Auto Identification Systems

Sensing
• Photoelectric Sensors • Fiber-Optic Sensors • Proximity Sensors
• Rotary Encoders • Ultrasonic Sensors

Safety
• Safety Light Curtains • Safety Laser Scanners • Programmable Safety Systems
• Safety Mats and Edges • Safety Door Switches • Emergency Stop Devices
• Safety Switches & Operator Controls • Safety Monitoring/Force-guided Relays

Control Components
• Power Supplies • Timers • Counters • Programmable Relays
• Digital Panel Meters • Monitoring Products

Switches & Relays
• Limit Switches • Pushbutton Switches • Electromechanical Relays
• Solid State Relays

Software
• Programming & Configuration • Runtime

R302I-E-01 Note: Specifications are subject to change. Printed in U.S.A.

Printed on recycled paper.