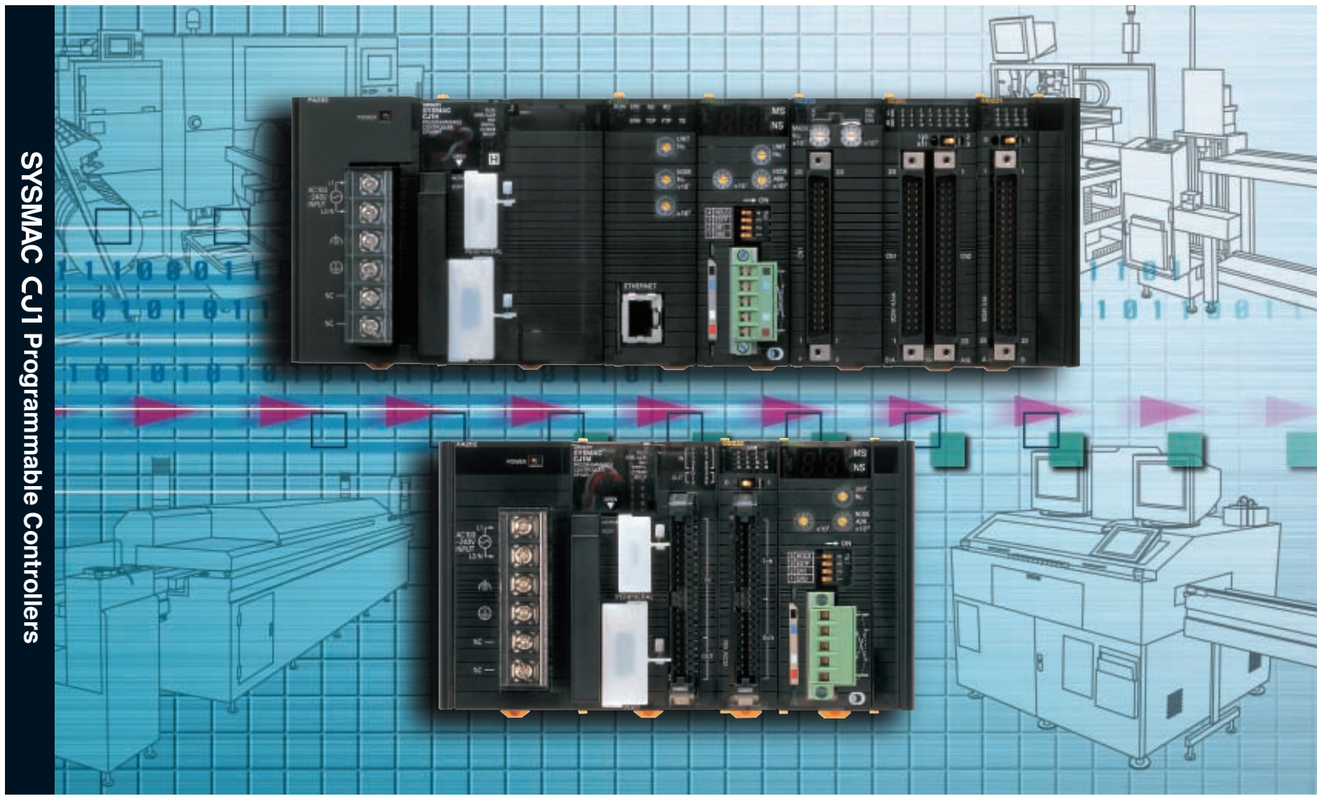
OMRON

SYSMAC CJ1

Programmable Controllers

A Small Big Player on the Production Site



SYSMAC CJ1 Programmable Controllers

Note: Do not use this document to operate the Unit.

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eco
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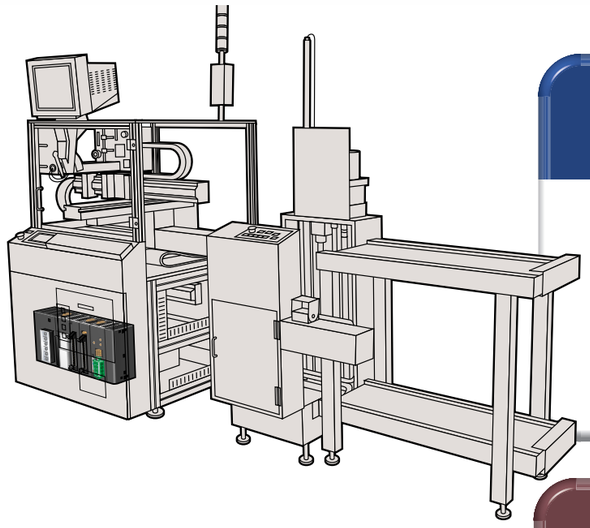
Note: Specifications subject to change without notice.

Cat. No. P052-E1-05
Printed in Japan
1204-3M

CJ1 Series: Small, Fast, and Flexible, the Little Big Player Creates New Roles in Machine Control



Small

Aids Machine Downsizing by Fitting Just About Anywhere.

Fast

Reduce Tact Time and Increase Productivity with Higher Machine Speed.

Flexible

A Backplane-free Structure Means Minimum Space for the Required Functions.

Seamless

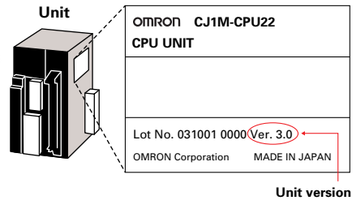
Network Management of Production Information. Use Ethernet, Controller Link, DeviceNet, or Whatever Network the Application Calls For.

ACTUAL SIZE

CJ1M-CPU21/22/23

● Unit Versions

Unit versions have been introduced to control differences in functions featured by CPU Units that are the result of version upgrades.
The unit version is marked on the nameplates of products subject to version control, as shown in the diagram.



This catalog contains information required to select products and is not intended to provide precautionary information. Refer to product user documentation for all precautionary information.

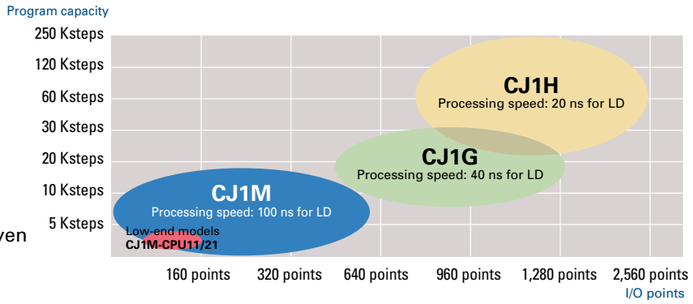
"Programmable Controller" is abbreviated "PLC" in this catalog. The term "personal computer" is written out, and not abbreviated.

Contents

A Wide Variation of Models to Handle Essentially Any Type of Machine Control. Build the Perfect CJ1-series PLC for Your Application.

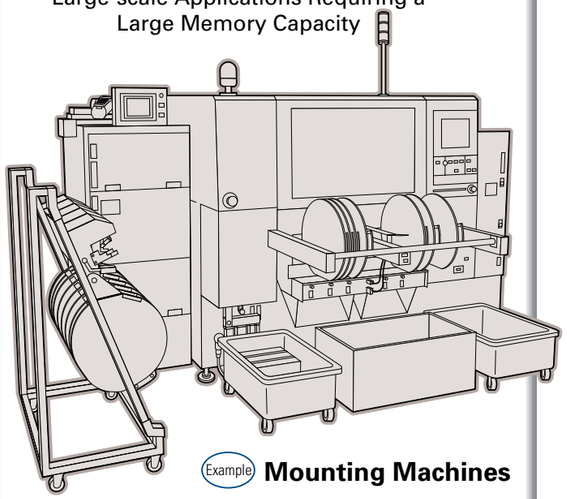
The CJ1H, CJ1G, and CJ1M are compatible for memory allocations, programming instructions, and I/O Units. Compatibility simplifies reusing designs from large-scale applications to small-scale applications.
Select from the range of CJ-series CPU Units including a lineup of low-end models with 160 I/O points and 5 Ksteps for use in even smaller machines.

NEW The CJ1H-CPU67H delivers control on an even larger scale.



CJ1H

For Applications Requiring Speed or Large-scale Applications Requiring a Large Memory Capacity

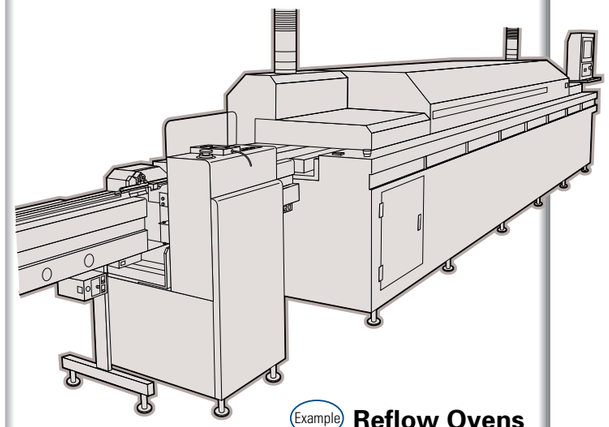


Example **Mounting Machines**

SYSMAC CJ1H-CPU□□H	
Small	YES 62 mm wide
Backplane-free structure	YES
Speed	LD instruction: 20 ns
Seamless	YES
Program capacity *NEW*	250 to 60 Ksteps
Memory capacity *NEW*	448 to 128 Kwords
I/O capacity	2,560 points
Memory Cards	YES Compact flash memory
Task programming	YES
Function Block *NEW*	YES
Serial Gateway *NEW*	YES

CJ1G

For Applications Requiring a Large Memory Capacity for Data Management

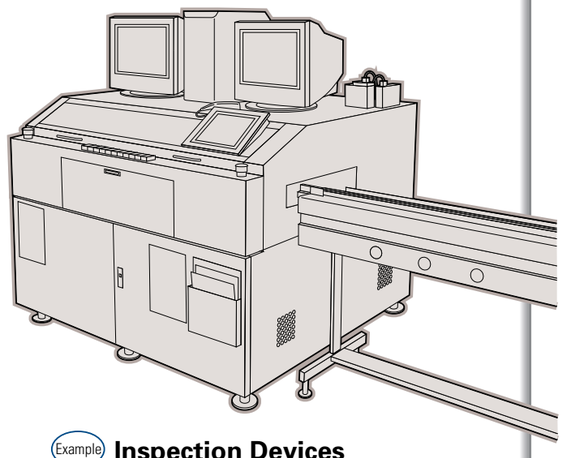


Example **Reflow Ovens**

SYSMAC CJ1G-CPU□□H	
Small	YES 62 mm wide
Backplane-free structure	YES
Speed	LD instruction: 40 ns
Seamless	YES
Program capacity	60 to 10 Ksteps
Memory capacity	128 to 64 Kwords
I/O capacity	960 to 1,280 points
Memory Cards	YES Compact flash memory
Task programming	YES
Function Block *NEW*	YES
Serial Gateway *NEW*	YES

CJ1M

For Small-scale Applications, such as Automatic Machines, Inspection Devices, etc.

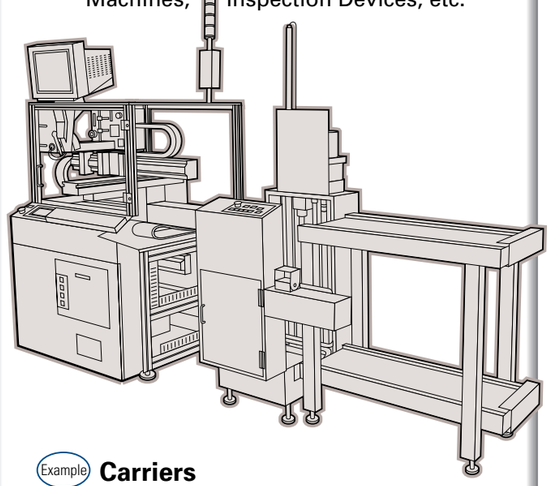


Example **Inspection Devices**

SYSMAC CJ1M-CPU11/12/13	
Small	YES 31 mm wide
Backplane-free structure	YES
Speed	LD instruction: 100 ns
Seamless	YES
Program capacity	20 to 5 Ksteps
Memory capacity	32 Kwords
I/O capacity	160 to 640 points
Memory Cards	YES Compact flash memory
Task programming	YES
Function Block *NEW*	YES
Serial Gateway *NEW*	YES
Serial PLC Link	YES

CJ1M Pulse I/O

For Small-scale Applications, such as Automatic Machines, Inspection Devices, etc.



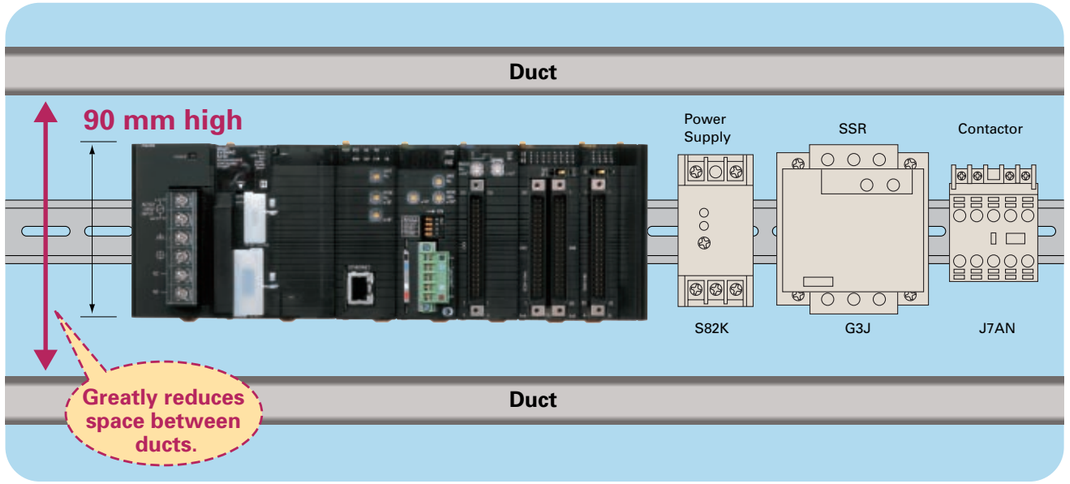
Example **Carriers**

SYSMAC CJ1M-CPU21/22/23 Pulse I/O	
Small	YES 49 mm wide
Backplane-free structure	YES
Speed	LD instruction: 100 ns
Seamless	YES
Program capacity	20 to 5 Ksteps
Memory capacity	32 Kwords
I/O capacity	160 to 640 points
Memory Cards	YES Compact flash memory
Task programming	YES
Function Block *NEW*	YES
Serial Gateway *NEW*	YES
Serial PLC Link	YES
Built-in pulse I/O	YES

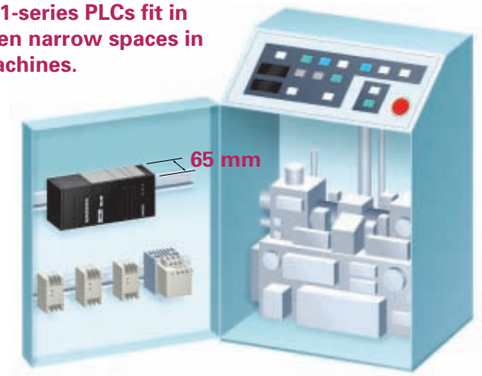
Small Aids Machine Downsizing by Fitting Just About Anywhere.

Super Compact: Only 90 mm High and 65 mm Deep, and I/O Units Available with Only 20 mm Widths.

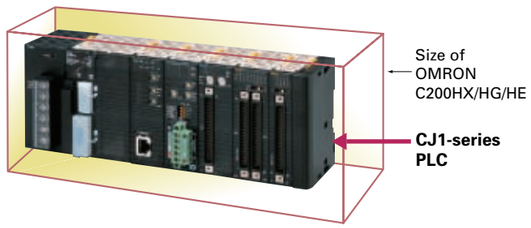
With a height of only 90 mm, CJ1-series PLCs fit between narrow ducts along with other components.



With a depth of only 65 mm, CJ1-series PLCs fit in even narrow spaces in machines.



Greatly downsized over previous models.



Volume compared to C200HX/HG/HE
Approx. 37%

Volume compared to CQM1H
Approx. 50%

Unit Downsizing

● CPU Units

CJ1M-CPU11/12/13

Even though only 31 mm wide, the CPU Units provide an RS-232C port in addition to a peripheral port. The Memory Card interface is also built in.

● I/O Units Only 20 mm Wide

32-point Unit | B7A Unit (64 points) | CompoBus/S Master Unit

Minimum width with 20-mm-wide I/O Units

● I/O Units Only 31 mm Wide

Double-head ID Sensor Unit | Temperature Control Unit (4 control loops)

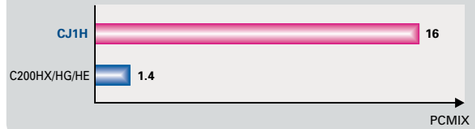
High-density Units for greater downsizing by external device modularization.

Fast Reduce Tact Time and Increase Productivity with Higher Machine Speed.

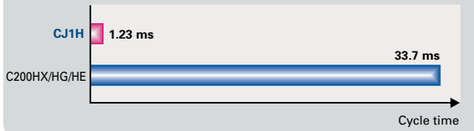
High speed from input through processing to output for better application performance.

● Top-of-the-Line CJ1-series PC: Executes 38-Kstep program in **1 ms** (with basic instructions only)
PCMIX = **16**
LD or OUT executed in 20 ns

PCMIX Values

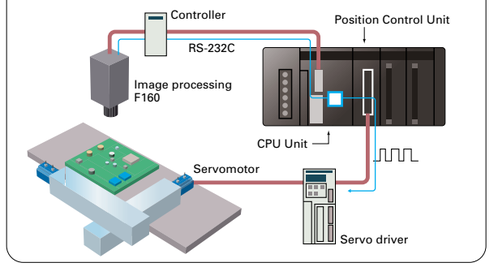


Cycle Time for 30-Kstep Program
(Conditions: Basic instructions: 50%; MOV instructions: 30%; Arithmetic instructions: 20%)

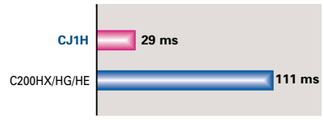


Application Examples

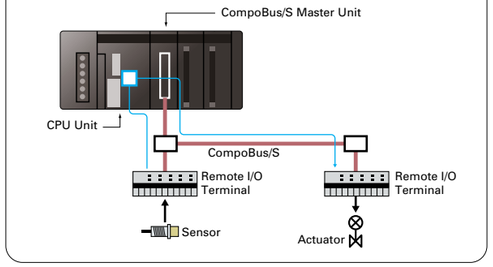
Example: Inspection Equipment



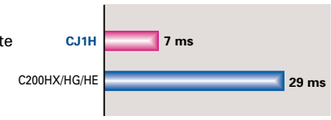
Time required to input image data, perform operations in the CPU Unit, and output pulses from the Position Control Unit
(Conditions: 30-Kstep program; ratio of basic instructions to special instructions: 1:1)



Example: Assembling Equipment

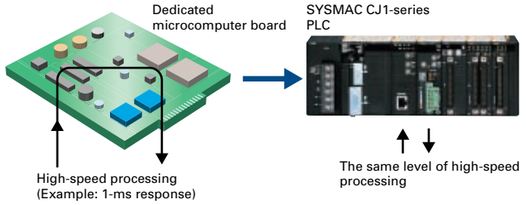


Time required to receive sensor input at the CompoBus/S Remote I/O Terminal, perform operations in the CPU Unit, and turn ON a solenoid valve via the CompoBus/S Remote I/O Terminal
(Conditions: 10-Kstep program; ratio of basic instructions to special instructions: 1:1)



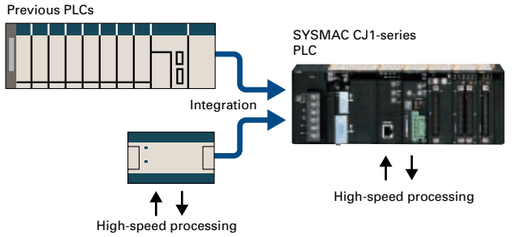
Replace High-speed Microcomputer Boards with PLCs.

Although previously microcomputer boards were used where processing speeds below 1 ms were required, the CJ1-series PLCs can now take this role, AND provide easier debugging and maintenance.



Replace Two PLCs Used to Increase Processing Speed with One CJ1-series PLC.

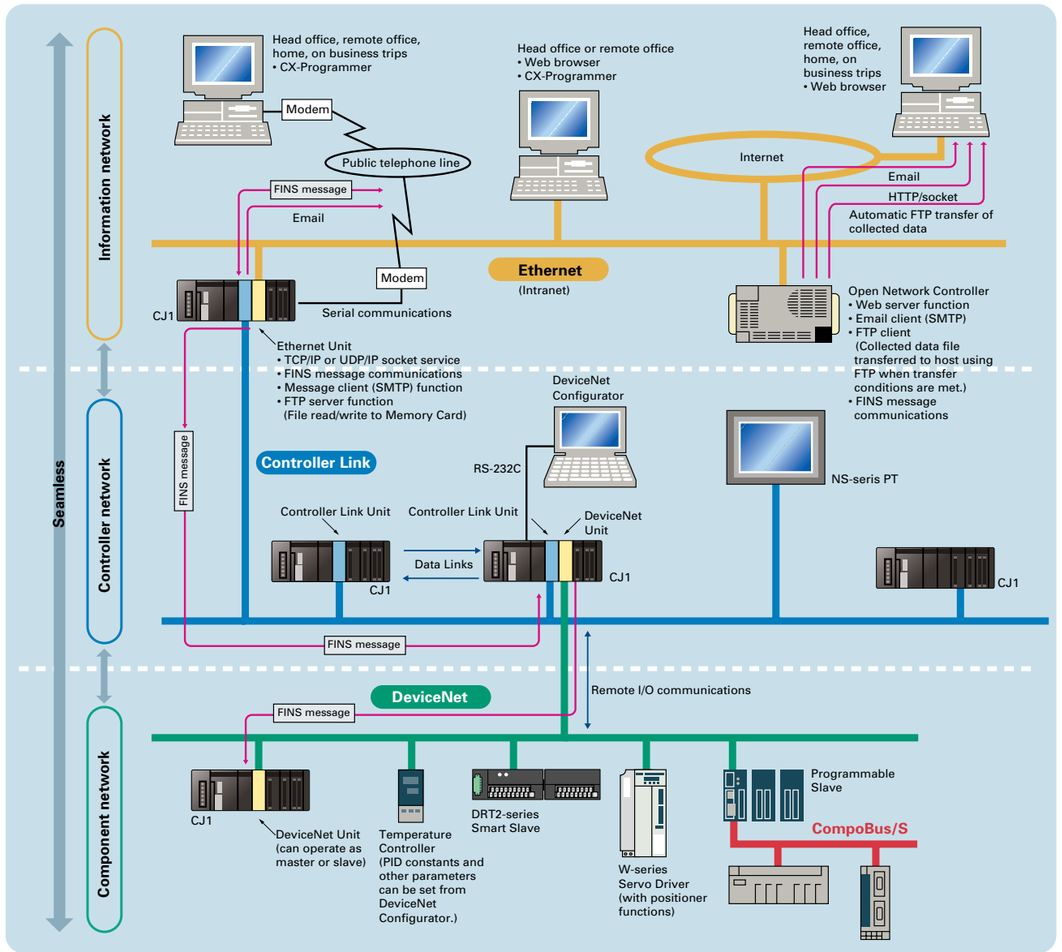
Although previously two PLCs were somtetimes used to enable reading short pulses, the CJ1-series PLCs can now take this role too.



Seamless

Seamless message communications across eight levels (See note) of component, controller, and information networks.

The CJ Series is suitable for equipment ranging from small to large scale, making it equally convenient for building systems for essentially any machine size.

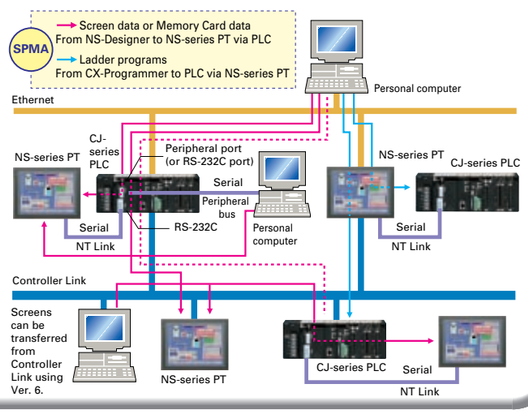


Note: Only Ethernet and Controller Link networks can be used for access across eight levels.

Use SPMA (Single Port Multi Access) to Transfer Ladder Programs, NS-series PT Screen Data, and Memory Card Data without Connecting to a Personal Computer.

Screen data can be transferred from the NS-Designer via the PLC to an NS-series PT connected to the PLC either serially or through the network. The CX-Programmer can be used to monitor ladder programs or transfer them via an NS-series PT to the PLC connected to an NS-series PT either serially or through the network.

- NS-series PT: System Ver. 3.0 or higher
- NS-Designer: Ver. 3.0 or higher
- CX-Programmer: Ver. 3.1 or higher
- PLC CJ1H/CJ1G-CPU□□H/CJ1M-CPU□□: Lot No. 030201 or later



Flexible

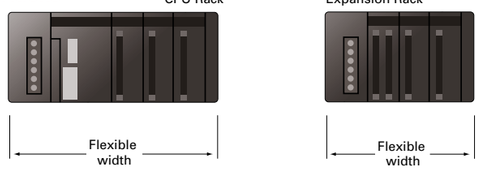
A Backplane-free Structure Means Minimum Space for the Required Functions.

Effectively combine Units.

Eliminating the backplane enables more flexible combinations.
Words in memory can still be reserved.

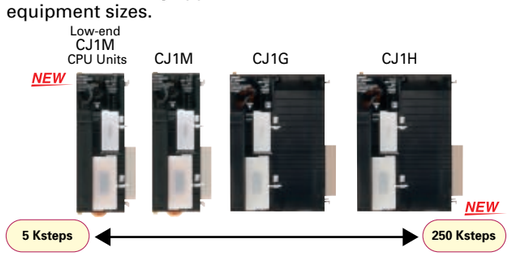
Utilizes the backplane-free structure of the CQM1 PLCs.

Backplane-free Structure Enables Flexible-width Racks



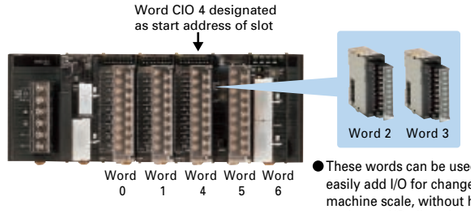
Select the Optimum CPU Unit According to the Control Scale

Low-end CJ1M CPU Units with 5 Ksteps are also available, enabling applications across a broader scale of equipment sizes.

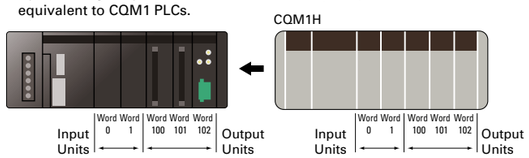


Any words can be allocated to the Basic I/O Units.

Words are allocated to each Unit from the left in order starting with the leftmost Unit as word CIO 0. The starting address of slots can be designated, however, by editing the I/O tables with the CX-Programmer.



- These words can be used to easily add I/O for changes in machine scale, without having to change I/O allocations.
- By allocating Output Units from word CIO 100, the I/O allocations will be equivalent to CQM1 PLCs.



Supported by CX-Programmer Ver. 3.1 or higher.
Supported for CJ1H/CJ1G-CPU□□H CPU Units manufactured on June 1, 2002 or later (Lot number 020601 or later).

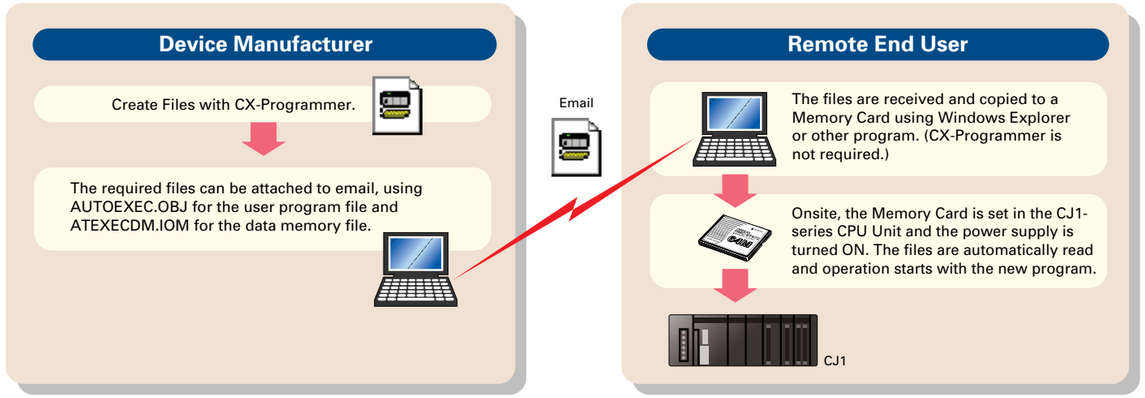
Select the Right Unit for the Application

Easier Maintenance with Memory Cards

Memory Cards

Easily change programs using Memory Cards.

Compact flash cards are used, enabling the Memory Cards to be shipped or mailed for speedy action even with offshore sites.

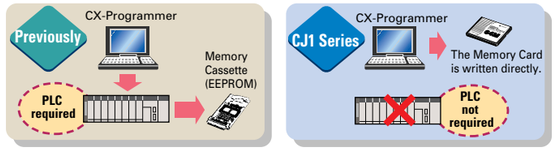


Handle as Windows Files from a Personal Computer.

User programs, parameters, I/O memory, names (including I/O comments), and rung comments can be handled as files, enabling standardization of programs and initial setting data for each system.

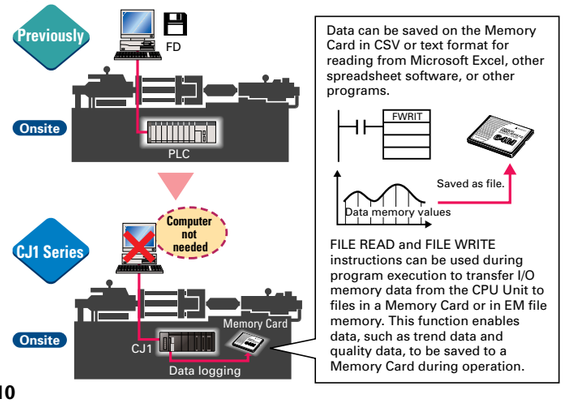
●Advantages in Using Windows Files

The Memory Card contains a compact flash card enabling programs to be written without a PLC. A PC card slot, available on many notebook computers, can be used instead of a Programming Device.



Log production conditions, inspection data, and other valuable information.

Eliminates the need for an onsite computer for a low-cost system that requires little space.

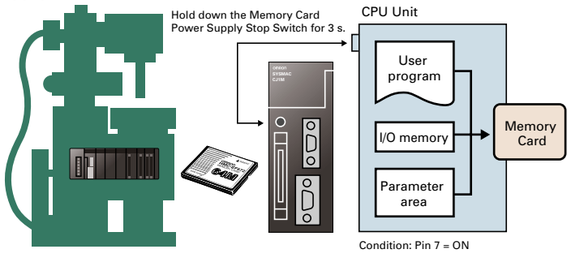


Data can be saved on the Memory Card in CSV or text format for reading from Microsoft Excel, other spreadsheet software, or other programs.

FILE READ and FILE WRITE instructions can be used during program execution to transfer I/O memory data from the CPU Unit to files in a Memory Card or in EM file memory. This function enables data, such as trend data and quality data, to be saved to a Memory Card during operation.

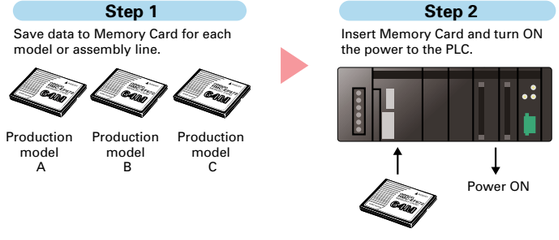
Backup is Simple.

Backup data for the entire PLC, including DeviceNet Units, Serial Communications Units, and other CPU Bus Units can be saved or read to a Memory Card. As a result, the same operation as that using ROM can be achieved using a Memory Card.



PLC Operation Can Be Switched by Changing the Memory Card.

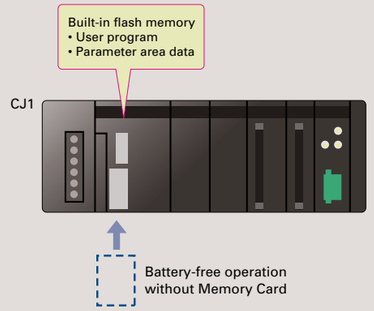
When the power is turned ON, the file in the Memory Card can be automatically transferred to the CPU Unit. As a result, the same operation as that using ROM can be achieved using a Memory Card.



Built-in Flash Memory (Standard Feature)

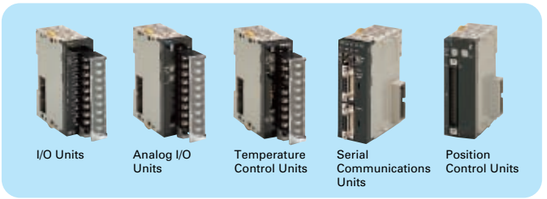
Battery-free Operation Using Flash Memory

When the user program or parameter area data is transferred to the CPU Unit, it is automatically backed up in flash memory in the CPU Unit. (The flash memory data is automatically restored to the working memory in the CPU Unit when the power supply is turned ON.) This enables battery-free operation without using a Memory Card.



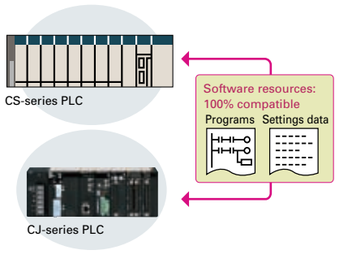
Reduce Maintenance Unit Stocks

The CJ1-series PLCs can be used for anything from small-scale to large-scale applications, helping to reduce the quantity of maintenance Units stocked for unexpected troubles or system expansion.



Software Compatibility with CS1-series PLCs

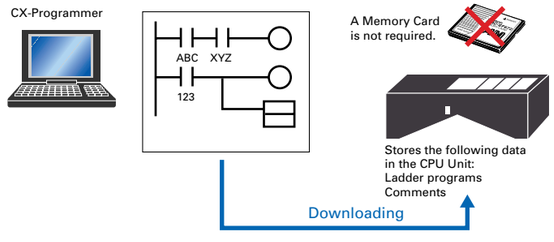
CJ-series architecture is 100% compatible with the CS-Series. User programs and other software resources can be shared to make standardizing software easier for all levels of the system.



Built-in Comment Memory *NEW*

(Unit version 3.0 or later and CX-Programmer Ver. 5.0 or higher are required.)

Comment memory is now provided in the CPU Unit. This enables comments for the CJ1M and other PLCs to be stored without a Memory Card.



When downloading projects, the Memory Card, EM file memory, or comment memory (in the CPU Unit's flash memory) can be selected as the transfer destination for I/O comments, symbol names, rung comments, and other data. This enables data such as I/O comments, symbol names, and rung comments to be stored in the CPU Unit's internal comment memory when a Memory Card or EM file memory are both not available.

64 KB: Equivalent to the contents of EM bank 1

Comment memory capacity	CJ1M			CJ1G				CJ1H		
	CPU□1	CPU□2	CPU□3	CPU42H	CPU43H	CPU44H	CPU45H	CPU65H	CPU66H	CPU67H
Program indices	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	128 KB	128 KB
Comments	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	128 KB	128 KB
Symbol tables	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	128 KB	128 KB	128 KB	128 KB

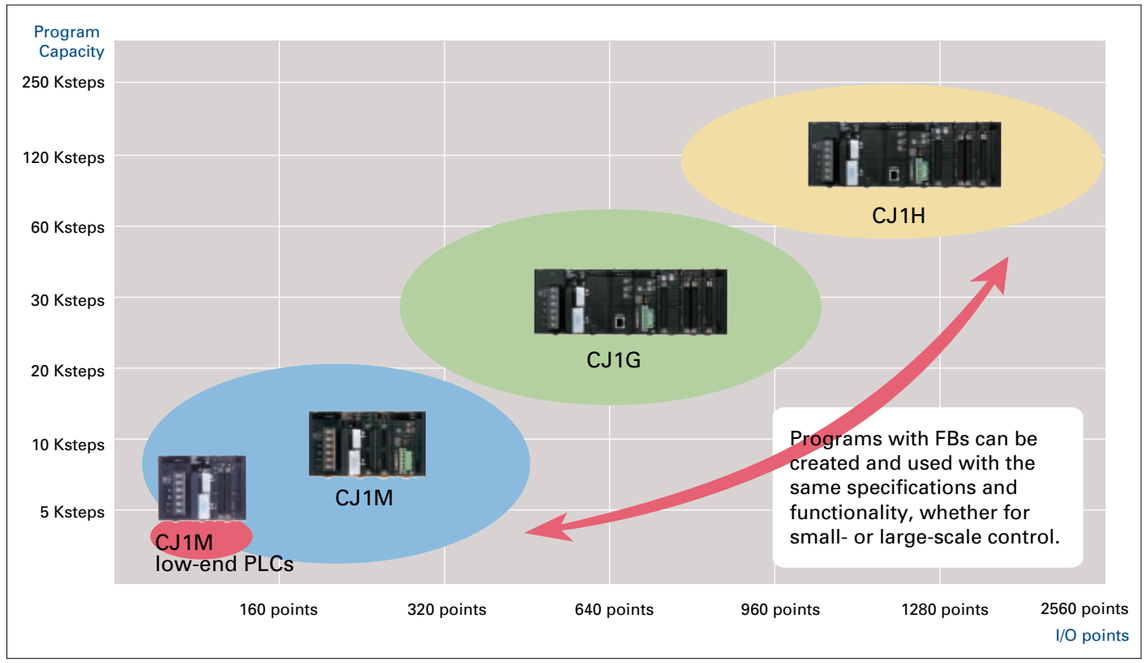
The comments can be stored in either of three locations: a) Memory Card, b) EM file memory, or c) Comment memory (added with this unit version). Select the location to store the comments in the user settings.

Greater Connectability with Component Products, with FB Compatibility (Ladder Programming/ Structured Text) More Attractive to Use with Gre ater Development Efficiency and Maintainability

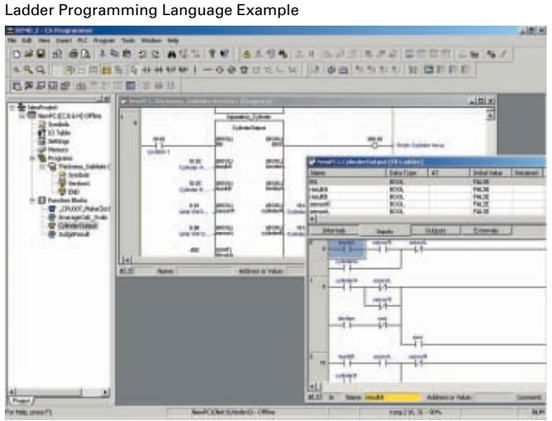
Function Block *NEW*

(Unit version 3.0 or later, and CX-Programmer Ver. 5.0 or higher are required.)

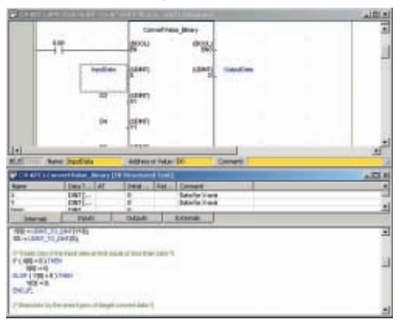
FB (Ladder Programming/Structured Text) Compatibility with all CS/CJ-series Models



Ladder Programming Language Example



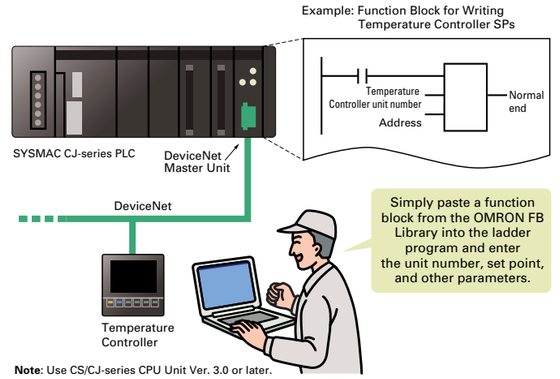
Structured Text Example



OMRON FB Library

The OMRON FB library provides function blocks for setting SPs, reading PVs, and reading/writing RUN/STOP status and other Temperature Controller parameters. The programmer simply pastes function blocks from the OMRON FB Library into the ladder program. The desired functions can be utilized simply by inputting the Temperature Controller unit number and address.

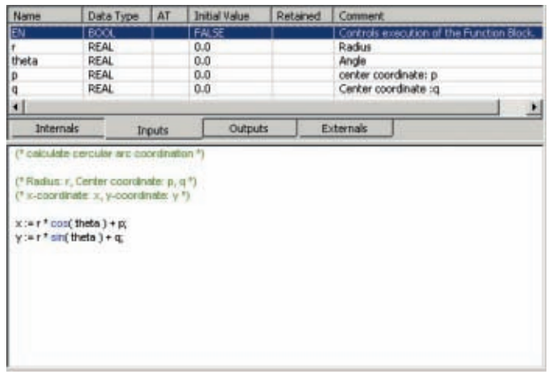
What Is the OMRON FB Library?
The OMRON FB Library is a set of functional objects for ladder programming for OMRON CS/CJ-series PLCs. By incorporating the OMRON function blocks provided by OMRON into a ladder program, the program interface for different control devices is easily completed. This reduces the number of working hours required for program development and, at the same time, improves product quality through standardization.



Note: Use CS/CJ-series CPU Unit Ver. 3.0 or later.

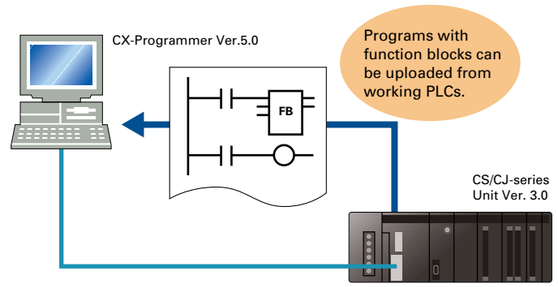
The Structured Text (ST) Language Enables Trigonometric Functions and Other Arithmetic Processes

In addition to ladder programming, function block logic can be written in ST, which conforms to IEC61131-3. With ST, arithmetic processing is also possible, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing difficult to achieve in ladder programs becomes easy to write.



Recovery Possible by Uploading Function Blocks from Working PLC

Programs with function blocks can be uploaded from CPU Units, just like normal programs, without the need for additional memory such as a Memory Card.



Truly Seamless Incorporation of OMRON Compon ents and Other Devices into Networks

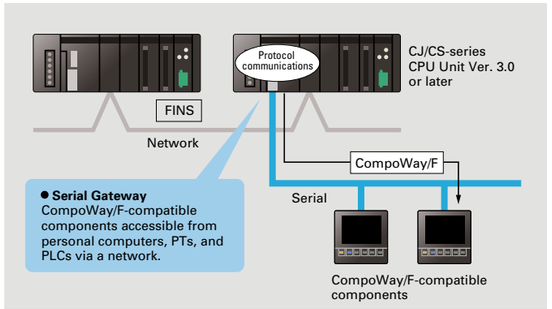
Serial Gateway NEW

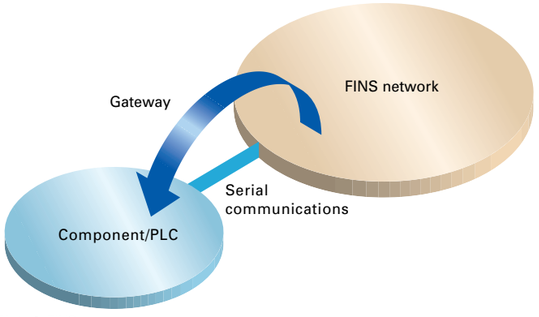
CPU Units with Ver. 3.0 or later
Serial Communications Units with Ver. 1.2 or later

When the CPU Unit (Ver. 3.0 or later) or Serial Communications Board or Serial Communications Unit (Ver. 1.2 or later) receives a FINS command containing a CompoWay/F command (See note 1.) via network or serial communications, the command is automatically converted to a protocol suitable for the message and forwarded using serial communications.

- CompoWay/F (See note 2.)
- Host Link FINS (Possible only with Serial Communications Boards or Serial Communications Units Ver. 1.2 or later)

FINS network



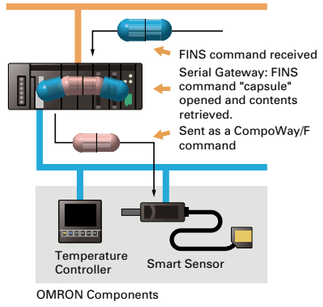


Note 1: FINS
Abbreviation for Factory Interface Network Service. A command system for message services common to OMRON networks. FINS commands can be sent across up to 8 network levels, including serial communications paths using a serial gateway. (Possible only with CS/CJ-series CPU Unit Ver. 2.0 or later.)

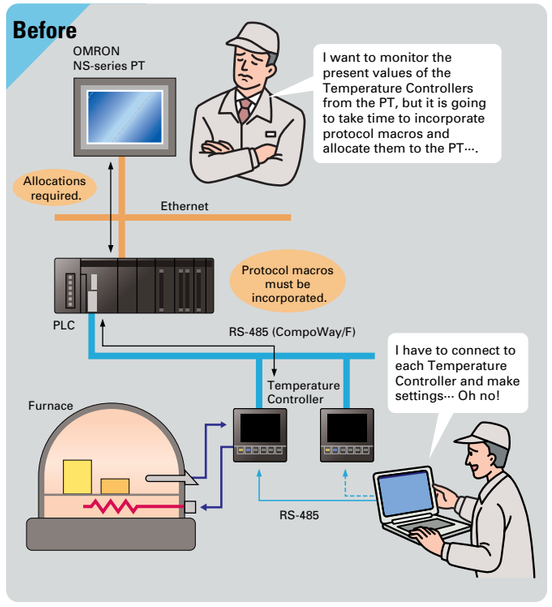
Note 2: CompoWay/F
CompoWay/F is an integrated communications protocol used for OMRON general-purpose serial communications. It is used by Temperature Controllers, Digital Panel Meters, Timer/Counters, Smart Sensors, Cam Positioners, Safety Controllers, etc. (as of July 2004).

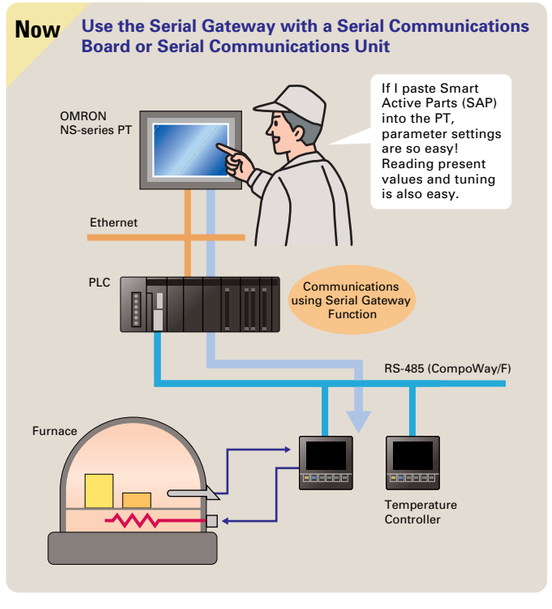
● Serial Gateway System (Reference)

When CompoWay/F commands are enclosed in FINS commands and sent to Serial Communications Boards or Serial Communications Units (Ver. 1.2) or serial ports on CPU Unit Ver. 3.0, the enclosed CompoWay/F command is retrieved using a Serial Gateway Function and sent as a CompoWay/F command.

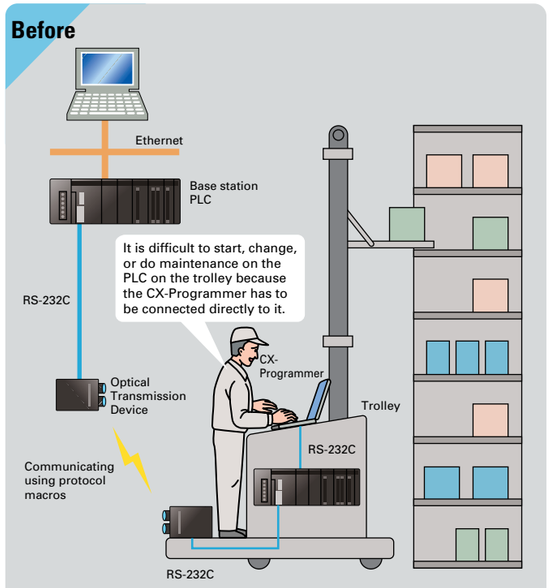


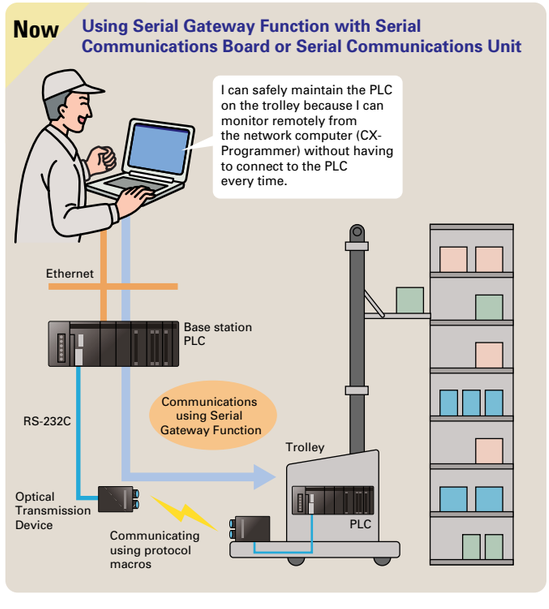
Example Setting Parameters and Monitoring CompoWay/F-compatible OMRON Temperature Controllers in a Furnace System





Example Remote Maintenance and Monitoring of a PLC on a Trolley in an Automated Warehouse





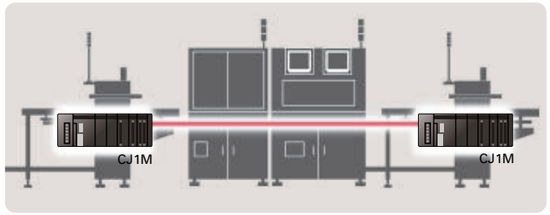
Note: Supported by Serial Communications Units only.

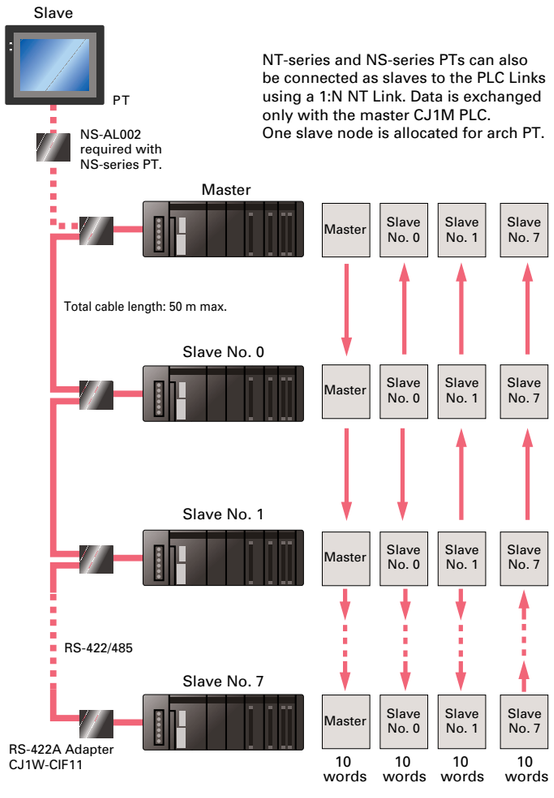
Serial PLC Links

(Connecting Built-in RS-232C Ports on CJ1M CPU Units)

Use PLC Links for exclusive control on PCB carrier loaders and unloaders, or to exchange temperature and time information on conveyor ovens.

Data links can be created between up to nine CJ1M PLCs with up to 10 words each using the built-in RS-232C ports. RS-422A Adapters (CJ1W-CIF11) can be used to easily convert between RS-232C and RS-422A.





NT-series and NS-series PTs can also be connected as slaves to the PLC Links using a 1:N NT Link. Data is exchanged only with the master CJ1M PLC.
One slave node is allocated for arch PT.

Achieve More Flexible, More Precise Machines with Pulse I/O Control

PULSE I/O Built-in Pulse I/O

CJ1M-CPU21 (5-Kstep)
CJ1M-CPU22 (10-Kstep)
CJ1M-CPU23 (20-Kstep)

- Pulse outputs: 100 kHz, 2 axes
- Counters: Single-phase, 100 kHz, 2 counters or Differential phases, 50 kHz, 2 counters
- Interrupts: 4
  The above can all be used simultaneously.

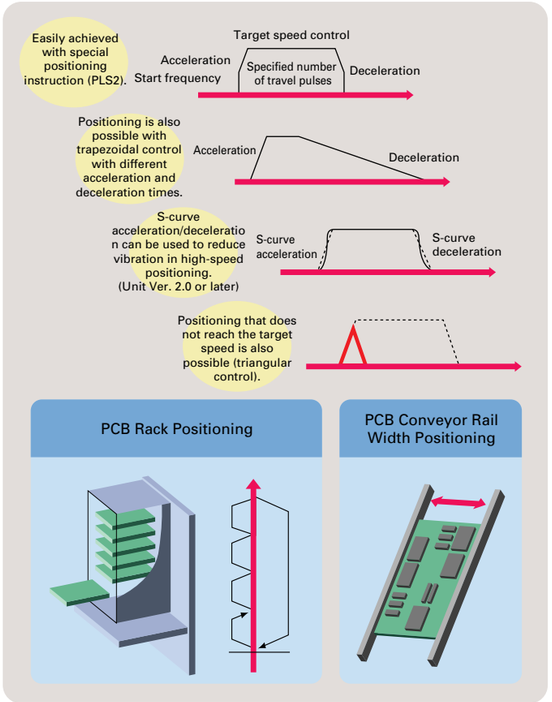
Pulse Outputs (CJ1M-CPU21/22/23)

Two Pulse Outputs at 100 kHz

■ Origin Searches (ORG Instruction)

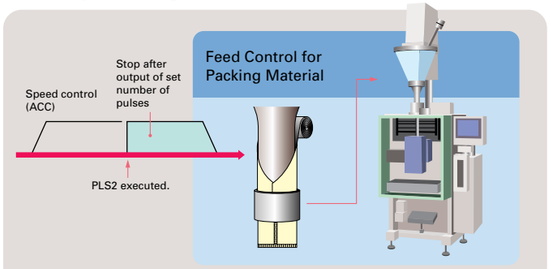
- Origin searches are possible with one ORG instruction.
- Even with servomotors, a differential-phase counter reset output minimizes position deviations for origin searches.

■ Positioning with Trapezoidal Acceleration/Deceleration (PLS2 Instruction)



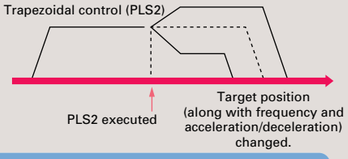
- Fast startup times (the time from instruction execution to start of pulse output): 46 μs minimum, 70 μs for trapezoidal acceleration/deceleration.

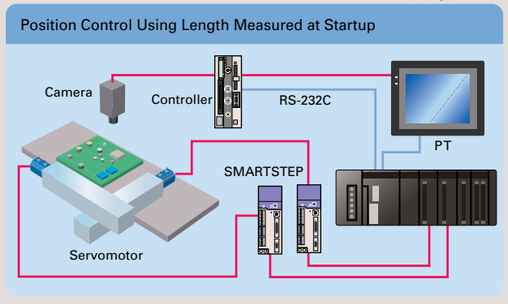
■ Interrupt Feeding (ACC and PLS2 Instructions)



■ Changing Target Position during Positioning (PLS2 and PLS2 Instructions)

- The target position can be changed even after positioning has been started. Reversals (positioning in the opposite direction) are also possible.





High-precision Variable Duty Ratio (PWM output)
(Unit Ver. 2.0 or later)

Specify a duty ratio in 0.1% units.

Fine-tune the opening/closing times of the valve.

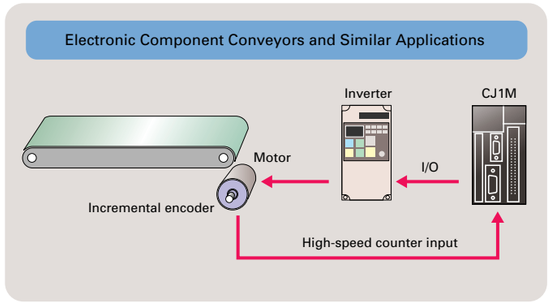
High-speed Counter Inputs (CJ1M-CPU21/22/23)

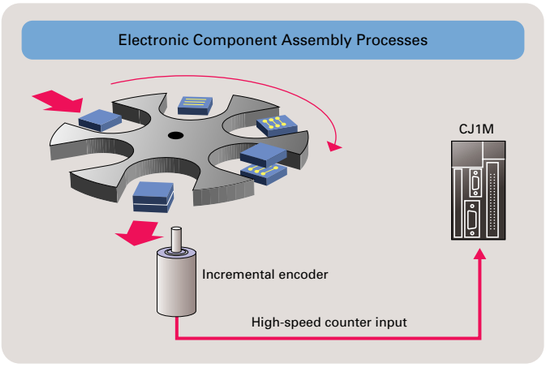
Two counter inputs, either single-phase, 100 kHz, or differential phases, 50 kHz

■ High-speed Counter in Linear Mode

■ High-speed Counter in Ring Mode

High-speed line-driver inputs for either single-phase, 100 kHz, or differential phases, 50 kHz, can be input. (For 24 V DC: Single-phase, 60 kHz, or differential phases, 30 kHz)



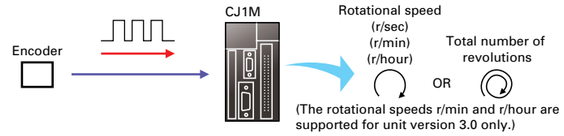


■ High-speed Counter Frequency (Speed) Measurements

For example, in rotational speed measurements in inspection applications or tact-time speed displays for conveyors, the speed can be monitored by counting pulses without using a special speed calculation device.
The present value can be monitored during high-speed counter input by using the PRV instruction.

Measure Revolution Data (Unit Ver. 2.0 or later)

High-speed counter input pulses can be converted to rotational speed (or total number of revolutions) using the new PRV2(883) instruction.

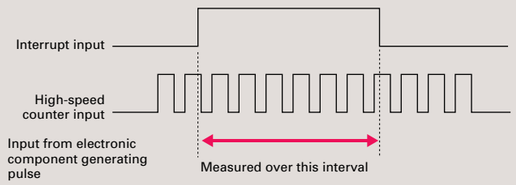


(The rotational speeds r/min and r/hour are supported for unit version 3.0 only.)

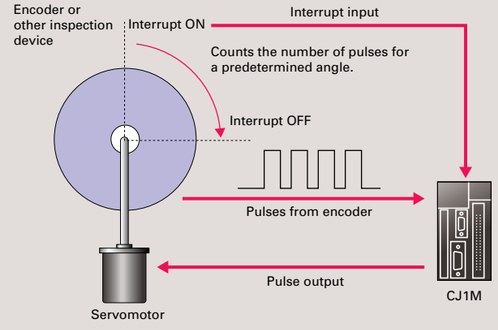
Interrupt Inputs (CJ1M-CPU21/22/23)

Use these inputs for either four interrupt inputs or four high-speed inputs (with a minimum pulse width of 30 μs).

- Interrupts can be generated either on the rising or falling edge to enable accurate recording or judgement of inspection data, such as that for electronic components.



- Application Example

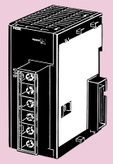


Use Five or More Interrupt Inputs, or Use High-speed Inputs for CPU Units Other Than the CJ1M-CPU21/22/23

Interrupt Input Units with 16 points and High-speed Input Units with 16 points can be used with any of the CJ1-series CPU Units to add high-speed input or interrupt input capabilities to CPU Units that do not support built-in pulse I/O. High-speed Input Units read pulse signals with a minimum pulse width of 50 μs, and Interrupt Input Units feature an interrupt response time of 370 μs.

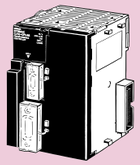
A Complete Lineup to Let You Select the Desired Functions

Power Supply Units



CJ1W-PA205R
CJ1W-PA202
CJ1W-PD025

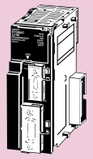
CPU Units



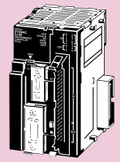
CJ1H-CPU67H *NEW*
CJ1H-CPU66H/65H
CJ1G-CPU45H/44H/43H/42H

End Cover

CJ1W-TER01
(included with CPU Unit)

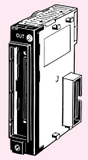


CJ1M-CPU13/12/11



CPU Unit with Pulse I/O
CJ1M-CPU23/22/21

I/O Control Unit

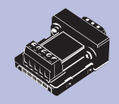


CJ1W-IC101 (required for Expansion Rack)

Memory Cards

HMC-372/672

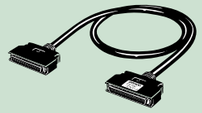
RS-422A Adapter



CJ1W-CIF11
(Converts RS-232C to RS-422A/485, no isolation)

CPU Rack

I/O Connecting Cables

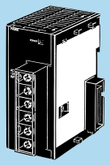


CS1W-CN□□3
(30 or 70 cm; 2, 3, 5, 10, or 12 m)

Expansion Rack

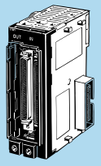
The CJ1M-CPU11/12/21/22 cannot be expanded.

Power Supply Units



CJ1W-PA205R
CJ1W-PA202
CJ1W-PD025

I/O Interface Unit



CJ1W-II101

End Cover

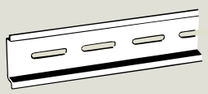
CJ1W-TER01
(included with I/O Interface Unit)

End Plate

PFP-M
(included with I/O Interface Unit)

DIN Track

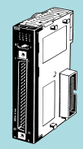
PFP-50N/100N/
100N2



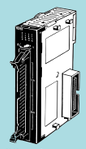
Basic I/O Units

●Input Units

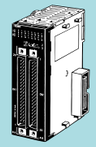
16-point
DC Input Unit
CJ1W-ID201/211



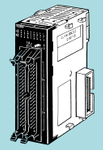
32-point
DC Input Unit
CJ1W-ID231



32-point
DC Input Unit
CJ1W-ID232



64-point
DC Input Unit
CJ1W-ID261



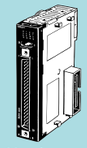
64-point
DC Input Unit
CJ1W-ID262

8 or 16-point
AC Input Units
CJ1W-IA111/201

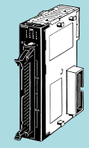
●Output Units

8-point
Transistor Output Units
CJ1W-OD20□

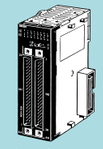
16-point
Transistor Output Units
CJ1W-OD211/212



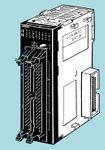
32-point
Transistor Output Unit
CJ1W-OD231



32-point
Transistor Output Units
CJ1W-OD232/233



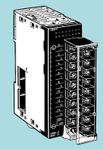
64-point
Transistor Output Unit
CJ1W-OD261



64-point
Transistor Output Unit
CJ1W-OD262/263

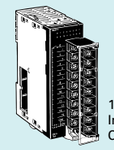
8-point (Independent)
Relay Contact Output Unit
CJ1W-OC201

16-point
Relay Contact Output Unit
CJ1W-OC211



8-point
Triac Output Unit
CJ1W-OA201

●Interrupt Input Unit

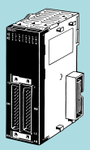


16-point
Interrupt Input Unit
CJ1W-INT01

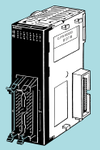
●High-speed Input Unit

16-point
High-speed Input Unit
CJ1W-IDP01

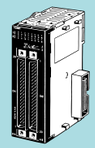
●I/O Units



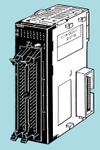
32-point
DC Input/Transistor
Output Unit
CJ1W-MD231



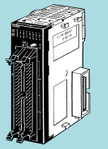
32-point
DC Input/Transistor
Output Unit
CJ1W-MD232/233



64-point
DC Input/Transistor
Output Unit
CJ1W-MD261

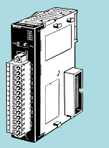


64-point
DC Input/Transistor
Output Unit
CJ1W-MD263



64-point
TTL I/O Unit
CJ1W-MD563

●B7A Interface Units



64-point
Interface Units
CJ1W-B7A□□

Special I/O Units

Analog Input Units
CJ1W-AD081-V1
CJ1W-AD041-V1
(4 or 8 inputs)

Analog Output Units
CJ1W-DA08V
CJ1W-DA041/021
(2, 4, or 8 outputs)

Analog I/O Unit
CJ1W-MAD42
(4 inputs and 2 outputs)

Process Analog Input
Units
CJ1W-PTS51
CJ1W-PTS52

Temperature Control Units
CJ1W-TC□□□
(2 or 4 temperature inputs)

Position Control Units
CJ1W-NC□□□
(1 to 4 axes)

High-speed
Counter Unit
CJ1W-CT021
(2 counters)

ID Sensor Units
CJ1W-V600C1□
(For 1 or 2 Heads)

CompoBus/S
Master Unit
CJ1W-SRM21

CPU Bus Units

NEW
Position Control Unit
CJ1W-NCF71

Serial Communications
Units
CJ1W-SCU41-V1 *NEW*
(RS-232C and
RS422/485)
CJ1W-SCU21-V1 *NEW*
(RS-232C x 2)

CJ1W-ETN21
(100Base-TX/10Base-T)

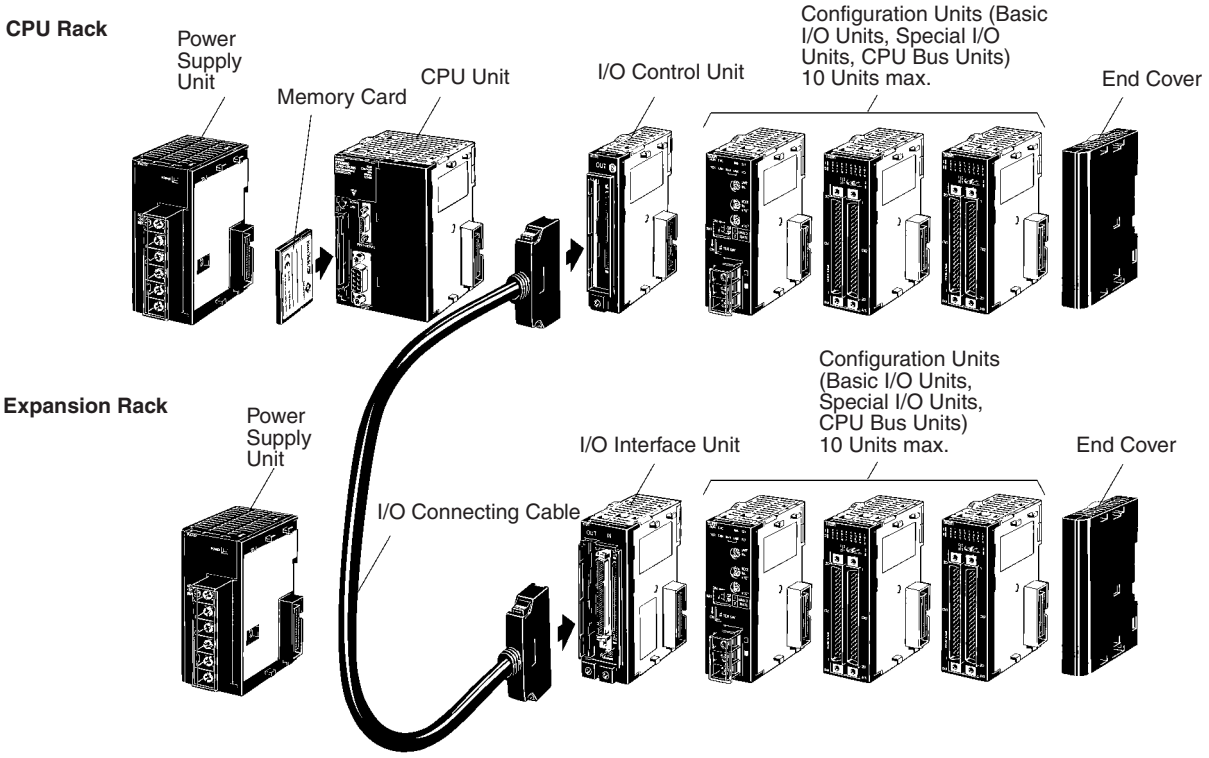
Controller Link Units
CJ1W-CLK21

FL-netUnit *NEW*
CJ1W-FLN22

DeviceNet Units
CJ1W-DRM21

Basic System Configuration

System Configuration



■ CJ-series CPU Rack

A CJ-series CPU Rack consists of a CPU Unit, Power Supply Unit, Basic I/O Units, Special I/O Units, CPU Bus Units, and an End Cover. I/O Control Units are required to connect CJ-series Expansion Racks. Memory Cards are optional.

■ CJ-series Expansion Racks

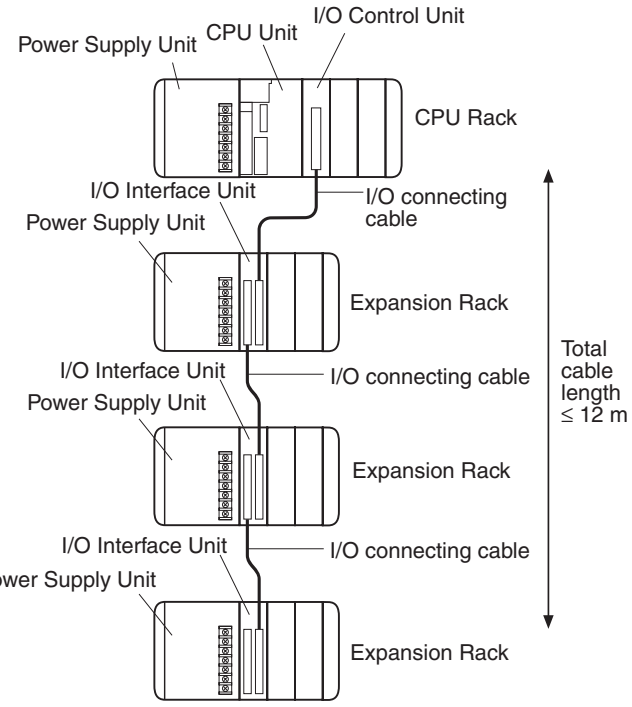
CJ-series Expansion Racks can be connected to CJ-series CPU Racks or other CJ-series Expansion Racks.

A CJ-series Expansion Rack consists of a Power Supply Unit, an I/O Interface Unit, Basic I/O Units, Special I/O Units, CPU Bus Units, and an End Cover.

Note: Connection of CS-series Expansion Racks is not supported.

Number of Expansion Racks

CPU Unit	No. of Expansion Racks	Max. No. of Units
CJ1H-CPU67H	3	40
CJ1H-CPU66H		
CJ1H-CPU65H		
CJ1G-CPU45H/45P		
CJ1G-CPU44H/44P		
CJ1G-CPU43H/43P	2	30
CJ1G-CPU42H/42P		
CJ1M-CPU13	1	20
CJ1M-CPU23		
CJ1M-CPU12	Cannot be connected.	10
CJ1M-CPU22		
CJ1M-CPU11		
CJ1M-CPU21		



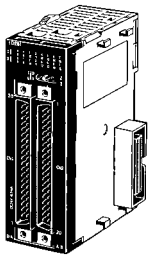
I/O Allocations

■ I/O Allocations

In CJ-series PLCs, part of the I/O memory is allocated to each Unit. Units are divided into the following 3 groups for allocations.

- Basic I/O Units
- Special I/O Units
- CPU Bus Units

Basic I/O Units



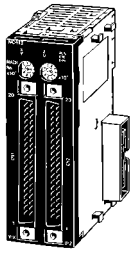
Basic I/O Units

Allocations

CIO Area:
CIO 0000 to CIO 0159 (See note.)
(Memory is allocated in word units based on mounting position in the Racks.)

Note: The Rack's first word setting can be changed from the default setting (CIO 0000) to any word from CIO 0000 to CIO 9999. The first word setting can be changed only with a Programming Device other than a Programming Console.

Special I/O Units



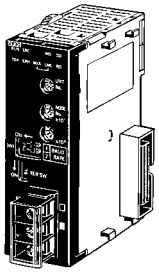
Special I/O Units

Allocations

Special I/O Unit Area:
CIO 2000 to CIO 2959 (See note.)
(Each Unit is allocated ten words based on its unit number.)

Note: A maximum of 40 Units can actually be mounted to a PLC because that is the maximum number of slots possible.

CJ1 CPU Bus Units



CJ1 CPU Bus Units

Allocations

CPU Bus Unit Area:
CIO 1500 to CIO 1899
(Each Unit is allocated 25 words based on its unit number.)

■ Allocations to Basic I/O Unit Groups

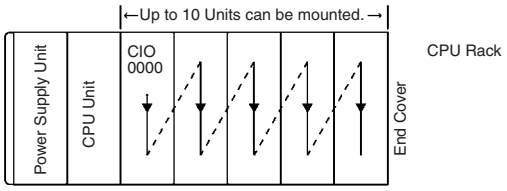
Allocated words in the CIO Area: CIO 0000 to CIO 0159

Basic I/O Units can be mounted to the CPU Rack and Expansion Racks.

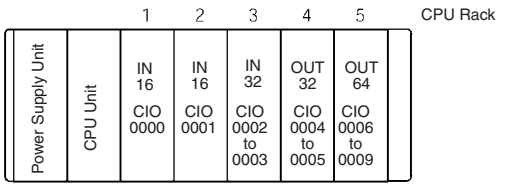
Allocation Methods

1. CPU Rack

Basic I/O Units on the CPU Rack are allocated words left to right (i.e., from the Unit nearest the CPU Unit) starting from CIO 0000. Units are allocated as many words as required in word units (16 bits). The CX-Programmer can also be used to specify the first slot words and to reserve words.



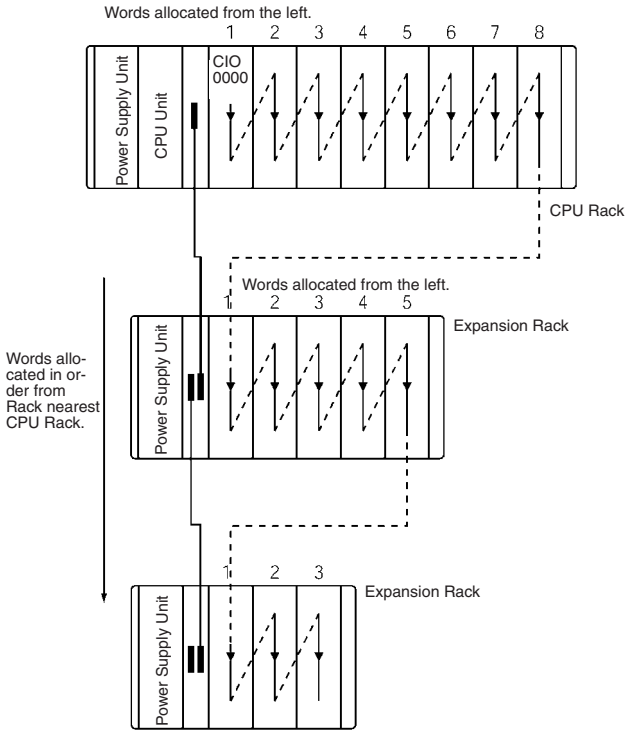
Example Words allocated from the left.



Note: Units with between 1 and 16 I/O points are allocated 1 word (16 bits) and Units with between 17 and 32 I/O points are allocated 2 words (32 bits). For example, 8-point Relay Units are allocated 1 word, with bits 00 to 07 actually allocated to the I/O points.

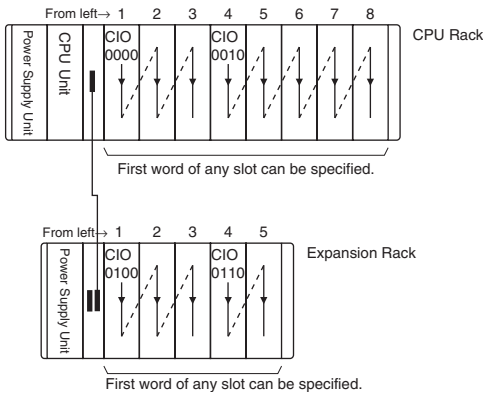
2. Allocations to Expansion Racks

I/O allocation to Basic I/O Units continues from the CPU Rack to the Expansion Racks. Words are allocated from left to right and each Unit is allocated as many words as it requires in word units, just like Units in the CPU Rack. A Rack's first word setting can be changed set to any word from CIO 0000 to CIO 9999 using a Programming Device.



Specifying First Slot Words (Unit Ver. 2.0 or Later with CX-Programmer Ver. 4.0 or Higher)

CX-Programmer version 4.0 can be used to specify the first word of specific slots on specific Racks. Up to 64 groups consisting of a corresponding Rack/slot number and first word can be specified, allowing, for example, Input Units and Output Units to be allocated in separate locations or allowing allocations to be specified in user-set groups.



Note: 1. CJ1G/H-CPU□□H: Up to 8 groups can be specified when using Pre-Ver. 2.0 CPU Units with lot number 020602 (June 1, 2002) or later.
CJ1M-CPU□2/□3: Up to 8 groups can be specified when using Pre-Ver. 2.0 CPU Units.

2. Up to 8 groups can be specified when using CX-Programmer version 3.2.

■ Allocations to Special I/O Units

Each of these Units is allocated ten words in the Special I/O Unit Area (CIO 2000 to CIO 2959).

Special /O Units can be mounted to the CPU Rack and Expansion Racks.

Each Unit is allocated 10 words in the Special I/O Unit Area according to its unit number, as shown in the following table.

Unit number	Words allocated
0	CIO 2000 to CIO 2009
1	CIO 2010 to CIO 2019
2	CIO 2020 to CIO 2029
⋮	⋮
15	CIO 2150 to CIO 2159
⋮	⋮
95	CIO 2950 to CIO 2959

Note: Special I/O Units are ignored during I/O allocation to Basic I/O Units. Slots containing Special I/O Units are treated as empty slots.

■ Allocations to CPU Bus Units

Each CPU Bus Unit is allocated 25 words in the CPU Bus Unit Area (CIO 1500 to CIO 1899).

CPU Bus Units can be mounted to the CPU Rack or Expansion Racks.

Basic System Configuration

Each Unit is allocated 25 words in the CPU Bus Unit Area according to its unit number, as shown in the following table.

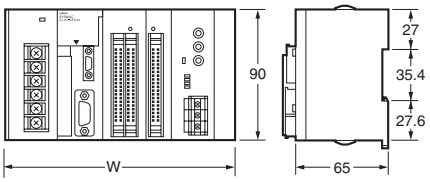
Unit number	Words allocated
0	CIO 1500 to CIO 1524
1	CIO 1525 to CIO 1549
2	CIO 1550 to CIO 1574
⋮	⋮
F	CIO 1875 to CIO 1899

Note: CPU Bus Units are ignored during I/O allocation to Basic I/O Units. The same unit numbers can be used for Special I/O Units and CPU Bus Units.

Dimensions

Note: Units are in mm unless specified otherwise.

■ Product Dimensions



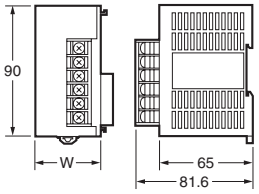
Power Supply Units, CPU Units, and End Covers

Unit/product	Model number	Width
Power Supply Unit	CJ1W-PA205R	80
	CJ1W-PA202	45
	CJ1W-PD025	60
CPU Unit	CJ1M-CPU1□	31
	CJ1M-CPU2□	49
	CJ1H-CPU□□□ CJ1G-CPU□□□	62
End Cover	CJ1W-TER01	14.7

■ Example Rack Widths using CJ1W-PA202 Power Supply Unit (AC, 14 W)

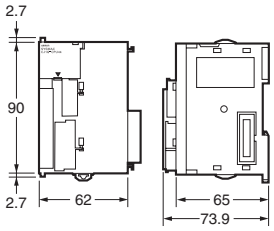
No. of Units mounted with 31-mm width	Rack width (mm)		
	With CJ1M-CPU11/12/13	With CJ1M-CPU21/22/23	With CJ1G or CJ1H CPU Unit
1	121.7	139.7	152.7
2	152.7	170.7	183.7
3	183.7	201.7	214.7
4	214.7	232.7	245.7
5	245.7	263.7	276.7
6	276.7	294.7	307.7
7	307.7	325.7	338.7
8	338.7	356.7	369.7
9	369.7	387.7	400.7
10	400.7	418.7	431.7

Power Supply Units

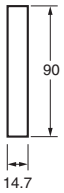


W=45: CJ1W-PA202
W=80: CJ1W-PA205R
W=60: CJ1W-PD025

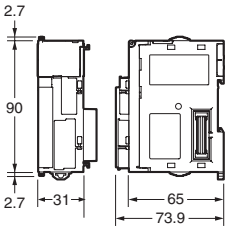
CPU Units
CJ1H-CPU□□□
CJ1G-CPU□□□



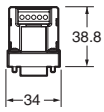
End Cover
(included with CPU Unit)



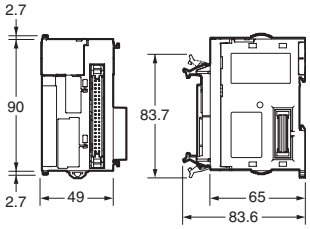
CJ1M-CPU11/12/13



RS-422A Adapter
CJ1W-CIF11



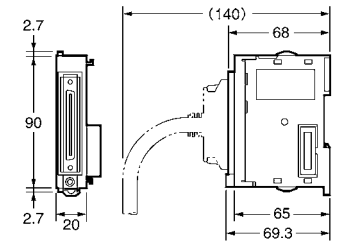
CJ1M-CPU21/22/23



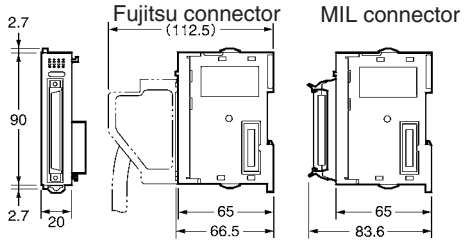
■ Units of Width 20 mm

Unit	Model number	Width
I/O Control Unit	CJ1W-IC101	20
32-point Basic I/O Units	CJ1W-ID231/232	
	CJ1W-OD231/232	
B7A Interface Unit	CJ1W-B7A22 CJ1W-B7A14 CJ1W-B7A04	
CompoBus/S Master Unit	CJ1W-SRM21	

I/O Control Unit



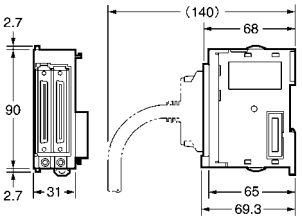
32-point I/O Units (CJ1W-ID23□/OD23□)



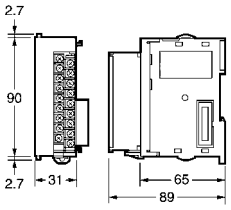
■ Units of Width 31 mm

Unit	Model number	Width
I/O Interface Unit	CJ1W-II101	31
8/16-point Basic I/O Units	CJ1W-ID201 CJ1W-ID211 CJ1W-IA111/201 CJ1W-OD20□ CJ1W-OD201/202 CJ1W-OD211/212 CJ1W-OC201/211 CJ1W-OA201	
32-point Basic I/O Units	CJ1W-MD231	
	CJ1W-MD232/233	
64-point Basic I/O Units	CJ1W-ID261 CJ1W-OD261 CJ1W-MD261	
	CJ1W-ID262 CJ1W-OD263/263 CJ1W-MD263 CJ1W-MD563	
Interrupt Input Unit	CJ1W-INT01	
High-speed Input Unit	CJ1W-IDP01	
Analog I/O Units	CJ1W-AD□□□ CJ1W-DA□□□ CJ1W-MAD42	
Process Input Units	CJ1W-PTS51/52	
Temperature Control Units	CJ1W-TC□□□	
Position Control Units	CJ1W-NC113/133	
	CJ1W-NC213/233	
	CJ1W-NC413/433	
High-speed Counter Unit	CJ1W-CT021	
ID Sensor Units	CJ1W-V600C11 CJ1W-V600C12	
Controller Link Unit	CJ1W-CLK21	
Serial Communications Unit	CJ1W-SCU41 CJ1W-SCU21	
Ethernet Unit	CJ1W-ETN11	
DeviceNet Unit	CJ1W-DRM21	

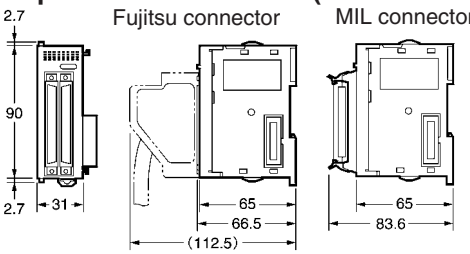
I/O Interface Unit



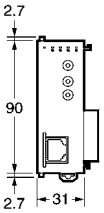
8/16-point Basic I/O Units, Interrupt Input Unit, and High-speed Input Unit



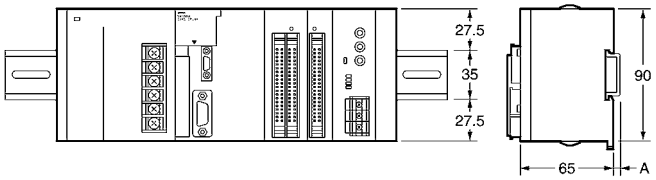
64-point Basic I/O Units and 32-point Basic I/O Units (CJ1W-MD23□)



Special I/O Units and CPU Bus Units



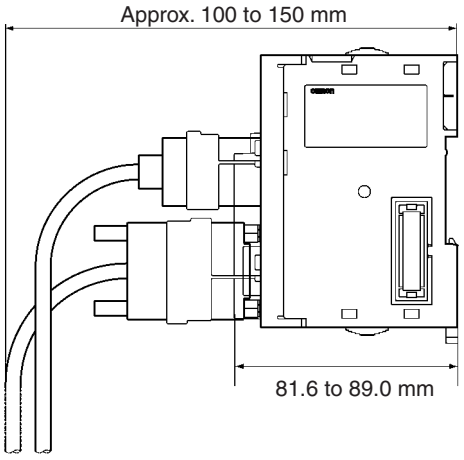
■ Mounting Dimensions



DIN Track model number	A
PFP-100N2	16 mm
PFP-100N	7.3 mm
FPP-50N	7.3 mm

■ Mounting Height

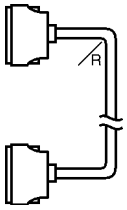
The mounting height of CJ-series CPU Racks and Expansion Racks is from 81.6 to 89.0 mm depending on the Units that are mounted. Additional height is required to connect Programming Devices (e.g., CX-Programmer or Programming Console) and Cables. Be sure to allow sufficient mounting height.



Note: Consider the following points when expanding the configuration:

- The total length of I/O Connecting Cable must not exceed 12 m.
- I/O Connecting Cables require the bending radius indicated below.

CJ-series Connecting Cable



R ≥ 69 mm

Note: Outer diameter of cable: 8.6 mm.

Current Consumption

The amount of current/power that can be supplied to the Units mounted in a Rack is limited by the capacity of the Rack's Power Supply Unit. The system must be designed so that the total current consumption of the Units does not exceed the maximum current for each voltage group and the total power consumption does not exceed the maximum for the Power Supply Unit.

■ CPU Racks and Expansion Racks

The following table shows the maximum currents and power that can be supplied by Power Supply Units on CPU Racks and Expansion Racks.

Note: 1. When calculating current/power consumption in a CPU Rack, be sure to include the power required by the CPU Unit itself. When expanding the configuration, be sure to include the power required by the I/O Control Unit.

2. When calculating current/power consumption in an Expansion Rack, be sure to include the power required by the I/O Interface Unit itself.

Power Supply Unit	Maximum current consumption			(C) Maximum total power consumption
	(A) 5-V group	(B) 24-V group relay driver power supply	24-V group service power supply	
CJ1W-PA205R	5.0 A	0.8 A	None	25 W
CJ1W-PA202	2.8 A	0.4 A	None	14 W
CJ1W-PD025	5.0 A	0.8 A	None	25 W

Be sure that both conditions 1 and 2 below are met.

Condition 1: Maximum Current Supply

1. Current required at 5 VDC by all Units (A) ≤ Maximum current consumption shown in table

2. Current required at 24 VDC by all Units (B) ≤ Maximum current consumption shown in table

Condition 2: Maximum Total Power Supply

A × 5 VDC + B × 24 VDC + C × 24 VDC ≤ Maximum total power consumption shown in table (C)

■ Example Calculations

In this example, the following Units are mounted to a CJ-series CPU Rack with a CJ1W-PA202 Power Supply Unit.

Unit	Model	Quantity	5-VDC	24-VDC
CPU Unit	CJ1G-CPU45H	1	0.910 A	---
I/O Control Unit	CJ1W-IC101	1	0.020 A	---
Input Units	CJ1W-ID211	2	0.080 A	---
	CJ1W-ID231	2	0.090 A	---
Output Units	CJ1W-OC201	2	0.090 A	0.048 A
Special I/O Unit	CJ1W-DA041	1	0.120 A	---
CPU Bus Unit	CJ1W-CLK21	1	0.350 A	---
Current consumption	Calculation		0.910+0.020+0.080×2+0.090×2+ 0.090×2+0.120+0.350	0.048 A×2
	Result		1.92 A (≤2.8 A)	0.096 A (≤0.4 A)
Power consumption	Calculation		1.92×5 V=9.60 W	0.096 A×24 V=2.304 W
	Result		9.60+2.304=11.904 W (≤14 W)	

■ Current Consumption Tables

CPU Units and Expansion Units

Name	Model	Current consumption at 5 V (A)
CPU Units (These values include current consumption for a Programming Console or CX-Programmer.)	CJ1H-CPU67H/66H/65H	0.99 (See note.)
	CJ1G-CPU45H/44H/ 43H/42H	0.91 (See note.)
	CJ1G-CPU45P/44P/ 43P/42P	1.06 (See note.)
	CJ1M-CPU11/12/13	0.58 (See note.)
	CJ1M-CPU21/22/23	0.64 (See note.)
Expansion Unit	CJ1W-IC101	0.02
	CJ1W-II101	0.13
End Cover	CJ1W-TER01	Included in CPU Unit or Expansion Unit.

Note: Add 0.15 A per Unit when the NT-AL001-E is connected and 0.04 A when the CJ1W-CIF11 RS-422A Adapter is connected.

CJ-series CPU Bus Units

Name	Model	Current consumption at 5 V (A)
Controller Link Unit	CJ1W-CLK21-V1	0.35
Serial Communications Unit	CJ1W-SCU41	0.38 (See note.)
	CJ1W-SCU21	0.28 (See note.)
Ethernet Unit	CJ1W-ETN21	0.37
	CJ1W-ETN11	0.38
FL-net Unit	CJ1W-FLN22	0.37
DeviceNet Unit	CJ1W-DRM21	0.33

Note: Add 0.15 A per Unit when the NT-AL001-E is connected and 0.04 A when the CJ1W-CIF11 RS-422A Adapter is connected.

CJ-series Basic I/O Units and Interrupt Input Unit

Category	Name	Model	Current consumption at 5 V (A)	Current consumption at 24 V (A)
Basic Input Units	DC Input Units	CJ1W-ID201	0.09	---
		CJ1W-ID211	0.08	
		CJ1W-ID231	0.09	
		CJ1W-ID232	0.09	
		CJ1W-ID261	0.09	
		CJ1W-ID262	0.09	
	AC Input Units	CJ1W-IA111	0.09	
		CJ1W-IA201	0.08	
Basic Output Units	Transistor Output Units	CJ1W-OD201	0.09	
		CJ1W-OD202	0.11	
		CJ1W-OD203	0.10	
		CJ1W-OD204	0.10	
		CJ1W-OD211	0.10	
		CJ1W-OD212	0.10	
		CJ1W-OD231	0.14	
		CJ1W-OD232	0.15	
		CJ1W-OD233	0.14	
		CJ1W-OD261	0.17	
		CJ1W-OD262	0.17	
		CJ1W-OD263	0.17	
	Relay Output Units	CJ1W-OC201	0.09	0.048 (0.006 × No.of ON points)
		CJ1W-OC211	0.11	0.096 (0.006 × No.of ON points)
	Triac Output Unit	CJ1W-OA201	0.22	---
Basic I/O Units	DC Input/ Transistor Output Units	CJ1W-MD231	0.13	
		CJ1W-MD233	0.13	
		CJ1W-MD261	0.14	
		CJ1W-MD263	0.14	
	TTL I/O Unit	CJ1W-MD563	0.19	
Interrupt Input Unit		CJ1W-INT01	0.08	
High-speed Input Unit		CJ1W-IDP01	0.08	
B7A Interface Units		CJ1W-B7A22	0.07	
		CJ1W-B7A14	0.07	
		CJ1W-B7A04	0.07	

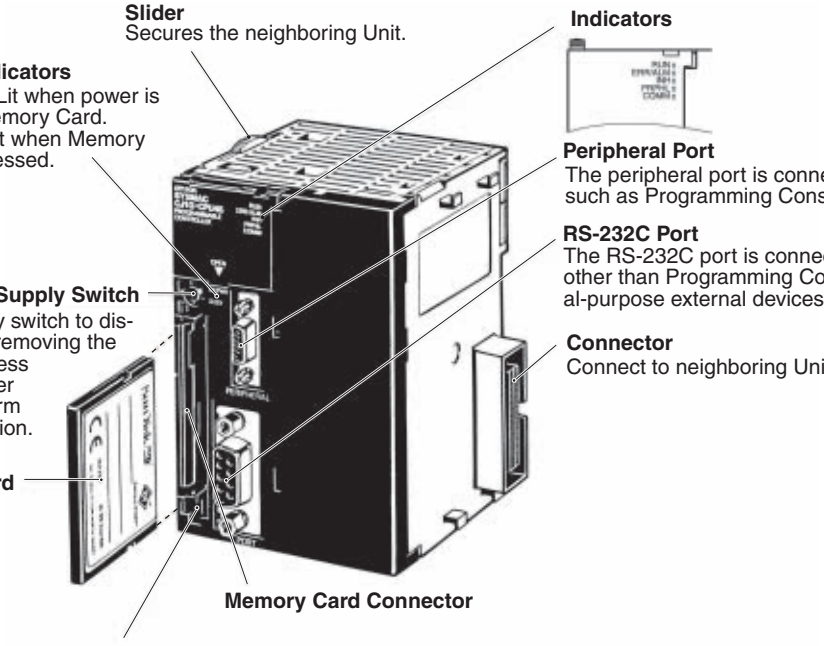
CJ-series Special I/O Units

Name	Model	Current consumption at 5 V (A)	Current consumption at 24 V (A)
Analog Input Units	CJ1W-AD081/081-V1	0.42	
	CJ1W-AD041-V1	0.42	
Analog Output Units	CJ1W-DA041	0.12	
	CJ1W-DA021	0.12	
	CJ1W-DA08V/08C	0.14	
Analog I/O Unit	CJ1W-MAD42	0.58	
Process Input Units	CJ1W-PTS51/52	0.25	
Temperature Control Units	CJ1W-TC□□□	0.25	
Position Control Units	CJ1W-NC113/133 CJ1W-NC213/233	0.25	
	CJ1W-NC413/433	0.36	
High-speed Counter Unit	CJ1W-CT021	0.28	
ID Sensor Units	CJ1W-V600C11	0.26	0.12
	CJ1W-V600C12	0.32	0.24
CompoBus/S Master Unit	CJ1W-SRM21	0.15	---

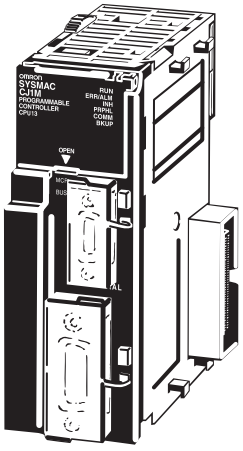
CPU Unit Descriptions

CPU Units
CJ1H/G-CPU□□H, CJ1M-CPU□□

CJ1H-CPU6□H
CJ1G-CPU4□H

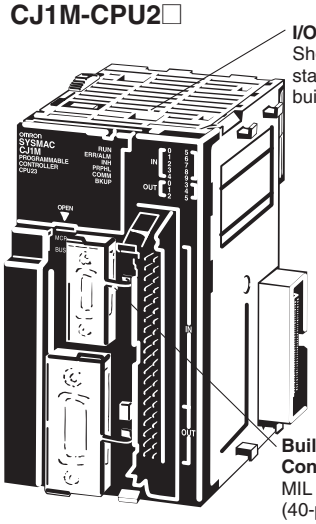


CJ1M-CPU1□



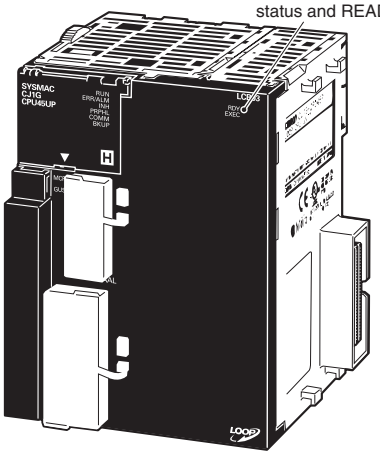
Components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

CJ1M-CPU2□



Other components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

CJ1-CPU□□P



Other components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

Specifications

■ CPU Units

Model	I/O bits	Program capacity	Data memory capacity (See note.)	LD instruction processing speed	Built-in ports	Options	Built-in I/O
CJ1H-CPU67H	2,560 bits (Up to 3 Expansion Racks)	250K steps	448K words (DM: 32K words, EM: 32K words x 13 banks)	0.02 μs	Peripheral port and RS-232C port	Memory Cards	---
CJ1H-CPU66H		120K steps	256K words (DM: 32K words, EM: 32K words x 7 banks)				
CJ1H-CPU65H		60K steps	128K words (DM: 32K words, EM: 32K words x 3 banks)				
CJ1G-CPU45H	1,280 bits (Up to 3 Expansion Racks)			0.04 μs			
CJ1G-CPU44H		30K steps	64K words (DM: 32K words, EM: 32K words x 1 bank)				
CJ1G-CPU43H	960 bits (Up to 2 Expansion Racks)	20K steps					
CJ1G-CPU42H		10K steps					
CJ1G-CPU45P	1,280 bits (Up to 3 Expansion Racks)	60K steps	128K words (DM: 32K words, EM: 32K words x 3 banks)	0.04 μs			
CJ1G-CPU44P		30K steps	64K words (DM: 32K words, EM: 32K words x 1 bank)				
CJ1G-CPU43P	960 bits (Up to 2 Expansion Racks)	20K steps					
CJ1G-CPU42P		10K steps					
CJ1M-CPU13	640 bits (Only 1 Expansion Rack)	20K steps	32 K words (DM: 32K words, EM: None)	0.10 μs			
CJ1M-CPU12	320 bits (No Expansion Rack)	10K steps					
CJ1M-CPU11	160 bits (No Expansion Rack)	5 K steps					
CJ1M-CPU23	640 bits (Only 1 Expansion Rack)	20K steps					Inputs: 10 Outputs: 6
CJ1M-CPU22	320 bits (No Expansion Rack)	10K steps					
CJ1M-CPU21	160 bits (No Expansion Rack)	5 K steps					

Note: The available data memory capacity is the sum of the Data Memory (DM) and the Extended Data Memory (EM).
The CJ1G-CPU□P has a built in CPU Unit for performing loop control. For details, refer to page 38.

Common Specifications

Item	Specification
Control method	Stored program
I/O control method	Cyclic scan and immediate processing are both possible.
Programming	Ladder diagram
Instruction length	1 to 7 steps per instruction
Ladder instructions	Approx. 400 (3-digit function codes)
Execution time	Basic instructions: 0.02 μs min.; Special instructions: 0.04 μs min.
Overhead time	CJ1G/H-CPU□□H, CJ1G-CPU□□P: 0.3 ms CJ1M-CPU□2/□3: 0.5 ms CJ1M-CPU□1: 0.8 ms
Unit connection method	No backplane (Units joined together with connectors.)
Mounting method	DIN Track mounting (screw mounting not supported)
Maximum number of connectable Units	Per CPU or Expansion Rack: 10 Units max. (Basic I/O Units, Special I/O Units, or CPU Bus Units) Total per PLC: 10 Units on CPU Rack and 10 Units each on 3 Expansion Racks = 40 Units max. (See note.)
Maximum number of Expansion Racks	3 max. (A CJ-series I/O Control Unit is required on the CPU Rack and a CJ-series I/O Interface Unit is required on each Expansion Rack.) (See note.)
Number of tasks	288 (cyclic tasks: 32, interrupt tasks: 256) Interrupt tasks can be defined as cyclic tasks to create cyclic interrupt tasks. Therefore, the total number of cyclic tasks is actually 288 max. **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: Power OFF interrupt task: 1 max. Scheduled interrupt tasks: 2 max. I/O interrupt tasks: 32 max. External interrupt tasks: 256 max.
Interrupt types	Scheduled Interrupts: Interrupts generated at a time scheduled by CPU Unit's built-in timer (Interval: 1 to 9,999 ms or 10 to 99,990 ms; also 0.5 to 999.9 ms with CJ1M) I/O interrupt tasks: Interrupts from Interrupt Input Units or, with CJ1M, built-in I/O Power OFF Interrupts: Interrupts executed when CPU Unit's power is turned OFF External interrupt tasks: Interrupts from Special I/O Units and CPU Bus Units
Calling subroutines from multiple tasks	Supported using global subroutines.
Function Blocks (See note 1.)	Languages supported for use in function block definitions: Ladder programming language and structured text

Note: The CJ1G-CPU43H/42H support a maximum of 2 Expansion Racks with a total maximum of 30 Units.
The CJ1M-CPU13/23 support only 1 Expansion Rack with a total maximum of 20 Units.
The CJ1M-CPU12/22 do not support Expansion Racks and support a total maximum of 10 Units.

Item		Specification	
CIO (Core I/O) Area	I/O Area	2,560 (160 words): CIO 000000 to CIO 015915 (words CIO 0000 to CIO 0159) Setting of first rack words can be changed from default (CIO 0000) so that CIO 0000 to CIO 0999 can be used. I/O bits are allocated to Basic I/O Units.	These bits can be used as work bits when not used for the applications described on the left.
	Built-in I/O Area	10 points, Inputs: CIO 296000 to CIO 296009, Outputs: CIO 296100 to CIO 296105 Used for built-in I/O, CJ1M-CPU22/23 only	
	Link Area	3,200 (200 words): CIO 100000 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) CPU Bus Unit bits store the operating status of CPU Bus Units. (25 words per Unit, 16 Units max.)	
	Special I/O Unit Area	15,360 (960 words): CIO 200000 to CIO 295915 (words CIO 2000 to CIO 2959) Special I/O Unit bits are allocated to Special I/O Units. (10 words per Unit, 96 Units max.)	
	Serial PLC Link Area	90 words, CIO 3100 to CIO 3189 (bits CIO 310000 to CIO 318915) Used for data links in serial PLC links, CJ1M only	
	DeviceNet Area	9,600 (600 words): CIO 320000 to CIO 379915 (words CIO3200 to CIO 3799) DeviceNet bits are allocated to Slaves for DeviceNet Unit remote I/O communications when the master function is used with fixed allocations. Fixed allocation setting 1 Outputs: CIO 3200 to CIO 3263 Inputs: CIO 3300 to CIO 3363 Fixed allocation setting 2 Outputs: CIO 3400 to CIO 3463 Inputs: CIO 3500 to CIO 3563 Fixed allocation setting 3 Outputs: CIO 3600 to CIO 3663 Inputs: CIO 3700 to CIO 3763 The following words are allocated to the master function even when the DeviceNet Unit is used as a slave. Fixed allocation setting 1 Outputs: CIO 3370 (master to slave) Inputs: CIO 3270 (slave to master) Fixed allocation setting 2 Outputs: CIO 3570 (master to slave) Inputs: CIO 3470 (slave to master) Fixed allocation setting 3 Outputs: CIO 3770 (master to slave) Inputs: CIO 3670 (slave to master)	
	Internal I/O Area (work bits)	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 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 (words W000 to W511) Control programs only. (I/O from external I/O terminals is not possible.) **Note:** When using work bits in programming, use bits in Work Area first before using bits from other areas.	
Holding Area		8,192 bits (512 words): H00000 to H51115 (words H000 to H511) Holding bits are used to control execution of program, and maintain their ON/OFF status when PLC is turned OFF or operating mode is changed. **Note:** Words H512 to H1535 are allocated to the Function Block Holding Area and are used only for the function block instance area (internally allocated variable area). (See note 1.)	
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 specific functions.	
Temporary Area		16 bits (TR00 to TR15) Temporary bits are used to store 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)	
DM Area		32K words: D00000 to D32767 Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in DM Area maintain their status when PLC is turned OFF or operating mode is changed. Internal 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.	
EM Area		32K words per bank, 7 banks max.: E0_00000 to E6_32767 max. (Not supported by CJ1M CPU Units.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in EM Area maintain their status when PLC is turned OFF or operating mode is changed. The EM Area is divided into banks, and addresses can be set by either of following methods. Changing current bank using EMBC(281) instruction and setting addresses for current bank. Setting bank numbers and addresses directly. EM data can be stored in files by specifying number of first bank. (EM file memory)	
Index Registers		IR0 to IR15. Store PLC memory addresses for indirect addressing. Index registers can be used independently in each task. One register is 32 bits (2 words). Index registers can be specified as shared or independent for each task.	
Task Flag Area		32 (TK0000 to TK0031). Task Flags are read-only flags that are ON when corresponding cyclic task is executable and OFF when corresponding task is not executable or in standby status.	
Trace Memory		4,000 words (trace data: 31 bits, 6 words)	
File Memory		Memory Cards: OMRON Memory Cards with 15-MB, 30-MB, or 64-MB capacities can be used. (MS-DOS format). EM file memory: Part of EM Area can be converted to file memory (MS-DOS format).	

Function Specifications

Item	Specification	
Constant cycle time	1 to 32,000 ms (Unit: 1 ms) **Note:** With the CJ1G/H-CPU□□H, using the Parallel Processing Mode will create a constant cycle time for program execution.	
Cycle time monitoring	Possible (Unit stops operating if cycle is too long): 1 to 40,000 ms (Unit: 10 ms) **Note:** When the Parallel Processing Mode is used for the CJ1G/H-CPU□□H, the program execution cycle is monitored. Also, a fatal error will occur in the CPU Unit if the peripheral servicing time exceeds 2 s.	
I/O refreshing	Cyclic refreshing, immediate refreshing, refreshing by IORF(097).	
Special refreshing for CPU Bus Units	Data links for Control Link Units, remote I/O communications for DeviceNet Units, and other special data for CPU Bus Units is refreshed at the following times. During I/O refresh period or when CPU BUS UNIT I/O REFRESH (DLNK) instruction is executed.	
I/O memory holding when changing operating modes	Depends on ON/OFF status of IOM Hold Bit in Auxiliary Area.	
Load OFF	All outputs on Output Units can be turned OFF when the CPU Unit is RUN, MONITOR, or PROGRAM mode.	
Input time constant setting	Time constants can be set for inputs from CJ-series Basic I/O Units. The time constant can be increased to reduce influence of noise and chattering or it can be decreased to detect shorter pulses on inputs.	
Operating mode setting at power-up	Possible (By default, the CPU Unit will start in RUN mode if a Programming Console is not connected.)	
Built-in flash memory	• Always stores (automatically backs up/restores) the user program and parameter area data (PLC Setup, etc.). • When downloading projects from the CX-Programmer Ver. 5.0 or later, symbol table files (including CX-Programmer symbol names and I/O comments), comment files (CX-Programmer rung comments and annotations), and program index files (CX-Programmer section names, section comments, and program comments) are stored in the flash memory's internal Comment Memory. (See note 1.)	
Memory Card functions	Automatically reading programs (autoboot) from the Memory Card when the power is turned ON.	Possible
	Program replacement during PLC operation	Possible
	Memory Card storage data	User program: Program file format PLC Setup and other parameters: Data file format I/O memory: Data file format (binary), text format, CSV format CPU Bus Unit data: Special format
	Memory Card read/write method	User program instructions, Programming Devices (including CX-Programmer and Programming Console), Host Link computers, AR Area control bits, easy backup operation
Filing	Memory Card data and EM (Extended Data Memory) Area can be handled as files.	
Debugging	Force-set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed)	
Online editing	One or more program blocks in user programs can be overwritten when CPU Unit is in PROGRAM or MONITOR mode. This function is not available for block programming areas. With the CX-Programmer, more than one program block can be edited at the same time.	
Program protection	Overwrite protection: Set using DIP switch. Copy protection: Password set using CX-Programmer.	
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 execution time and logic of each programming block. Error status can be simulated with the FAL and FALS instructions.	
Error log	Up to 20 errors are stored in error log. Information includes error code, error details, and time error occurred. The system can be set so that user-defined FAL errors are not stored in the error log.	
Serial communications	Built-in peripheral port: Programming Device (e.g., CX-Programmer or Programming Console), Host Links, NT Links Built-in RS-232C port: Programming Device (e.g., CX-Programmer), Host Links, no-protocol communications, NT Links, Serial PLC Links (CJ1M only)	
	Serial Communications Unit (sold separately): Protocol macros, Host Links, NT Links	
Clock	Provided on all models. Accuracy: ± 1.5 min/mo. at 25°C (accuracy varies with the temperature) **Note:** Used to store 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 protection	Held Areas: Holding bits, user program, Data Memory, Extended Data Memory, and status of counter Completion Flags and present values. **Note:** If IOM Hold Bit in Auxiliary Area is turned ON, and PLC Setup is set to maintain IOM Hold Bit status when power to PLC is turned ON, contents of CIO Area, Work Area, part of Auxiliary Area, timer Completion Flag and PVs, Index Registers, and Data Registers will be saved.	
Sending commands to a Host Link computer	FINS commands can be sent to a computer connected via Host Link System by executing Network Communications Instructions from 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 2.)	Host Link communications can be used for remote programming and remote monitoring from devices on networks up to eight levels away (Controller Link Network, Ethernet Network, or other network).	
Storing comments in CPU Unit	I/O comments can be stored in Memory Cards, EM file memory, or in the Comment Memory (See note 3.) contained in the CPU Unit's flash memory.	
Program check	Program checks are performed for items such as no END instruction and instruction errors. CX-Programmer can also be used to check programs.	
Control output signals	RUN output: The internal contacts will turn ON (close) while the CPU Unit is operating (CJ1W-PA205R).	
Battery life	5 years at 25°C (The battery life depends on the ambient operating temperature; 0.75 years min. for CJ1H/G, 1.5 years min. for CJ1M) (See note 4.)	
Self-diagnostics	CPU errors (watchdog timer), I/O bus errors, memory errors, and battery errors	
Other functions	Storage of number of times power has been interrupted. (Stored in A514.)	

Note: 1. Supported for CPU Unit Ver. 3.0 or later only.
2. Supported for CPU Unit Ver. 2.0 or later only. (Three-level communications are supported for Pre-Ver. 2.0 CPU Units.)
3. Supported for CX-Programmer Ver. 5.0 and CPU Unit Ver. 3.0 or later only.
4. Use a Replacement Battery that is within two years of its date of manufacture.

General Specifications

Item	Specifications		
Power Supply Unit	CJ1W-PA205R	CJ1W-PA202	CJ1W-PD025
Supply voltage	100 to 240 V AC (wide-range), 50/60 Hz		24 V DC
Operating voltage and frequency ranges	85 to 264 V AC, 47 to 63 Hz		19.2 to 28.8 V DC
Power consumption	100 VA max.	50 VA max.	50 W max.
Inrush current (See note 1.)	At 100 to 120 V AC: 15 A/8 ms max. for cold start at room temperature At 200 to 240 V AC: 30 A/8 ms max. for cold start at room temperature	At 100 to 120 V AC: 20 A/8 ms max. for cold start at room temperature At 200 to 240 V AC: 40 A/8 ms max. for cold start at room temperature	At 24 VDC: 30 A/20 ms max. for cold start
Output capacity	5.0 A, 5 V DC (including supply to CPU Unit)	2.8 A, 5 V DC (including supply to CPU Unit)	5.0 A, 5 V DC (including supply to CPU Unit)
	0.8 A, 24 V DC Total: 25 W max.	0.4 A, 24 V DC Total: 14 W max.	0.8 A, 24 V DC Total: 25 W max.
Power supply output terminals	None		
RUN output (See note 2.)	Contact configuration: SPST-NO Switching capacity: 250 V AC, 2 A (resistive load) 120 V AC, 0.5 A (inductive load), 24 V DC, 2 A (resistive load) 24 V DC, 2 A (inductive load)	Not provided	
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See note 3.)		20 MΩ min. (at 500 V DC) between DC external and GR terminals (See note 3.)
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See note 3.) Leakage current: 10 mA max.		
	1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See note 3.) 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 min.) (according to JIS C0040)		
Shock resistance	147 m/s^2, 3 times each in X, Y, and Z directions (Relay Output Unit: 100 m/s^2) (according to JIS C0041)		
Ambient operating temperature	0 to 55°C		
Ambient operating humidity	10% to 90% (with no condensation)		
Atmosphere	Must be free from corrosive gases.		
Ambient storage temperature	–20 to 75°C (excluding battery)		
Grounding	Less than 100 Ω		
Enclosure	Mounted in a panel.		
Weight	All models are each 5 kg max.		
CPU Rack dimensions	90.7 to 466.7 × 90 × 65 (W × H × D) (not including cables)		
Safety measures	Conforms to cULus and EC Directives.		

Note: 1. The values for inrush current given above for AC power supplies are for a cold start at room temperature. The values given for DC power supplies are for a cold start. The inrush control circuit in AC power supplies uses a thermistor element with a low-temperature current control characteristic. If the ambient temperature is high or the PC is hot-started, the thermistor will not be sufficiently cool, and the inrush currents given in the table may be exceeded by up to twice the given values. The inrush control circuit in DC power supplies uses a capacitor-charging delay circuit. If the PC is hot-started, the capacitor will have not discharged, and the inrush currents given in the table may be exceeded by up to twice the given values. When selecting fuses or breakers for external circuits, allow sufficient margin in shut-off performance.

2. Supported only when mounted to CPU Rack.

3. Disconnect the 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.

Additional CJ1M-CPU21/22/23 Specifications

■ Data Area Allocations for Built-in I/O

I/O Code			IN0	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	OUT1	OUT2	OUT3	OUT4	OUT5	OUT6
		Address	CIO 2960										CIO 2961					
		Bit	00	01	02	03	04	05	06	07	08	09	00	01	02	03	04	05
Inputs		General-purpose inputs	General-purpose input 0	General-purpose input 1	General-purpose input 2	General-purpose input 3	General-purpose input 4	General-purpose input 5	General-purpose input 6	General-purpose input 7	General-purpose input 8	General-purpose input 9	---	---	---	---	---	---
		Interrupt inputs	Interrupt input 0	Interrupt input 1	Interrupt input 2	Interrupt input 3	---	---	---	---	---	---	---	---	---	---	---	---
		Quick-response inputs	Quick-response input 0	Quick-response input 1	Quick-response input 2	Quick-response input 3	---	---	---	---	---	---	---	---	---	---	---	---
		High-speed counters	---	---	High-speed counter 1 (phase-Z/reset)	High-speed counter 0 (phase-Z/reset)	---	---	High-speed counter 1 (phase-A, increment, or count input)	High-speed counter 1 (phase-B, decrement, or direction input)	High-speed counter 0 (phase-A, increment, or count input)	High-speed counter 0 (phase-B, decrement, or direction input)	---	---	---	---	---	---
Outputs	General-purpose outputs		---	---	---	---	---	---	---	---	---	---	General-purpose output 0	General-purpose output 1	General-purpose output 2	General-purpose output 3	General-purpose output 4	General-purpose output 5
	Pulse outputs	CW/CCW outputs	---	---	---	---	---	---	---	---	---	---	Pulse output 0 (CW)	Pulse output 0 (CCW)	Pulse output 1 (CW)	Pulse output 1 (CCW)	---	---
		Pulse + direction outputs	---	---	---	---	---	---	---	---	---	---	Pulse output 0 (pulse)	Pulse output 1 (pulse)	Pulse output 0 (direction)	Pulse output 1 (direction)	---	---
		Variable duty ratio outputs	---	---	---	---	---	---	---	---	---	---	---	---	---	---	PWM(891) output 0	PWM(891) output 1 (See note.)
Origin search			Origin search 0 (Origin Input Signal)	Origin search 0 (Origin Proximity Input Signal)	Origin search 1 (Origin Input Signal)	Origin search 1 (Origin Proximity Input Signal)	Origin search 0 (Positioning Completed Signal)	Origin search 1 (Positioning Completed Signal)	---	---	---	---	---	---	---	---	Origin search 0 (Error Counter Reset Output)	Origin search 1 (Error Counter Reset Output)

Note: 1. CJ1M-CPU21 CPU Units have one PWM output only and do not have PWM output 1.

■ Built-in Input Specifications

Interrupt Inputs and Quick-response Inputs

Item		Specification
No. of interrupt inputs/quick-response inputs		4 total
Input interrupts	Direct (Input Interrupt) Mode	Execution of an interrupt task is started at the interrupt input's rising or falling edge. Interrupt numbers 140 to 143 are used (fixed). Response time from meeting input condition to start of interrupt task execution: 93 μs min.
	High-speed Counter Mode	Rising or falling edges of the interrupt are counted using either an incrementing or decrementing counter, and an interrupt task is started when the input count reaches the set value. Interrupt numbers 140 to 143 are used (fixed). I/O response frequency: 1 kHz
Quick-response inputs		Signals that are shorted than the cycle time (30 μs min.) can be read and treated the same as signals that are one for more than one cycle time.

High-speed Counter Inputs

Item		Specification			
Number of high-speed counters		2 (High-speed counters 0 and 1)			
Pulse input mode (Selected in PLC Setup)		Differential phase inputs (phase-A, phase-B, and phase-Z input)	Up/down inputs (up inputs, down inputs, reset inputs)	Pulse + direction inputs (pulse inputs, direction inputs, reset inputs)	Increment inputs (increment inputs, reset inputs)
Response frequency	Line-driver inputs	50 kHz	100 kHz	100 kHz	100 kHz
	24-V DC inputs	30 kHz	60 kHz	60 kHz	60 kHz
Counting mode		Linear mode or Ring mode (Select in the PLC Setup.)			
Count value		Linear mode: 80000000 to 7FFFFFFF hex Ring mode: 00000000 to Ring SV (The Ring SV is set in the PLC Setup and the setting range is 00000001 to FFFFFFFF hex.)			
High-speed counter PV storage locations		High-speed counter 0: A271 (leftmost 4 digits) and A270 (rightmost 4 digits) High-speed counter 1: A273 (leftmost 4 digits) and A272 (rightmost 4 digits) Target value comparison interrupts or range comparison interrupts can be executed based on these PVs. The PVs are refreshed in the overseeing processes at the beginning of each cycle. Use the PRV(881) instruction to read the most recent PVs.			

Item		Specification
Control method	Target value comparison	Up to 48 target values and corresponding interrupt task numbers can be registered.
	Range comparison	Up to 8 ranges can be registered, with an upper limit, lower limit, and interrupt task number for each.
Counter reset method		Phase-Z + Software reset: Counter is reset when phase-Z input goes ON while Reset Bit is ON. Software reset: Counter is reset when Reset Bit goes ON. Reset Bits: High-speed Counter 0 Reset Bit is A53100, Counter 1 Reset Bit is A53101.

■ Built-in Output Specifications

Position Control and Speed Control

Item	Specifications
Output frequency	1 Hz to 100 kHz (1-Hz units from 1 to 100 Hz, 10-Hz units from 100 Hz to 4 kHz, and 100-Hz units from 4 to 100 kHz)
Frequency acceleration and deceleration rates	Set in 1 Hz units for acceleration/deceleration rates from 1 Hz to 2 kHz (every 4 ms). The acceleration and deceleration rates can be set separately only with PLS2(887).
Changing SVs during instruction execution	The target frequency, acceleration/deceleration rate, and target position can be changed. Changes to the target frequency and acceleration/deceleration rate must be made at constant speed.
Pulse output method	CW/CCW inputs or Pulse + direction inputs
Number of output pulses	Relative coordinates: 00000000 to 7FFFFFFF hex (Each direction accelerating or decelerating: 2,147,483,647) Absolute coordinates: 80000000 to 7FFFFFFF hex (–2,147,483,648 to 2,147,483,647)
Instruction used for origin searches and returns	ORIGIN SEARCH (ORG(889)): Origin search and origin return operations according to set parameters
Instructions used for position and speed control	PULSE OUTPUT (PLS2(887): Trapezoidal output control with separate acceleration and deceleration rate SET PULSES (PULS(886)): Setting the number of pulses for pulse output SPEED OUTPUT ((SPED(885): Pulse output without acceleration or deceleration (Number of pulses must be set in advance with PULS(886) for position control.) ACCELERATION CONTROL (ACC(888)): Changes frequency or pulse output with acceleration and deceleration MODE CONTROL (INI(880)): Stopping pulse output
Pulse output PV's storage location	The following Auxiliary Area words contain the pulse output PVs: Pulse output 0: A277 (leftmost 4 digits) and A276 (rightmost 4 digits) Pulse output 1: A279 (leftmost 4 digits) and A278 (rightmost 4 digits) The PVs are refreshed during regular I/O refreshing. PVs can be read to user-specified words with the PRV(881) instruction.

Variable-duty Pulse Outputs (PWM)

Item	Specifications
Duty ratio	0% to 100%, set in 0.1% units (See note.)
Frequency	0.1 Hz to 999.9 Hz, Set in 0.1 Hz units.
Instruction	PULSE WITH VARIABLE DUTY RATIO (PWM(891)): Sets duty ratio and outputs pulses.

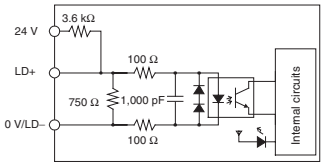
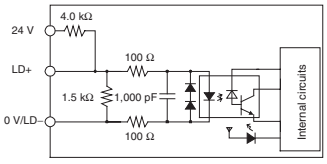
Note: CJ1M CPU Unit Ver. 2.0 or later only. (0% to 100%, set in 1% units for Pre-Ver. 2.0 CPU Units.)

■ Hardware Specifications

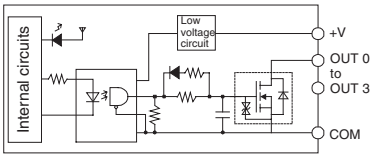
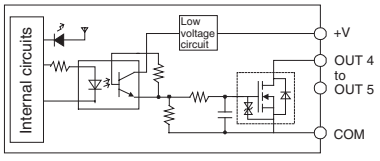
Input Specifications

Item		Specifications			
Number of inputs		10 inputs			
Input method		24-V DC inputs or line driver (wiring changed to select)			
Input voltage specifications		24 V DC		Line driver	
Terminals		IN0 to IN5	IN6 to IN9	IN0 to IN5	IN6 to IN9
Input voltage		20.4 to 26.4 V DC		RS-422A or RS-422 line driver (conforming to AM26LS31), Power supply voltage of 5 V ±5%	
Input impedance		3.6 kΩ	4.0 kΩ	---	---
Input current (typical)		6.2 mA	4.1 mA	13 mA	10 mA
Minimum ON voltage		17.4 V DC/3 mA min.		---	---
Maximum OFF voltage		5.0 V DC/1 mA max.			
Response speed (for general-purpose inputs)	ON response time	Default setting: 8 ms max. (The input time constant can be set to 0 ms, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, or 32 ms in the PLC Setup.)			
	OFF response time	Default setting: 8 ms max. (The input time constant can be set to 0 ms, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, or 32 ms in the PLC Setup.)			

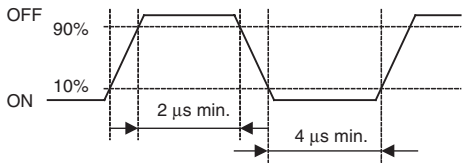
Input Circuit Configuration

Item	Specification	
Input	IN0 to IN5	IN6 to IN9
Circuit configuration		

General-purpose Output Specifications for Transistor Outputs (Sinking)

Item	Specification	
Output	OUT0 to OUT3	OUT4 to OUT5
Rated voltage	5 to 24 V DC	
Allowable voltage range	4.75 to 26.4 V DC	
Max. switching capacity	0.3 A/output; 1.8 A/Unit	
Number of circuits	6 outputs (6 outputs/common)	
Max. inrush current	3.0 A/output, 10 ms max.	
Leakage current	0.1 mA max.	
Residual voltage	0.6 V max.	
ON delay	0.1 ms max.	
OFF delay	0.1 ms max.	
Fuse	None	
External power supply	10.2 to 26.4 V DC 50 mA min.	
Circuit configuration		

Pulse Output Specifications (OUT0 to OUT3)

Item	Specifications
Max. switching capacity	30 mA, 4.75 to 26.4 V DC
Min. switching capacity	7 mA, 4.75 to 26.4 V DC
Max. output frequency	100 kHz
Output waveform	

CJ1G-CPU□□P (Loop-control CPU Units) Specifications

Providing Effective Solutions by Integrating Sequence Control and Loop Control into the Same Basic Functionality of the CJ Series

■ Overview

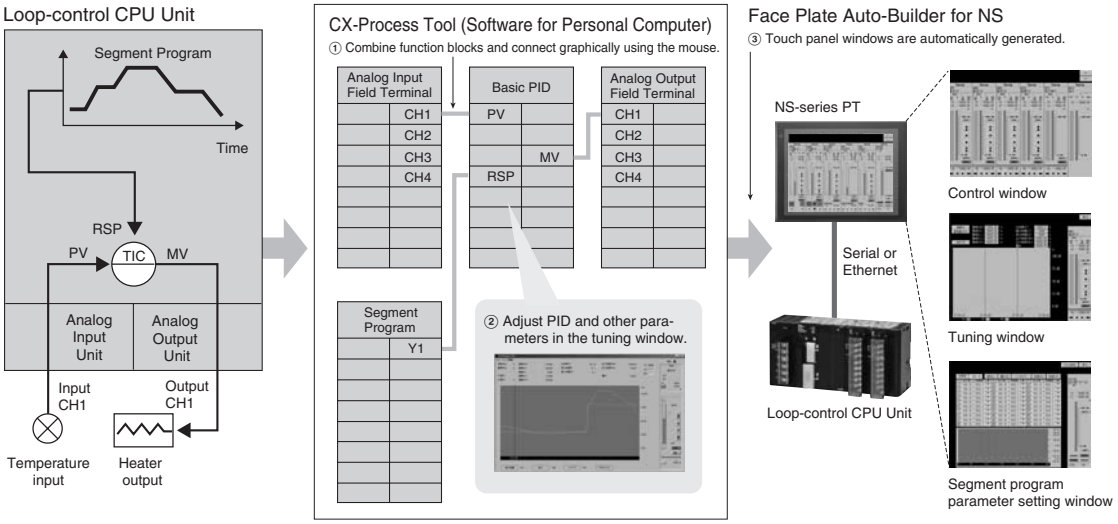
An engine for controlling analog quantities (e.g., temperature, pressure, flowrate) is built into the same CPU Unit as the engine for executing sequence control, delivering high-speed sequence control and high-speed, advanced analog quantity control in a single Unit.

■ Features

- Program graphically by pasting function blocks for PID control, square root calculations, or other functions in a window and then connect them with the mouse.
- More than 70 types of function blocks are provided, including Bank Selector and Split Converter (for heating and cooling control), supporting a wide array of control methods from basic PID control to cascade control and feed-forward control.
- Function blocks enable a control cycle speed of up to 10 ms. A range of control methods are supported from detailed flowrate control and pressure control to high-speed temperature control.
- The CX-Process Tool can be used to open the tuning window and change parameters while monitoring PVs, SPs, and MVs.
- The Face Plate Auto-builder for NS (order separately) can be used to automatically create touch panel adjustment windows, including control windows, tuning windows, and segment program parameter setting windows, from function block data.

■ Programming Example

Example: Program Control



■ Function Specifications

CPU Element (Sequence Control)

Name	I/O bits	Program capacity	DM words	EM words	Model
Loop-control CPU Unit	1,280 bits	60K steps	32K words	32K words × 3 banks E0_00000 to E2_32767	CJ1G-CPU45P
		30K steps		32K words × 1 bank E0_00000 to E0_32767	CJ1G-CPU44P
	960 bits	20K steps			CJ1G-CPU43P
		10K steps			CJ1G-CPU42P

Loop Controller Element (Loop Control)

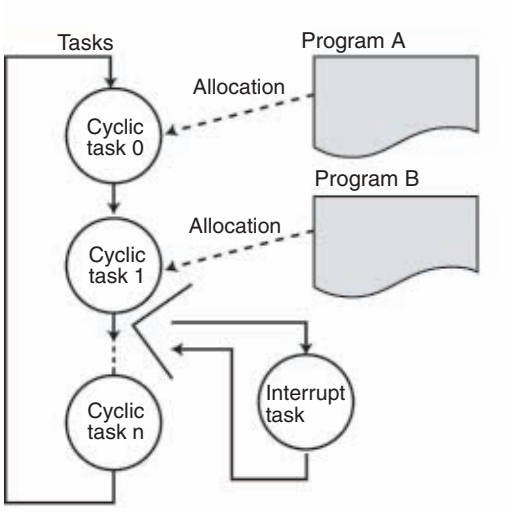
Item			Model	CJ1G-CPU42P	CJ1G-CPU43P	CJ1G-CPU44P	CJ1G-CPU45P
Operation method				Function block method			
Operation cycle				0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) Can be set for each function block.			
Number of function blocks	Analog operations	Control and operation blocks		50 blocks max.	300 blocks max.		
	Sequence control	Step ladder program blocks		20 blocks max. 2,000 commands total	200 blocks max. 4,000 commands total		
	I/O blocks	Field terminal blocks		30 blocks max.		40 blocks max.	
		User link tables		2,400 data items max.			
		Batch allocation		HMI function, allocated 1 EM Area bank			
	System Common block			Single block			
Method for creating and transferring function blocks				Created using CX-Process Tool (order separately) and transferred to Loop Controller.			
Control method	PID control method			PID with 2 degrees of freedom (with autotuning)			
	Control combinations			Any of the following function blocks can be combined: Basic PID control, cascade control, feed-forward control, sample PI control, Smith dead time compensation control, PID control with differential gap, override control, program control, time-proportional control, etc.			
Alarms	PID block internal alarms			4 PV alarms (upper upper-limit, upper limit, lower limit, lower lower-limit) and 1 deviation alarm per PID block.			
	Alarm blocks			High/low alarm blocks, deviation alarm blocks			

CPU Unit Features

TASK PROGRAMMING

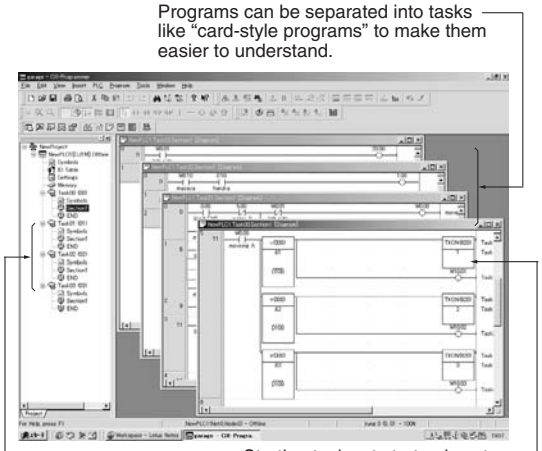
Better Design/Development Efficiency
Structured Programming and Team Program Development Using Tasks

With CJ-series PLCs, programs can be divided into programming units called tasks. There are both cyclic tasks, which are executed each cycle in a specified order, and interrupt tasks, which are executed when an interrupt occurs.



With CJ1-series PLCs, up to 288 tasks can be executed as cyclic tasks.

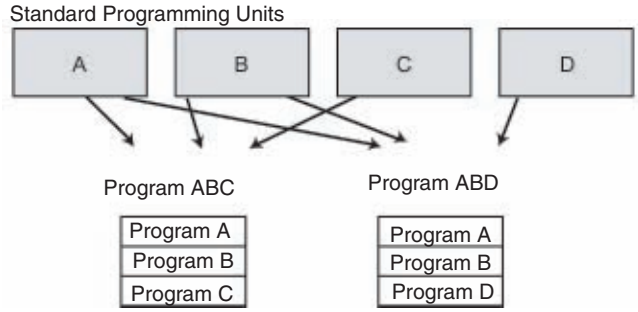
■ Task Programming Example with CX-Programmer



Advantages

Program Standardization

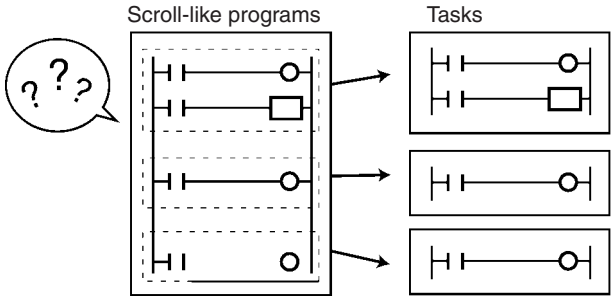
Task programs are created in units divided by functionally by purpose. These functional units can be easily reused when programming new PLCs or systems with the same functionality.



Easier-to-understand Programs

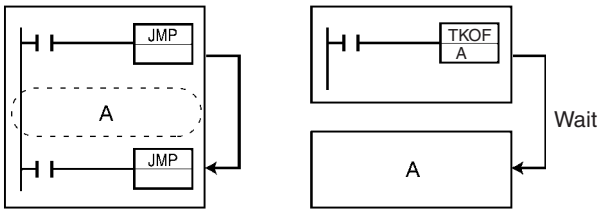
With scroll-like programs, individual functional units are extremely difficult to find just by looking at the program.

Tasks are used to separate a program functionally and make the program much easier to understand.



Shorter Cycle Times

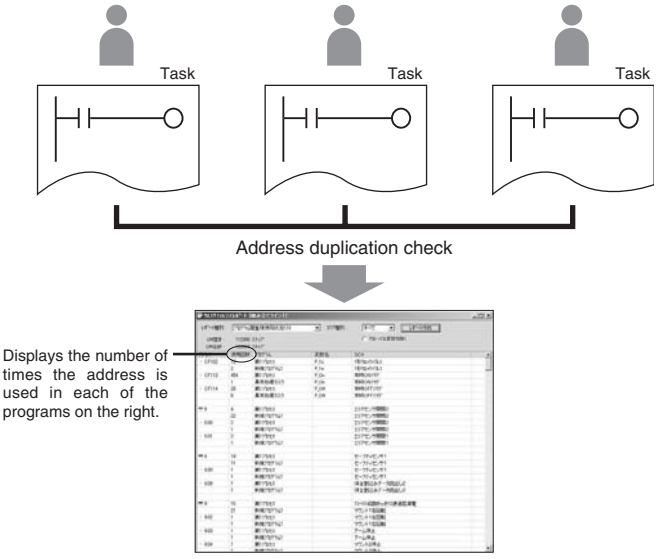
With a scroll-like program, many jump and similar instructions had to be used to avoid executing specific parts of the program. This not only slows down the programs, but makes them more difficult to understand. With task programming, special instructions enable controlling the execution of tasks so that only the require tasks are executed during any particular cycle.



■ Greater Efficiency in Team Program Development (Unit Ver. 2.0 or Later Only)

Checking Address Duplication between Tasks (CX-Programmer Ver. 4.0 or Higher)

The CX-Programmer automatically executes a cross-reference report that checks whether the same addresses have been used by two or more tasks (programs) created by two or more people.

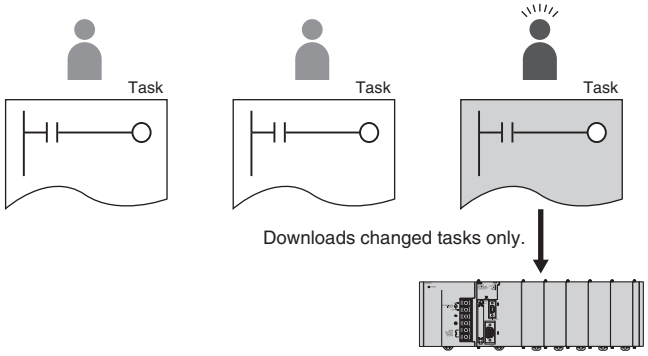


List of duplicated addresses on CX-Programmer

Downloading in Task Units

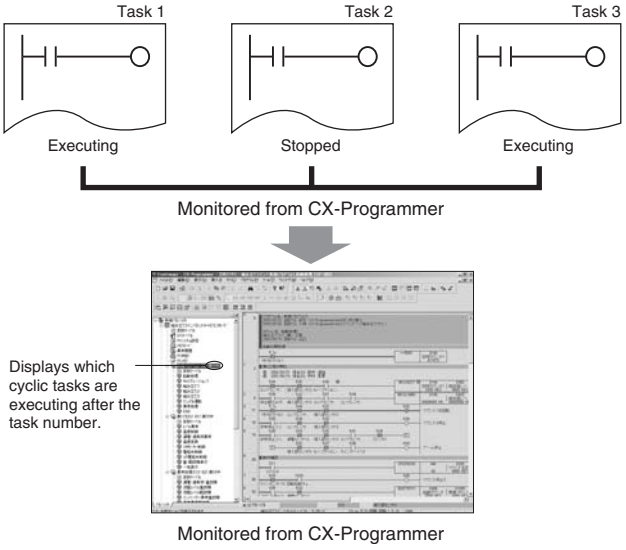
(CX-Programmer Ver. 4.0 or Higher)

When a program has been created by two or more people, each person can use the CX-Programmer to download only the task (program) they have changed.



Monitoring Operating Status for Each Task (CX-Programmer Ver. 4.0 or Higher)

The execution status for each task can be monitored from the CX-Programmer, contributing to improved debugging efficiency.

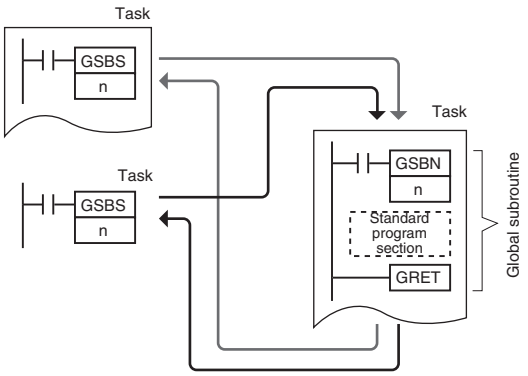


Monitored from CX-Programmer

■ Task Features

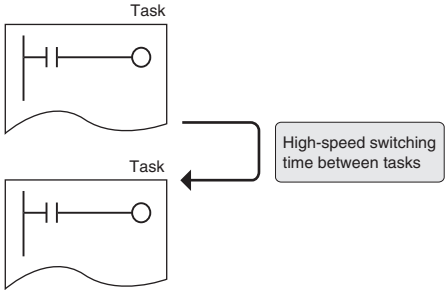
Standardization of Common Processing

Global subroutines are supported that can be called from different tasks. This enables removing standard programming sections from individual tasks for execution as global subroutines, greatly reducing the size of the overall program.



Faster Switching between Tasks

Switching between tasks is faster than ever before to ensure high-speed cycle times even with structured programming.



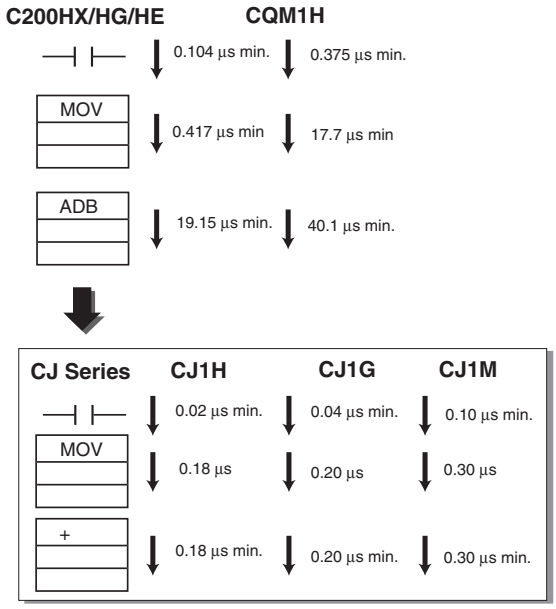
HIGH-SPEED PROCESSING

Ample Speed for Advanced Machine Interfaces, Communications, and Data Processing

■ High-speed Instructions and System Bus

Faster Execution Times (from 20 ns) and Faster Processing of Frequently Used Instructions

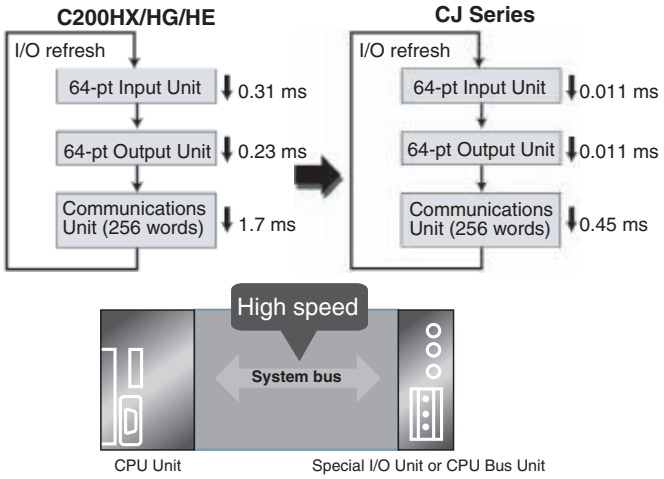
Faster instruction processing includes 0.02 μs for LD and 0.18 μs for MOV. A complete range of instructions (more than 400) is supported, more than 100 of which are frequently used special instructions that can be processed almost as fast as basic instructions, as fast as 0.18 μs for some instructions.



Four Times the Peripheral Servicing and I/O Refresh Speed

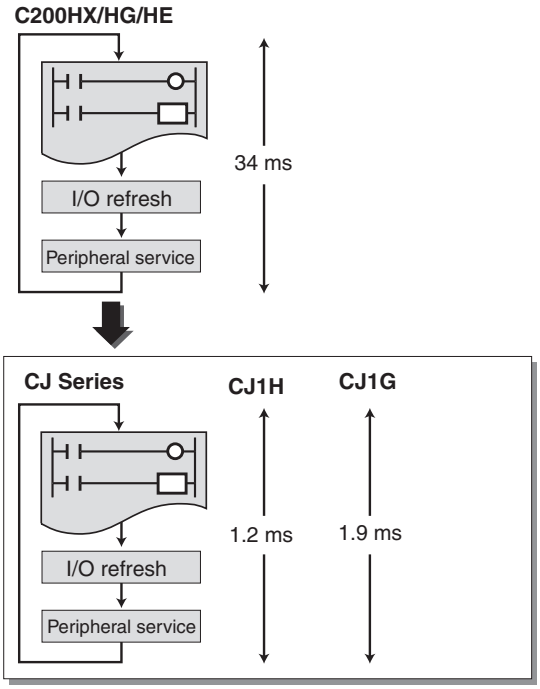
Increased efficiency in data transmission between the CPU Unit and Special I/O Units/CPU Bus Units further improves performance of the entire system.

Refresh time for CJ-series 64-point Input Units:
0.011 ms (16 times faster)
Refresh time for CJ-series 64-point Output Units:
0.011 ms (8 times faster)
Refresh time for 256 words for Communications Unit:
0.45 ms (4 times faster)

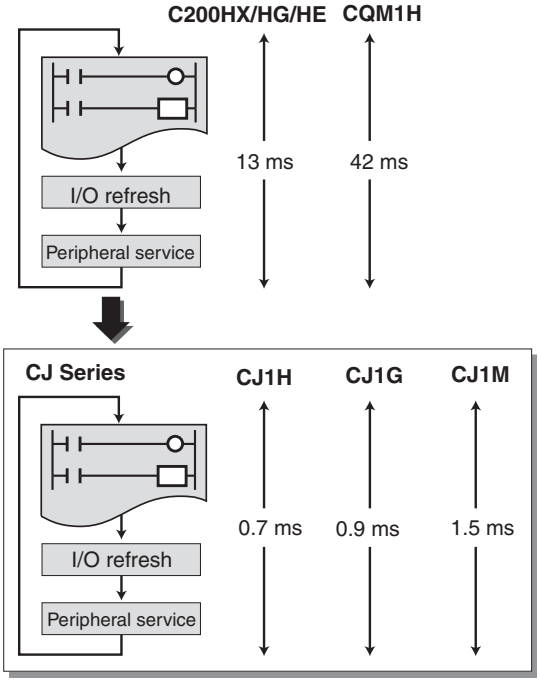


30 Times the Overall Cycle Speed

Example 1: The following example is for 30-Kstep programs (basic instructions: 50%; MOV instructions: 30%; arithmetic operation instructions: 20%).



Example 2: The following example is for 10-Kstep programs (basic instructions: 50%; MOV instructions: 30%; arithmetic operation instructions: 20%).

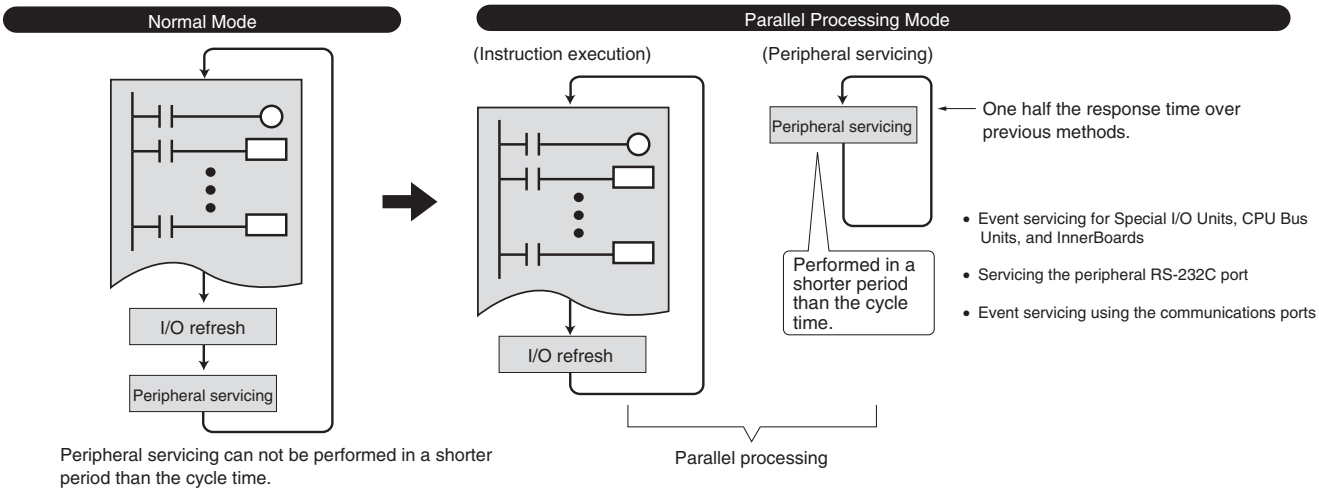


■ High-speed Exchange with Communications Units and High-speed Data Processing

Response Time for both Instruction Execution and Peripheral Servicing Can Be Emphasized

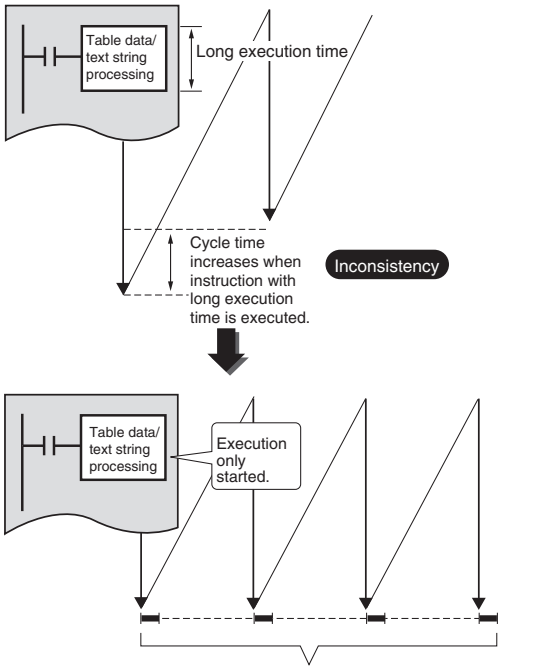
With CJ1G and CJ1H CPU Units, a Parallel Processing Mode can be used to perform program execution and peripheral servicing in parallel. Parallel processing doubles the speed of peripheral serving time over previous PLCs, enabling the following types of application.

- High-volume, high-speed data exchange is possible with a host without the speed being affected by the size of the program in the CPU Unit.
- Data can be exchanged with SCADA software with consistent timing for smooth data updates.
- The cycle time is not affected even if communications are increased or networks added in future system expansions.



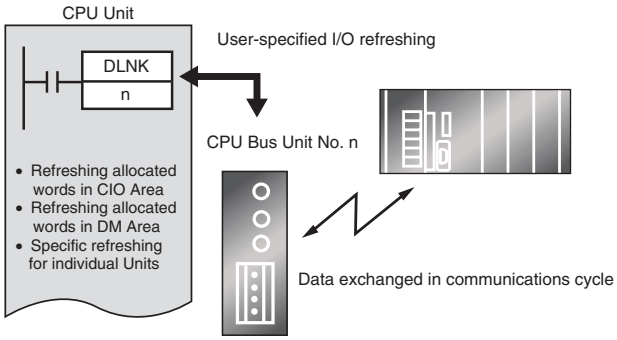
Control Inconsistencies in the Cycle Time for Data Processing

Table data, text string, or other instructions requiring long execution times can be executed over multiple cycles to minimize the affect on the cycle time and maintain more consistent I/O response characteristics.



Better Refresh Performance for Data Links, DeviceNet Remote I/O, and More

I/O refresh processing with CPU Bus Units, which was previously performed only during I/O refreshing after instruction execution, is now possible at any time using the DLNK instruction. The CPU Bus Unit's refresh response performance has been improved by enabling refresh processing specific to CPU Bus Units, such as data links and DeviceNet remote I/O communications, and refreshing of words allocated to the Units in the CIO Area and DM Area any time during instruction execution.



Unit	Refresh function
Controller Link Unit	Data links
DeviceNet Unit	Remote I/O
Serial Communications Unit	Protocol macros
Ethernet Unit	Socket servicing for specific bit manipulations

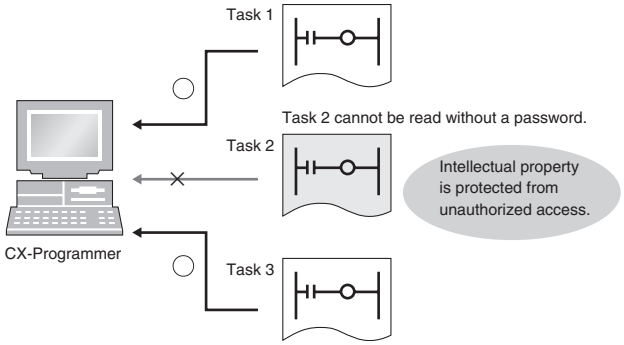
INCREASED SECURITY

Various Forms of Protection Provide Better Security

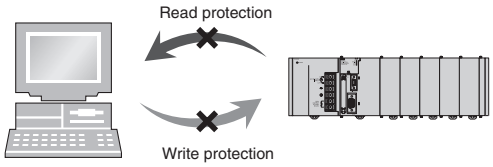
■ Conceal Intellectual Property Contained in Programs (Unit Ver. 2.0 or Later)

Password Read Protection for Tasks (CX-Programmer Ver. 4.0 or Higher)

Specific tasks (programs) can be set to prohibit reading unless the correct password is input.



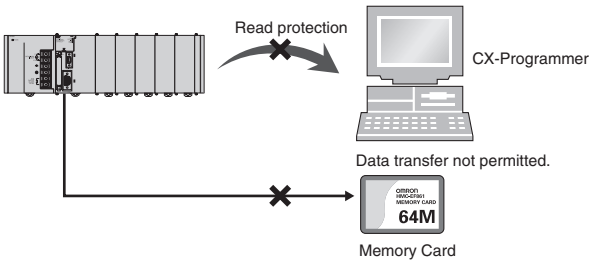
This function enables concealment of intellectual property contained in programs. The overwrite prohibit function also protects programs concealing intellectual property from being carelessly overwritten.



■ Prevent Leakage of Intellectual Property (Unit Ver. 2.0 or Later)

Prohibit/Allow File Memory Program File Creation (CX-Programmer Ver. 4.0 or Higher)

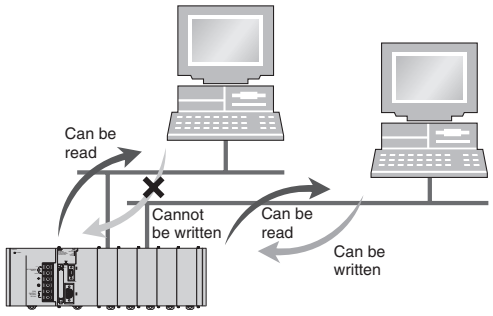
In addition to UM read protection and task read protection, user programs can also be protected from being illegally transferred to a Memory Card. This function enables complete read protection of programs in the PLC and prevents leakage of intellectual property.



■ Write Protection from Specific Nodes through Networks (Unit Ver. 2.0 or Later)

CPU Unit FINS Write/Protection through Networks (CX-Programmer Ver. 4.0 or Higher)

Specific nodes can be prohibited from writing to other nodes on the network. Data transmissions through the network are monitored, preventing data being carelessly written to the PLC, and preventing problems in the system.



Instructions

Instruction Features

■ High-volume Data Processing with One Instruction

The basic data format for specifying instruction operands has been changed from BCD to binary, enabling specification of more data for each instruction.

Example: BLOCK TRANSFER Instruction

Address type	C200HX/HG/HE PLCs	CJ-series PLCs
Direct	0 to 6,655 words	0 to 65,535 words
Indirect for DM Area	DM 0000 to DM 9999	D00000 to D32767

Binary Specifications for Timer/Counter Instructions

Either BCD or binary can be used to specify the set values for timer and counter instructions. Using a binary specification enables specifying longer periods of time and higher count values.

Examples: TIM instruction (BCD): 0 to 999.9 s
TIMX instruction (binary) 0 to 6,553.5 s
CNT instruction (BCD): 0 to 9,999 counts
CNTX instruction (binary): 0 to 65,535 counts

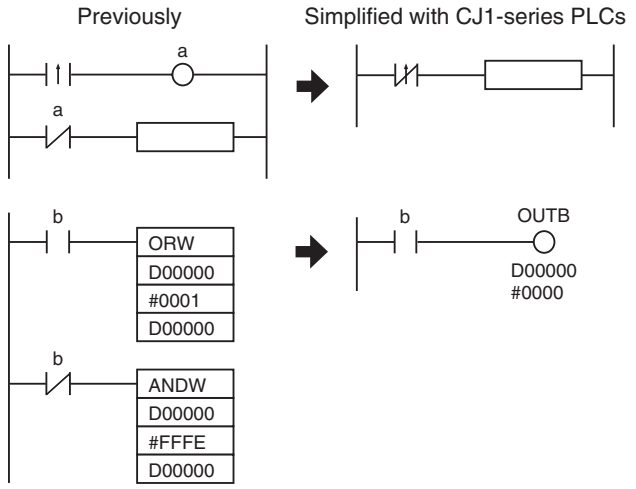
Applicable Instructions:

Binary Timer/Counter Instructions:

BINARY TIMER: TIMX(550)
BINARY COUNTER: CNTX(546)
BINARY HIGH-SPEED TIMER: TIMHX(551)
BINARY ONE-MS TIMER: TMHHX(552)
BINARY ACCUMULATIVE TIMER: TTIMX(555)
BINARY LONG TIMER: TIMLX(553)
BINARY MULTI-OUTPUT TIMER: MTIMX(554)
BINARY REVERSIBLE COUNTER: CNTRX(548)
BINARY RESET TIMER/COUNTER: CNRX(547)

■ Simplifier Ladder Programming

Programs using many basic instructions can be simplified greatly by using differentiated versions of the LD NOT, AND NOT, and OR NOT instructions, as well as bit access instructions for the DM and EM Areas.

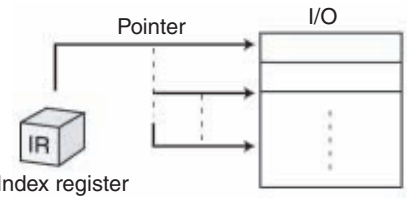


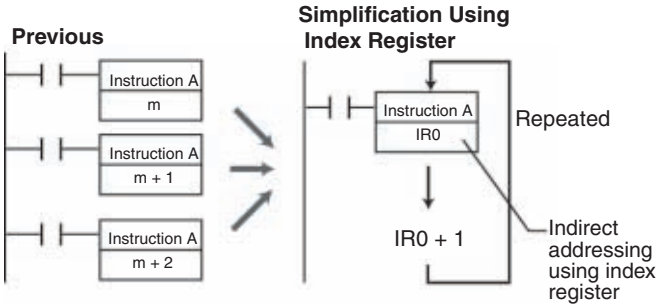
Applicable Instructions:

Bit Access Instructions:
SINGLE BIT OUTPUT (OUTB(534))

■ Simplify Programs with Index Registers

Index registers can be used as memory pointers to enable easily changing the addresses specified for instructions. Using an index register can often enable one instruction to preform the processing previously performed by many instructions.

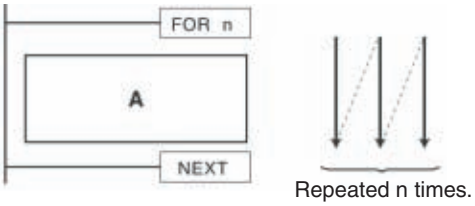




Index Registers: IR00 to IR15

■ Easily Repeat Processing

Instructions are provided that let you easily repeat sections of the program. Repeat execution can also be ended for a specified condition.



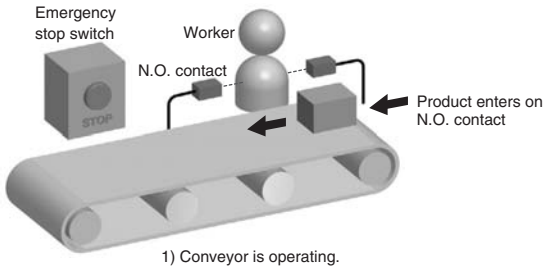
Applicable Instructions:

Loop Control Instructions:
START FOR-NEXT LOOPS (FOR(512))
END FOR-NEXT LOOPS (NEXT(513))
BREAK LOOP (BREAK(514))

■ Interlock Nesting (Unit Ver. 2.0 or Later Only)

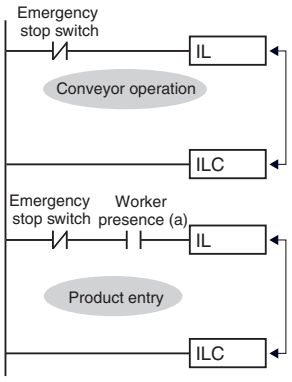
(CX-Programmer Ver 4.0 or Higher)

The previous interlock instructions cannot be nested. In actual applications, however, the entire interlock condition is often combined with partial interlock conditions. Multi-interlock instructions can be nested to better handle real applications.

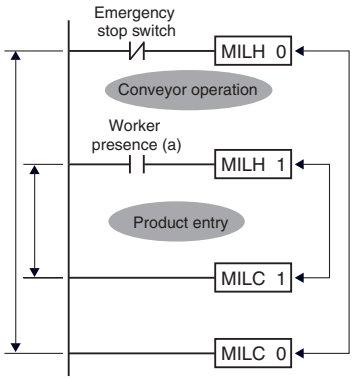


1) Conveyor is operating.
2) When a worker is present, the N.O. contact turns ON, and the product enters the conveyor.
3) When the emergency stop switch is pressed, the conveyor and product entry stop.

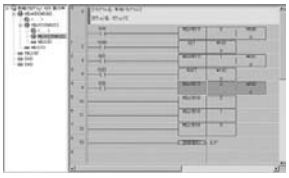
Using Existing IL Instructions



Using Multi-interlock Instructions



● CX-Programmer Screen



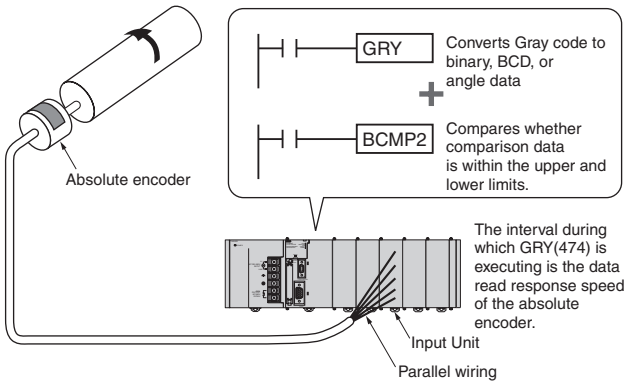
Interlock status is easy to understand using the software.

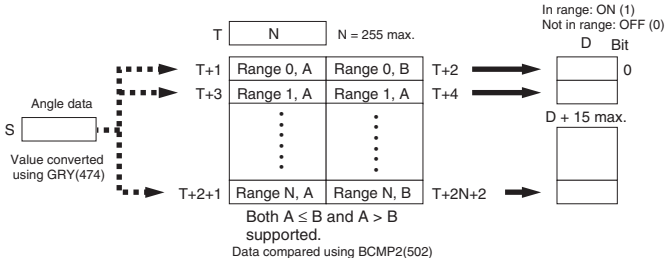
Applicable Instructions:

Sequence Control Instructions**:**
MULTI-INTERLOCK DIFFERENTIATION HOLD (MILH(517))
MULTI-INTERLOCK DIFFERENTIATION RELEASE (MILR(518))
MULTI-INTERLOCK CLEAR (MILC(519))

■ Easily Program Cam Switch Control (Unit Ver. 2.0 or Later Only)

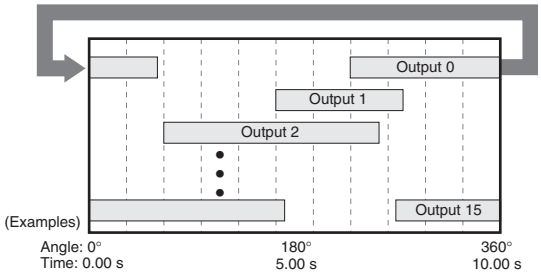
The EXPANDED BLOCK COMPARE (BCMP2(502)) instruction can be used to compare data converted from Gray binary code to binary data, BCD data, or an angle using the GRAY CODE CONVERT (GRY(474)) instruction. It can also compare data in ranges including 0, such as angle data.





If the comparison data (S) is within an of the 256 ranges, BCMP2(502) will turn ON the corresponding output bit in the results. If the upper limit is less than the lower limit, the comparison range will include 0.

Example of Compare Data



Angle Data

Controlling a Machine that Adjusts Timing According to Angles (Cam Switch Control)

Repeatedly Starting a Timer

Controlling Machine Timing Directly (Rotary Timer Control)

Applicable Instructions:

Conversion instructions:

GRAY CODE CONVERT (GRY(474))

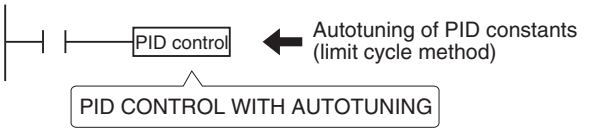
Comparison instructions:

EXPANDED BLOCK COMPARE (BCMP2(502))

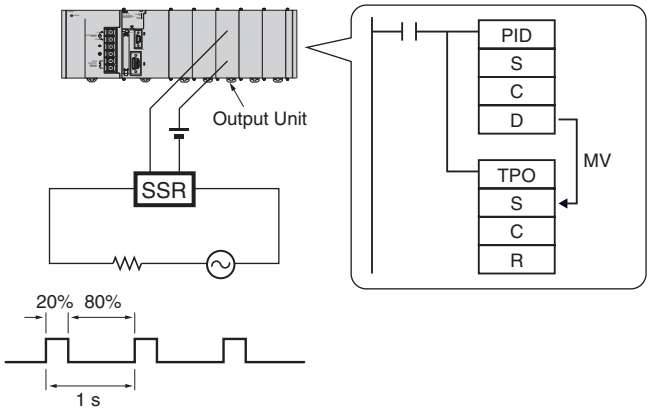
BCMP2(502) is supported by Pre-Ver. 2.0 CJ1M CPU Units or later.

■ PID Autotuning

PID constants can be automatically tuned for the PID instructions. The limit cycle method is used for tuning, allowing tuning to be completely quickly. This is particularly effective when there are many PID control loops.



PID instructions can be combined with the TIME-PROPORTIONAL OUTPUT (TPO(685)) instruction to enable time-proportional output of a manipulated variable (MV).



Applicable Instructions:

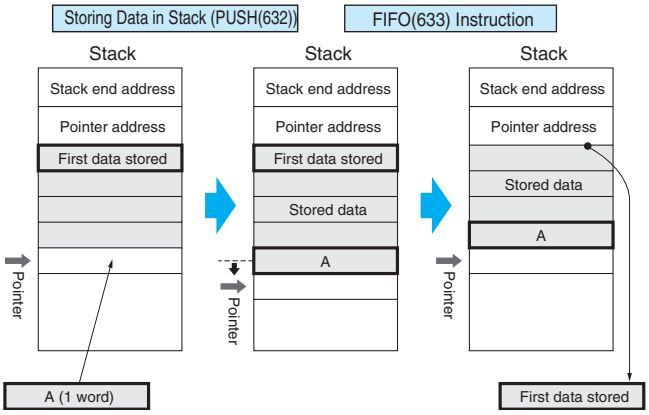
Control instructions:

PID CONTROL WITH AUTOTUNING (PIDAT(191))

TIME-PROPORTIONAL OUTPUT (TPO(685))

■ Easily Process Stacks: One-word Records for FIFO Processing

Stacks can be created in the DM Area or other areas for FIFO or other stack processing. The SET STACK (SSET(630)) instruction is used to create a stack.

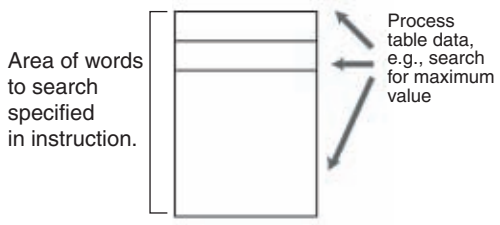


Applicable Instructions:

Stack Instructions:
SET STACK (SSET(630))
PUSH ONTO STACK (PUSH(632))
FIRST IN FIRST OUT (FIFO(633))
LAST IN FIRST OUT (LIFO(634))

■ Simple Data Searches (Single Words)

Instructions are provided to find the maximum value, minimum value, and search values.

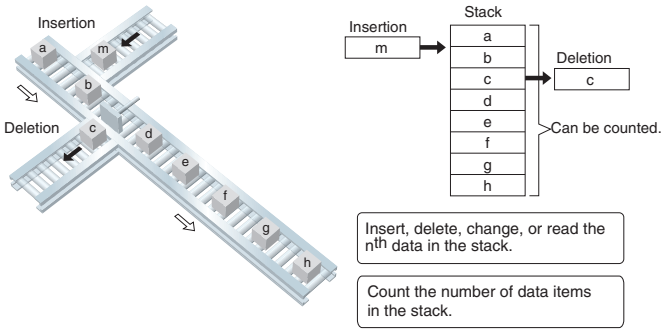


Applicable Instructions:

Search Instructions:
DATA SEARCH (SRCH(181))
FIND MAXIMUM (MAX(182))
FIND MINIMUM (MIN(183))

■ Real-time Data Management for Conveyors and Other Applications

When workpieces are added and removed during processing, such as with conveyors, the CJ1-series PLCs enable stack data to be inserted or deleted as required to easily manage workpiece data in real-time.



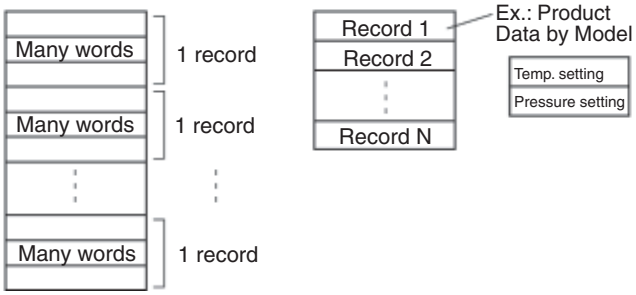
Applicable Instructions:

Table Data Processing Instructions:
SET STACK (SSET(630))
STACK SIZE READ (SNUM(638))
STACK DATA READ (SREAD(639))
STACK DATA OVERWRITE (SWRIT(640))
STACK DATA INSERT (SINS(641))
STACK DATA DELETE (SDEL(642))

■ Process Data Tables: Multi-word Records

Areas of memory can be defined as tables with the specified record size (words). Index registers can be used with such tables to easily sort records, search for values, or otherwise process the records in the table.

For example, the temperature, pressure, and other settings for each model of a product can be set in separate records and the data handled by record.

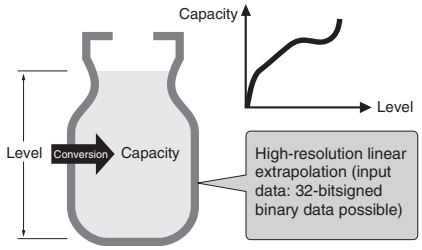


Applicable Instructions:

Table Data Instructions:
DIMENSION RECORD TABLE (DIM(631))
SET RECORD LOCATION (SETR(635))
GET RECORD NUMBER (GETR(636))

■ High-precision Approximations

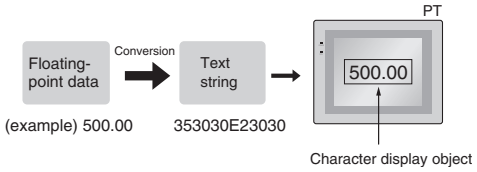
Converting a level meter reading in mm to tank capacity in liters according to the shape of the tank and other difficult linear extrapolations requiring high data resolution can be performed. (Linear data can be handled as 16-bit unsigned binary or BCD data, 16-bit or 32-bit signed binary data, or floating-point decimal data.)



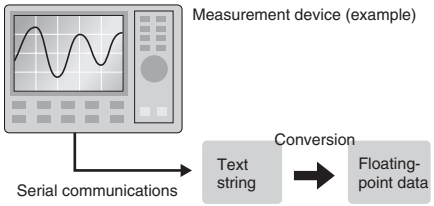
Applicable Instructions:
ARITHMETIC PROCESS (APR(069))

■ Convert between Floating-point and Text Data

Instructions are provided to easily convert floating-point decimal numbers (real numbers) to text strings (ASCII) for display on PTs. These are display as character display objects on the PT.



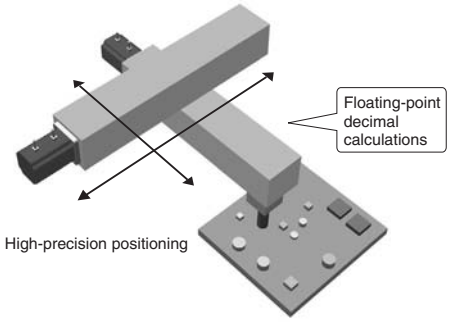
You can also convert ASCII data (text strings) received from measurement devices to floating-point decimal data for use in calculations.



Applicable Instructions:
Floating-point Decimal Math instructions
FLOATING- POINT TO ASCII (FSTR(448))
ASCII TO FLOATING-POINT (FVAL(449))

■ High-precision Positioning for XY Tables and Other Applications

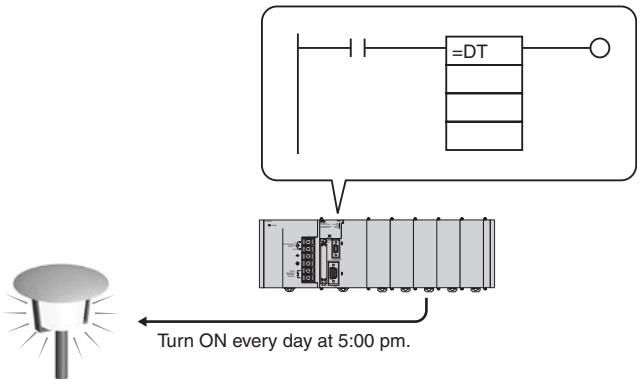
Floating-point decimal and double-precision calculation instruction have been supported. These are essential for position control operations. Now more precise position control is possible than ever before.



Applicable Instructions:
Floating-point Decimal and Double-precision Math instructions

■ Easily Programmed Calendar Timers (Unit Ver. 2.0 or Later)

Two sets of calendar data can be compared. The calendar data to be compared can be restricted to the year, month, day, hour, minutes, or seconds.



Example: The calendar timer function can be easily set for a specific function to operate every day at 17:00:00 (H:M:S).

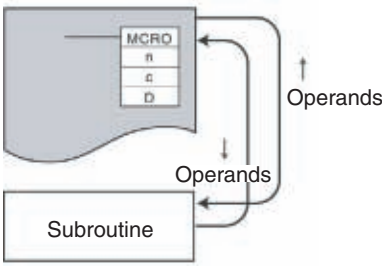
Applicable Instructions:
Comparison instructions

Time comparison:

= DT(341)
<> DT(342)
< DT(343)
<= DT(344)
> DT(345)
>= DT(346)

■ Simplified Execution of Subroutines with Different Operands

Macro instructions can be used to execute the same subroutine program with different operands from different locations in the programs.

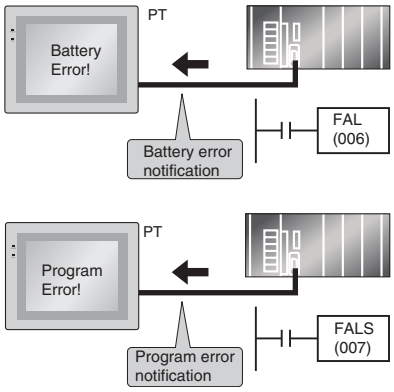


Applicable Instructions:
Subroutine instruction: MACRO (MCRO(099))

■ Simulate Specific Error Statuses for Debugging

The FAL(006) and FALS(007) instructions can be used to simulate a desired error condition. This can be used, for example, to intentionally create error conditions in the CPU Unit while debugging to check to see if the correct error messages are displayed on a PT.

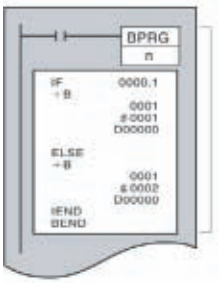
Example



Applicable Instructions:
Diagnostic Instructions
FAILURE ALARM (FAL(006))
SEVERE FAILURE ALARM (FALS(007))

■ Easily Program Logic Flow Control with Block Programming Sections

A block of mnemonic programming instructions can be executed as a group based on a single execution condition. IF/THEN, WAIT, TIMER WAIT, and other instructions can be used inside the block programming section to easily program logic flow control that is difficult to program with ladder diagrams.

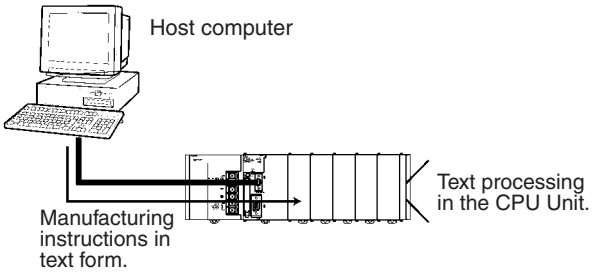


Block programming section

Applicable Instructions:
Block Programming instructions

■ Easily Handle Text Strings

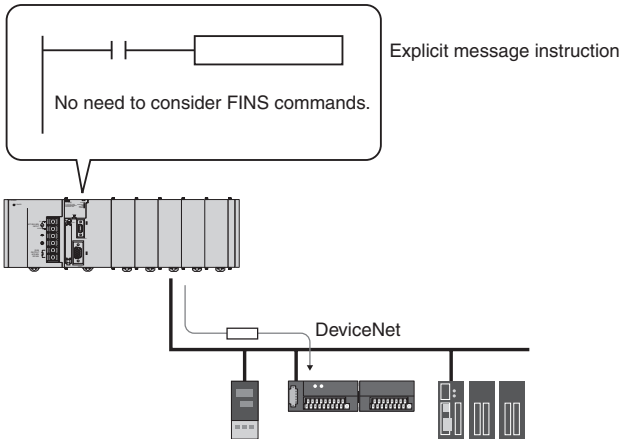
Manufacturing instruction can be obtained from a host computer or other external source, stored in memory, and then manipulated as text strings (ASCII data) as required by the applications. The text strings can be searched, fetched, reordered, or other processed in the CPU Unit of the PLC.



Applicable Instructions:
Text String Processing instructions

■ Read Maintenance Information Easily through DeviceNet (Unit Ver. 2.0 or Later) NEW!

Send user-set explicit messages easily without having to consider FINS commands. Data transmission between PLCs can also be achieved simply using explicit messages.



Applicable Instructions:
Network Instructions
EXPLICIT MESSAGE SEND (EXPLT(720))
EXPLICIT GET ATTRIBUTE (EGATR(721))
EXPLICIT SET ATTRIBUTE (ESATR(722))
EXPLICIT WORD READ (ECHRD(723))
EXPLICIT WORD WRITE (ECHWR(724))

Note: The shaded instructions in the following tables are described in *Instruction Features* on page 44.

Sequence Input Instructions

Name	Mnemonic	Function code	Function
LOAD	LD	---	Indicates a logical start and creates an ON/OFF execution condition based on the ON/OFF status of the specified operand bit.
LOAD NOT	LD NOT	---	Indicates a logical start and creates an ON/OFF execution condition based on the reverse of the ON/OFF status of the specified operand bit.
AND	AND	---	Takes a logical AND of the status of the specified operand bit and the current execution condition.
AND NOT	AND NOT	---	Reverses the status of the specified operand bit and takes a logical AND with the current execution condition.
OR	OR	---	Takes a logical OR of the ON/OFF status of the specified operand bit and the current execution condition.
OR NOT	OR NOT	---	Reverses the status of the specified bit and takes a logical OR with the current execution condition.
AND LOAD	AND LD	---	Takes a logical AND between logic blocks.
OR LOAD	OR LD	---	Takes a logical OR between logic blocks.
NOT	NOT	520	Reverses the execution condition.
CONDITION ON	UP	521	UP(521) turns ON the execution condition for one cycle when the execution condition goes from OFF to ON.
CONDITION OFF	DOWN	522	DOWN(522) turns ON the execution condition for one cycle when the execution condition goes from ON to OFF.
BIT TEST	LD TST	350	LD TST(350), AND TST(350), and OR TST(350) are used in the program like LD, AND, and OR; the execution condition is ON when the specified bit in the specified word is ON and OFF when the bit is OFF.
BIT TEST NOT	LD TSTN	351	LD TSTN(351), AND TSTN(351), and OR TSTN(351) are used in the program like LD NOT, AND NOT, and OR NOT; the execution condition is OFF when the specified bit in the specified word is ON and ON when the bit is OFF.
BIT TEST	AND TST	350	LD TST(350), AND TST(350), and OR TST(350) are used in the program like LD, AND, and OR; the execution condition is ON when the specified bit in the specified word is ON and OFF when the bit is OFF.
BIT TEST NOT	AND TSTN	351	LD TSTN(351), AND TSTN(351), and OR TSTN(351) are used in the program like LD NOT, AND NOT, and OR NOT; the execution condition is OFF when the specified bit in the specified word is ON and ON when the bit is OFF.
BIT TEST	OR TST	350	LD TST(350), AND TST(350), and OR TST(350) are used in the program like LD, AND, and OR; the execution condition is ON when the specified bit in the specified word is ON and OFF when the bit is OFF.
BIT TEST NOT	OR TSTN	351	LD TSTN(351), AND TSTN(351), and OR TSTN(351) are used in the program like LD NOT, AND NOT, and OR NOT; the execution condition is OFF when the specified bit in the specified word is ON and ON when the bit is OFF.

Sequence Output Instructions

Name	Mnemonic	Function code	Function
OUTPUT	OUT	---	Outputs the result (execution condition) of the logical processing to the specified bit.
OUTPUT NOT	OUT NOT	---	Reverses the result (execution condition) of the logical processing, and outputs it to the specified bit.
KEEP	KEEP	011	Operates as a latching relay.
DIFFERENTIATE UP	DIFU	013	DIFU(013) turns the designated bit ON for one cycle when the execution condition goes from OFF to ON (rising edge).
DIFFERENTIATE DOWN	DIFD	014	DIFD(014) turns the designated bit ON for one cycle when the execution condition goes from ON to OFF (falling edge).
SET	SET	---	SET turns the operand bit ON when the execution condition is ON.
RESET	RSET	---	RSET turns the operand bit OFF when the execution condition is ON.
MULTIPLE BIT SET	SETA	530	SETA(530) turns ON the specified number of consecutive bits.
MULTIPLE BIT RESET	RSTA	531	RSTA(531) turns OFF the specified number of consecutive bits.

Name	Mnemonic	Function code	Function
SINGLE BIT SET	SETB	532	Turns ON the specified bit in the specified word when the execution condition is ON.
SINGLE BIT RESET	RSTB	533	Turns OFF the specified bit in the specified word when the execution condition is ON.
SINGLE BIT OUTPUT	OUTB	534	Outputs the result (execution condition) of the logical processing to the specified bit.

Sequence Control Instructions

Name	Mnemonic	Function code	Function
END	END	001	Indicates the end of a program. END(001) completes the execution of a program for that cycle. No instructions written after END(001) will be executed. Execution proceeds to the program with the next task number. When the program being executed has the highest task number in the program, END(001) marks the end of the overall main program.
NO OPERATION	NOP	000	This instruction has no function. (No processing is performed for NOP(000).)
INTERLOCK	IL	002	Interlocks all outputs between IL(002) and ILC(003) when the execution condition for IL(002) is OFF. IL(002) and ILC(003) are normally used in pairs.
INTERLOCK CLEAR	ILC	003	Interlocks all outputs between IL(002) and ILC(003) when the execution condition for IL(002) is OFF. IL(002) and ILC(003) are normally used in pairs.
MULTI-INTERLOCK DIFFERENTIATION HOLD (Unit Ver. 2.0 or later only)	MILH	517	When the execution condition for MILH(517) is OFF, the outputs for all instructions between that MILH(517) instruction and the next MILC(519) instruction are interlocked. MILH(517) and MILC(519) are used as a pair. MILH(517)/MILC(519) interlocks can be nested (e.g., MILH(517)—MILH(517)—MILC(519)—MILC(519)). If there is a differentiated instruction (DIFU, DIFD, or instruction with a @ or % prefix) between MILH(517) and the corresponding MILC(519), that instruction will be executed after the interlock is cleared if the differentiation condition of the instruction was established.
MULTI-INTERLOCK DIFFERENTIATION RELEASE (Unit Ver. 2.0 or later only)	MILR	518	When the execution condition for MILR(518) is OFF, the outputs for all instructions between that MILR(518) instruction and the next MILC(519) instruction are interlocked.MILR(518) and MILC(519) are used as a pair. MILR(518)/MILC(519) interlocks can be nested (e.g., MILR(518)—MILR(518)—MILC(519)—MILC(519)). If there is a differentiated instruction (DIFU, DIFD, or instruction with a @ or % prefix) between MILR(518) and the corresponding MILC(519), that instruction will not be executed after the interlock is cleared even if the differentiation condition of the instruction was established.
MULTI-INTERLOCK CLEAR (Unit Ver. 2.0 or later only)	MILC	519	Clears an interlock started by an MILH(517) or MILR(518) with the same interlock number.
JUMP	JMP	004	When the execution condition for JMP(004) is OFF, program execution jumps directly to the first JME(005) in the program with the same jump number. When the execution condition is ON, all instructions are executed normally.
JUMP END	JME	005	JME(005) indicates the destination of jumps made for JMP(004), CJP(510), and CJPN(511).
CONDITIONAL JUMP	CJP	510	The operation of CJP(510) is the basically the opposite of JMP(004). When the execution condition for CJP(510) is ON, program execution jumps directly to the first JME(005) in the program with the same jump number. When the execution condition is OFF, all instructions are executed normally.
CONDITIONAL JUMP	CJPN	511	The operation of CJPN(511) is almost identical to JMP(004). When the execution condition for CJP(004) is OFF, program execution jumps directly to the first JME(005) in the program with the same jump number. When the execution condition is ON, all instructions are executed normally.
MULTIPLE JUMP	JMP0	515	When the execution condition for JMP0(515) is OFF, all instructions from JMP0(515) to the next JME0(516) in the program are processed as NOP(000). When the execution condition is ON, all instructions are executed normally. Use JMP0(515) and JME0(516) in pairs. There is no limit on the number of pairs that can be used in the program.
MULTIPLE JUMP END	JME0	516	JME0(516) indicates the destination of jumps made for JMP0(515).
START FOR-NEXT LOOP	FOR	512	The instructions between FOR(512) and NEXT(513) are repeated a specified number of times. FOR(512) and NEXT(513) are used in pairs.
BREAK LOOP	BREAK	514	Programmed in a FOR-NEXT loop to cancel the execution of the loop for a given execution condition. The remaining instructions in the loop are processed as NOP(000) instructions.
END FOR-NEXT LOOP	NEXT	513	The instructions between FOR(512) and NEXT(513) are repeated a specified number of times. FOR(512) and NEXT(513) are used in pairs.

Timer and Counter Instructions

Name	Mnemonic	Function code	Function
BCD TIMER	TIM	---	TIM operates a decrementing timer with units of 0.1-s. Setting range for Set Value (SV): BCD: 0 to 999.9 s Binary: 0 to 6,553.5 s
BINARY TIMER	TIMX	550	
BCD COUNTER	CNT	---	CNT operates a decrementing counter. Setting range for Set Value (SV): BCD: 0 to 9,999 counts Binary: 0 to 65,535 counts
BINARY COUNTER	CNTX	546	
BCD HIGH-SPEED TIMER	TIMH	015	TIMH(015) operates a decrementing timer with units of 10-ms. Setting range for Set Value (SV): BCD: 0 to 99.99 s Binary: 0 to 655.35 s
BINARY HIGH-SPEED TIMER	TIMHX	551	
BCD ONE-MS TIMER	TMHH	540	TMHH(540) operates a decrementing timer with units of 1-ms. Setting range for Set Value (SV): BCD: 0 to 9.999 s Binary: 0 to 65.535 s
BINARY ONE-MS TIMER	TMHHX	552	
BCD ACCUMULATIVE TIMER	TTIM	087	TTIM(087) operates an incrementing timer with units of 0.1-s. Setting range for Set Value (SV): BCD: 0 to 999.9 s Binary: 0 to 6,553.5 s
BINARY ACCUMULATIVE TIMER	TTIMX	555	
BCD LONG TIMER	TIML	542	TIML(542) operates a decrementing timer with units of 0.1-s. Setting range for Set Value (SV): BCD: 115 days Binary: 49,710 days
BINARY LONG TIMER	TIMLX	553	
BCD MULTI-OUTPUT TIMER	MTIM	543	MTIM(543) operates a 0.1-s incrementing timer with eight independent SVs and Completion Flags. Setting range for Set Value (SV): BCD: 0 to 999.9 s Binary: 0 to 6,553.5 s
BINARY MULTI-OUTPUT TIMER	MTIMX	554	
BCD REVERSIBLE COUNTER	CNTR	012	CNTR(012) operates a reversible counter.
BINARY REVERSIBLE COUNTER	CNTRX	548	
BCD RESET TIMER/COUNTER	CNR	545	Resets the timers or counters within the specified range of timer or counter numbers. Sets the set value (SV) to the maximum of 9,999 for BCD instructions and FFFF for binary instructions.
BINARY RESET TIMER/COUNTER	CNRX	547	

Symbol Comparison Instructions

Name	Mnemonic	Function code	Function
Symbol Comparison (Unsigned)	LD, AND, OR + =, <>, <, <=, >, >=	300 (=) 305 (<>) 310 (<>) 315 (<=) 320 (>) 325(>=)	Symbol comparison instructions (unsigned) compare two values (constants and/or the contents of specified words) in 16-bit binary data and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
Symbol Comparison (Double-word, unsigned)	LD, AND, OR + =, <>, <, <=, >, >= + L	301 (=) 306 (<>) 311 (<>) 316 (<=) 321 (>) 326 (>=)	Symbol comparison instructions (double-word, unsigned) compare two values (constants and/or the contents of specified double-word data) in unsigned 32-bit binary data and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
Symbol Comparison (Signed)	LD, AND, OR + =, <>, <, <=, >, >= +S	302 (=) 307 (<>) 312 (<>) 317 (<=) 322 (>) 327 (>=)	Symbol comparison instructions (signed) compare two values (constants and/or the contents of specified words) in signed 16-bit binary (4-digit hexadecimal) and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.
Symbol Comparison (Double-word, signed)	LD, AND, OR + =, <>, <, <=, >, >= +SL	303 (=) 308 (<>) 313 (<>) 318 (<=) 323 (>) 328 (>=)	Symbol comparison instructions (double-word, signed) compare two values (constants and/or the contents of specified double-word data) in signed 32-bit binary (8-digit hexadecimal) and create an ON execution condition when the comparison condition is true. There are three types of symbol comparison instructions, LD (LOAD), AND, and OR.

Name	Mnemonic	Function code	Function
Time comparison (Unit Ver. 2.0 or later only)	LD, AND, OR + = DT <> DT < DT, <= DT > DT >= DT	341 (= DT) 342 (<> DT) 343 (< DT) 344 (<= DT) 345 (> DT) 346 (>= DT)	Time comparison instructions compare two BCD time values and create an ON execution condition when the comparison condition is true. There are three types of time comparison instructions, LD (LOAD), AND, and OR. Time values (year, month, day, hour, minute, and second) can be masked/unmasked in the comparison so it is easy to create calendar timer functions.
COMPARE	CMP	020	Compares two unsigned binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
DOUBLE COMPARE	CMPL	060	Compares two double unsigned binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
SIGNED BINARY COMPARE	CPS	114	Compares two signed binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
DOUBLE SIGNED BINARY COMPARE	CPSL	115	Compares two double signed binary values (constants and/or the contents of specified words) and outputs the result to the Arithmetic Flags in the Auxiliary Area.
TABLE COMPARE	TCMP	085	Compares the source data to the contents of 16 consecutive words and turns ON the corresponding bit in the result word when the contents of the words are equal.
MULTIPLE COMPARE	MCMP	019	Compares 16 consecutive words with another 16 consecutive words and turns ON the corresponding bit in the result word where the contents of the words **are not** equal.
BLOCK COMPARE	BCMP	068	Compares the source data to 16 ranges (defined by 16 lower limits and 16 upper limits) and turns ON the corresponding bit in the result word when the source data is within the range.
EXPANDED BLOCK COMPARE (CJ1G/H CPU Unit Ver. 2.0 or later)	BCMP2	502	Compares the source data to up to 256 ranges (defined by upper and lower limits) and turns ON the corresponding bit in the result word when the source data is within a range.
AREA RANGE COMPARE	ZCP	088	Compares the 16-bit unsigned binary value in CD (word contents or constant) to the range defined by LL and UL and outputs the results to the Arithmetic Flags in the Auxiliary Area.
DOUBLE AREA RANGE COMPARE	ZCPL	116	Compares the 32-bit unsigned binary value in CD and CD+1 (word contents or constant) to the range defined by LL and UL and outputs the results to the Arithmetic Flags in the Auxiliary Area.

Data Movement Instructions

Name	Mnemonic	Function code	Function
MOVE	MOV	021	Transfers a word of data to the specified word.
DOUBLE MOVE	MOVL	498	Transfers two words of data to the specified words.
MOVE NOT	MVN	022	Transfers the complement of a word of data to the specified word.
DOUBLE MOVE NOT	MVNL	499	Transfers the complement of two words of data to the specified words.
MOVE BIT	MOVB	082	Transfers the specified bit.
MOVE DIGIT	MOVD	083	Transfers the specified digit or digits. (Each digit is made up of 4 bits.)
MULTIPLE BIT TRANSFER	XFRB	062	Transfers the specified number of consecutive bits.
BLOCK TRANSFER	XFER	070	Transfers the specified number of consecutive words.
BLOCK SET	BSET	071	Copies the same word to a range of consecutive words.
DATA EXCHANGE	XCHG	073	Exchanges the contents of the two specified words.
DOUBLE DATA EXCHANGE	XCGL	562	Exchanges the contents of a pair of consecutive words with another pair of consecutive words.
SINGLE WORD DISTRIBUTE	DIST	080	Transfers the source word to a destination word calculated by adding an offset value to the base address.
DATA COLLECT	COLL	081	Transfers the source word (calculated by adding an offset value to the base address) to the destination word.
MOVE TO REGISTER	MOVR	560	Sets the PLC memory address of the specified word, bit, or timer/counter Completion Flag in the specified Index Register. (Use MOVRW(561) to set the PLC memory address of a timer/counter PV in an Index Register.)
MOVE TIMER/COUNTER PV TO REGISTER	MOVRW	561	Sets the PLC memory address of the specified timer or counter's PV in the specified Index Register. (Use MOVR(560) to set the PLC memory address of a word, bit, or timer/counter Completion Flag in an Index Register.)

Data Shift Instructions

Name	Mnemonic	Function code	Function
SHIFT REGISTER	SFT	010	Operates a shift register.
REVERSIBLE SHIFT REGISTER	SFTR	084	Creates a shift register that shifts data to either the right or the left.
ASYNCHRONOUS SHIFT REGISTER	ASFT	017	Shifts all non-zero word data within the specified word range either towards St or toward E, replacing 0000Hex word data.
WORD SHIFT	WSFT	016	Shifts data between St and E in word units.
ARITHMETIC SHIFT LEFT	ASL	025	Shifts the contents of Wd one bit to the left.
DOUBLE SHIFT LEFT	ASLL	570	Shifts the contents of Wd and Wd +1 one bit to the left.
ARITHMETIC SHIFT RIGHT	ASR	026	Shifts the contents of Wd one bit to the right.
DOUBLE SHIFT RIGHT	ASRL	571	Shifts the contents of Wd and Wd +1 one bit to the right.
ROTATE LEFT	ROL	027	Shifts all Wd bits one bit to the left including the Carry Flag (CY).
DOUBLE ROTATE LEFT	ROLL	572	Shifts all Wd and Wd +1 bits one bit to the left including the Carry Flag (CY).
ROTATE LEFT WITHOUT CARRY	RLNC	574	Shifts all Wd bits one bit to the left not including the Carry Flag (CY).
DOUBLE ROTATE LEFT WITHOUT CARRY	RLNL	576	Shifts all Wd and Wd +1 bits one bit to the left not including the Carry Flag (CY).
ROTATE RIGHT	ROR	028	Shifts all Wd bits one bit to the right including the Carry Flag (CY).
DOUBLE ROTATE RIGHT	RORL	573	Shifts all Wd and Wd +1 bits one bit to the right including the Carry Flag (CY).
ROTATE RIGHT WITHOUT CARRY	RRNC	575	Shifts all Wd bits one bit to the right not including the Carry Flag (CY). The contents of the rightmost bit of Wd shifts to the leftmost bit and to the Carry Flag (CY).
DOUBLE ROTATE RIGHT WITHOUT CARRY	RRNL	577	Shifts all Wd and Wd +1 bits one bit to the right not including the Carry Flag (CY). The contents of the rightmost bit of Wd +1 is shifted to the leftmost bit of Wd, and to the Carry Flag (CY).
ONE DIGIT SHIFT LEFT	SLD	074	Shifts data by one digit (4 bits) to the left.
ONE DIGIT SHIFT RIGHT	SRD	075	Shifts data by one digit (4 bits) to the right.
SHIFT N-BIT DATA LEFT	NSFL	578	Shifts the specified number of bits to the left.
SHIFT N-BIT DATA RIGHT	NSFR	579	Shifts the specified number of bits to the right.
SHIFT N-BITS LEFT	NASL	580	Shifts the specified 16 bits of word data to the left by the specified number of bits.
DOUBLE SHIFT N-BITS LEFT	NSLL	582	Shifts the specified 32 bits of word data to the left by the specified number of bits.
SHIFT N-BITS RIGHT	NASR	581	Shifts the specified 16 bits of word data to the right by the specified number of bits.
DOUBLE SHIFT N-BITS RIGHT	NSRL	583	Shifts the specified 32 bits of word data to the right by the specified number of bits.

Increment/Decrement Instructions

Name	Mnemonic	Function code	Function
INCREMENT BINARY	++	590	Increments the 4-digit hexadecimal content of the specified word by 1.
DOUBLE INCREMENT BINARY	++L	591	Increments the 8-digit hexadecimal content of the specified words by 1.
DECREMENT BINARY	−−	592	Decrements the 4-digit hexadecimal content of the specified word by 1.
DOUBLE DECREMENT BINARY	−−L	593	Decrements the 8-digit hexadecimal content of the specified words by 1.
INCREMENT BCD	++B	594	Increments the 4-digit BCD content of the specified word by 1.
DOUBLE INCREMENT BCD	++BL	595	Increments the 8-digit BCD content of the specified words by 1.
DECREMENT BCD	−−B	596	Decrements the 4-digit BCD content of the specified word by 1.
DOUBLE DECREMENT BCD	−−BL	597	Decrements the 8-digit BCD content of the specified words by 1.

Symbol Math Instructions

Name	Mnemonic	Function code	Function
SIGNED BINARY ADD WITHOUT CARRY	+	400	Adds 4-digit (single-word) hexadecimal data and/or constants.
DOUBLE SIGNED BINARY ADD WITHOUT CARRY	+L	401	Adds 8-digit (double-word) hexadecimal data and/or constants.
SIGNED BINARY ADD WITH CARRY	+C	402	Adds 4-digit (single-word) hexadecimal data and/or constants with the Carry Flag (CY).
DOUBLE SIGNED BINARY ADD WITH CARRY	+CL	403	Adds 8-digit (double-word) hexadecimal data and/or constants with the Carry Flag (CY).
BCD ADD WITHOUT CARRY	+B	404	Adds 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD ADD WITHOUT CARRY	+BL	405	Adds 8-digit (double-word) BCD data and/or constants.
BCD ADD WITH CARRY	+BC	406	Adds 4-digit (single-word) BCD data and/or constants with the Carry Flag (CY).
DOUBLE BCD ADD WITH CARRY	+BCL	407	Adds 8-digit (double-word) BCD data and/or constants with the Carry Flag (CY).
SIGNED BINARY SUBTRACT WITHOUT CARRY	–	410	Subtracts 4-digit (single-word) hexadecimal data and/or constants.
DOUBLE SIGNED BINARY SUBTRACT WITHOUT CARRY	–L	411	Subtracts 8-digit (double-word) hexadecimal data and/or constants.
SIGNED BINARY SUBTRACT WITH CARRY	–C	412	Subtracts 4-digit (single-word) hexadecimal data and/or constants with the Carry Flag (CY).
DOUBLE SIGNED BINARY WITH CARRY	–CL	413	Subtracts 8-digit (double-word) hexadecimal data and/or constants with the Carry Flag (CY).
BCD SUBTRACT WITHOUT CARRY	–B	414	Subtracts 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD SUBTRACT WITHOUT CARRY	–BL	415	Subtracts 8-digit (double-word) BCD data and/or constants.
BCD SUBTRACT WITH CARRY	–BC	416	Subtracts 4-digit (single-word) BCD data and/or constants with the Carry Flag (CY).
DOUBLE BCD SUBTRACT WITH CARRY	–BCL	417	Subtracts 8-digit (double-word) BCD data and/or constants with the Carry Flag (CY).
SIGNED BINARY MULTIPLY	*	420	Multiplies 4-digit signed hexadecimal data and/or constants.
SIGNED BINARY MULTIPLY	*L	421	Multiplies 8-digit signed hexadecimal data and/or constants.
UNSIGNED BINARY MULTIPLY	*U	422	Multiplies 4-digit unsigned hexadecimal data and/or constants.
DOUBLE UNSIGNED BINARY MULTIPLY	*UL	423	Multiplies 8-digit unsigned hexadecimal data and/or constants.
BCD MULTIPLY	*B	424	Multiplies 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD MULTIPLY	*BL	425	Multiplies 8-digit (double-word) BCD data and/or constants.
SIGNED BINARY DIVIDE	/	430	Divides 4-digit (single-word) signed hexadecimal data and/or constants.
DOUBLE SIGNED BINARY DIVIDE	/L	431	Divides 8-digit (double-word) signed hexadecimal data and/or constants.
UNSIGNED BINARY DIVIDE	/U	432	Divides 4-digit (single-word) unsigned hexadecimal data and/or constants.
DOUBLE UNSIGNED BINARY DIVIDE	/UL	433	Divides 8-digit (double-word) unsigned hexadecimal data and/or constants.
BCD DIVIDE	/B	434	Divides 4-digit (single-word) BCD data and/or constants.
DOUBLE BCD DIVIDE	/BL	435	Divides 8-digit (double-word) BCD data and/or constants.

Conversion Instructions

Name	Mnemonic	Function code	Function
BCD-TO BINARY	BIN	023	Converts BCD data to binary data.
DOUBLE BCD-TO-DOUBLE BINARY	BINL	058	Converts 8-digit BCD data to 8-digit hexadecimal (32-bit binary) data.
BINARY-TO-BCD	BCD	024	Converts a word of binary data to a word of BCD data.
DOUBLE BINARY-TO-DOUBLE BCD	BCDL	059	Converts 8-digit hexadecimal (32-bit binary) data to 8-digit BCD data.
2'S COMPLEMENT	NEG	160	Calculates the 2's complement of a word of hexadecimal data.

Name	Mnemonic	Function code	Function
DOUBLE 2'S COMPLEMENT	NEGL	161	Calculates the 2's complement of two words of hexadecimal data.
16-BIT TO 32-BIT SIGNED BINARY	SIGN	600	Expands a 16-bit signed binary value to its 32-bit equivalent.
DATA DECODER	MLPX	076	Reads the numerical value in the specified digit (or byte) in the source word, turns ON the corresponding bit in the result word (or 16-word range), and turns OFF all other bits in the result word (or 16-word range). 4-to-16 bit conversion
DATA ENCODER	DMPX	077	FInds the location of the first or last ON bit within the source word (or 16-word range), and writes that value to the specified digit (or byte) in the result word. 16-to-4 bit conversion
ASCII CONVERT	ASC	086	Converts 4-bit hexadecimal digits in the source word into their 8-bit ASCII equivalents.
ASCII TO HEX	HEX	162	Converts up to 4 bytes of ASCII data in the source word to their hexadecimal equivalents and writes these digits in the specified destination word.
COLUMN TO LINE	LINE	063	Converts a column of bits from a 16-word range (the same bit number in 16 consecutive words) to the 16 bits of the destination word.
LINE TO COLUMN	COLM	064	Converts the 16 bits of the source word to a column of bits in a 16-word range of destination words (the same bit number in 16 consecutive words).
SIGNED BCD-TO-BINARY	BINS	470	Converts one word of signed BCD data to one word of signed binary data.
DOUBLE SIGNED BCD-TO-BINARY	BISL	472	Converts double signed BCD data to double signed binary data.
SIGNED BINARY-TO-BCD	BCDS	471	Converts one word of signed binary data to one word of signed BCD data.
DOUBLE SIGNED BINARY-TO-BCD	BDSL	473	Converts double signed binary data to double signed BCD data.
GRAY CODE CONVERT **(Unit Ver. 2.0 or later only)**	GRY	474	Converts the gray binary code data in the specified word to standard binary, BCD, or angle (°) data at the specified resolution.

Logic Instructions

Name	Mnemonic	Function code	Function
LOGICAL AND	ANDW	034	Takes the logical AND of corresponding bits in single words of word data and/or constants.
DOUBLE LOGICAL AND	ANDL	610	Takes the logical AND of corresponding bits in double words of word data and/or constants.
LOGICAL OR	ORW	035	Takes the logical OR of corresponding bits in single words of word data and/or constants.
DOUBLE LOGICAL OR	ORWL	611	Takes the logical OR of corresponding bits in double words of word data and/or constants.
EXCLUSIVE OR	XORW	036	Takes the logical exclusive OR of corresponding bits in single words of word data and/or constants.
DOUBLE EXCLUSIVE OR	XORL	612	Takes the logical exclusive OR of corresponding bits in double words of word data and/or constants.
EXCLUSIVE NOR	XNRW	037	Takes the logical exclusive NOR of corresponding single words of word data and/or constants.
DOUBLE EXCLUSIVE NOR	XNRL	613	Takes the logical exclusive NOR of corresponding bits in double words of word data and/or constants.
COMPLEMENT	COM	029	Turns OFF all ON bits and turns ON all OFF bits in Wd.
DOUBLE COMPLEMENT	COML	614	Turns OFF all ON bits and turns ON all OFF bits in Wd and Wd+1.

Special Math Instructions

Name	Mnemonic	Function code	Function
BINARY ROOT	ROTB	620	Computes the square root of the 32-bit binary content of the specified words and outputs the integer portion of the result to the specified result word.
BCD SQUARE ROOT	ROOT	072	Computes the square root of an 8-digit BCD number and outputs the integer portion of the result to the specified result word.
ARITHMETIC PROCESS	APR	069	Calculates the sine or cosine of the source angle data between 0° and 90° and outputs the result as a 4-digit BCD value below the decimal. The linear extrapolation function allows any relationship between X and Y to be approximated with line segments. The input data can be unsigned 16-bit BCD data, unsigned 16-bit binary data, signed 16-bit binary data, signed 32-bit binary data, or single-precision floating-point decimal data.
FLOATING POINT DIVIDE (BCD)	FDIV	079	Divides a 7-digit floating-point number (mantissa) by a 1-digit floating-point number (exponent).
BIT COUNTER	BCNT	067	Counts the total number of ON bits in the specified word(s).

Floating-point Math Instructions

Name	Mnemonic	Function code	Function
FLOATING TO 16-BIT	FIX	450	Converts a 32-bit floating-point value to 16-bit signed binary data and places the result in the specified result word.
FLOATING TO 32-BIT	FIXL	451	Converts a 32-bit floating-point value to 32-bit signed binary data and places the result in the specified result words.
16-BIT TO FLOATING	FLT	452	Converts a 16-bit signed binary value to 32-bit floating-point data and places the result in the specified result words.
32-BIT TO FLOATING	FLTL	453	Converts a 32-bit signed binary value to 32-bit floating-point data and places the result in the specified result words.
FLOATING POINT ADD	+F	454	Adds two 32-bit floating-point numbers and places the result in the specified result words.
FLOATING POINT SUBTRACT	–F	455	Subtracts one 32-bit floating-point number from another and places the result in the specified result words.
FLOATING- POINT DIVIDE	/F	457	Divides one 32-bit floating-point number by another and places the result in the specified result words.
FLOATING- POINT MULTIPLY	*F	456	Multiplies two 32-bit floating-point numbers and places the result in the specified result words.
DEGREES TO RADIANS	RAD	458	Converts a 32-bit floating-point number from degrees to radians and places the result in the specified result words.
RADIANS TO DEGREES	DEG	459	Converts a 32-bit floating-point number from radians to degrees and places the result in the specified result words.
SINE	SIN	460	Calculates the sine of a 32-bit floating-point number (in radians) and places the result in the specified result words.
COSINE	COS	461	Calculates the cosine of a 32-bit floating-point number (in radians) and places the result in the specified result words.
TANGENT	TAN	462	Calculates the tangent of a 32-bit floating-point number (in radians) and places the result in the specified result words.
ARC SINE	ASIN	463	Calculates the arc sine of a 32-bit floating-point number and places the result in the specified result words. (The arc sine function is the inverse of the sine function; it returns the angle that produces a given sine value between –1 and 1.)
ARC COSINE	ACOS	464	Calculates the arc cosine of a 32-bit floating-point number and places the result in the specified result words. (The arc cosine function is the inverse of the cosine function; it returns the angle that produces a given cosine value between –1 and 1.)
ARC TANGENT	ATAN	465	Calculates the arc tangent of a 32-bit floating-point number and places the result in the specified result words. (The arc tangent function is the inverse of the tangent function; it returns the angle that produces a given tangent value.)
SQUARE ROOT	SQRT	466	Calculates the square root of a 32-bit floating-point number and places the result in the specified result words.
EXPONENT	EXP	467	Calculates the natural (base e) exponential of a 32-bit floating-point number and places the result in the specified result words.
LOGARITHM	LOG	468	Calculates the natural (base e) logarithm of a 32-bit floating-point number and places the result in the specified result words.

Name	Mnemonic	Function code	Function
EXPONENTIAL POWER	PWR	840	Raises a 32-bit floating-point number to the power of another 32-bit floating-point number.
FLOATING SYMBOL COMPARISON	LD, AND, OR + =F, <>F, <F, <=F, >F, >=F	329 (=F) 330 (<>F) 331 (<F) 332 (<=F) 333 (>F) 334 (>+F)	Compares the specified single-precision data (32 bits) or constants and creates an ON execution condition if the comparison result is true. Three kinds of symbols can be used with the floating-point symbol comparison instructions: LD (Load), AND, and OR.
FLOATING- POINT TO ASCII	FSTR	448	Converts the specified single-precision floating-point data (32-bit decimal-point or exponential format) to text string data (ASCII) and outputs the result to the destination word.
ASCII TO FLOATING-POINT	FVAL	449	Converts the specified text string (ASCII) representation of single-precision floating-point data (decimal-point or exponential format) to 32-bit single-precision floating-point data and outputs the result to the destination words.

Double-precision Floating-point Instructions

Name	Mnemonic	Function code	Function
DOUBLE FLOATING TO 16-BIT BINARY	FIXD	841	Converts the specified double-precision floating-point data (64 bits) to 16-bit signed binary data and outputs the result to the destination word.
DOUBLE FLOATING TO 32-BIT BINARY	FIXLD	842	Converts the specified double-precision floating-point data (64 bits) to 32-bit signed binary data and outputs the result to the destination words.
16-BIT BINARY TO DOUBLE FLOATING	DBL	843	Converts the specified16-bit signed binary data to double-precision floating-point data (64 bits) and outputs the result to the destination words.
32-BIT BINARY TO DOUBLE FLOATING	DBLL	844	Converts the specified 32-bit signed binary data to double-precision floating-point data (64 bits) and outputs the result to the destination words.
DOUBLE FLOATING-POINT ADD	+D	845	Adds the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE FLOATING-POINT SUBTRACT	–D	846	Subtracts the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE FLOATING-POINT MULTIPLY	*D	847	Multiplies the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE FLOATING-POINT DIVIDE	/D	848	Divides the specified double-precision floating-point values (64 bits each) and outputs the result to the result words.
DOUBLE DEGREES TO RADIANS	RADD	849	Converts the specified double-precision floating-point data (64 bits) from degrees to radians and outputs the result to the result words.
DOUBLE RADIANS TO DEGREES	DEGD	850	Converts the specified double-precision floating-point data (64 bits) from radians to degrees and outputs the result to the result words.
DOUBLE SINE	SIND	851	Calculates the sine of the angle (radians) in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE COSINE	COSD	852	Calculates the cosine of the angle (radians) in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE TANGENT	TAND	853	Calculates the tangent of the angle (radians) in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE ARC SINE	ASIND	854	Calculates the angle (in radians) from the sine value in the specified double-precision floating-point data (64 bits) and outputs the result to the result words. (The arc sine function is the inverse of the sine function; it returns the angle that produces a given sine value between –1 and 1.)
DOUBLE ARC COSINE	ACOSD	855	Calculates the angle (in radians) from the cosine value in the specified double-precision floating-point data (64 bits) and outputs the result to the result words. (The arc cosine function is the inverse of the cosine function; it returns the angle that produces a given cosine value between –1 and 1.)
DOUBLE ARC TANGENT	ATAND	856	Calculates the angle (in radians) from the tangent value in the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE SQUARE ROOT	SQRTD	857	Calculates the square root of the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE EXPONENT	EXPD	858	Calculates the natural (base e) exponential of the specified double-precision floating-point data (64 bits) and outputs the result to the result words.

Name	Mnemonic	Function code	Function
DOUBLE LOGARITHM	LOGD	859	Calculates the natural (base e) logarithm of the specified double-precision floating-point data (64 bits) and outputs the result to the result words.
DOUBLE EXPONENTIAL POWER	PWRD	860	Raises a double-precision floating-point number (64 bits) to the power of another double-precision floating-point number and outputs the result to the result words.
DOUBLE SYMBOL COMPARISON	LD, AND, OR + =D, <>D, <D, <=D, >D, >=D	335 (=D) 336 (<>D) 337 (<D) 338 (<=D) 339 (>D) 340 (>=D)	Compares the specified double-precision data (64 bits) and creates an ON execution condition if the comparison result is true. Three kinds of symbols can be used with the floating-point symbol comparison instructions: LD (Load), AND, and OR.

Table Data Processing Instructions

Name	Mnemonic	Function code	Function
SET STACK	SSET	630	Defines a stack of the specified length beginning at the specified word and initializes the words in the data region to all zeroes.
PUSH ONTO STACK	PUSH	632	Writes one word of data to the specified stack.
FIRST IN FIRST OUT	FIFO	633	Reads the first word of data written to the specified stack (the oldest data in the stack).
LAST IN FIRST OUT	LIFO	634	Reads the last word of data written to the specified stack (the newest data in the stack).
DIMENSION RECORD TABLE	DIM	631	Defines a record table by declaring the length of each record and the number of records. Up to 16 record tables can be defined.
SET RECORD LOCATION	SETR	635	Writes the location of the specified record (the PLC memory address of the beginning of the record) in the specified Index Register.
GET RECORD NUMBER	GETR	636	Returns the record number of the record at the PLC memory address contained in the specified Index Register.
DATA SEARCH	SRCH	181	Searches for a word of data within a range of words.
SWAP BYTES	SWAP	637	Switches the leftmost and rightmost bytes in all of the words in the range.
FIND MAXIMUM	MAX	182	Finds the maximum value in the range.
FIND MINIMUM	MIN	183	Finds the minimum value in the range.
SUM	SUM	184	Adds the bytes or words in the range and outputs the result to two words.
FRAME CHECKSUM	FCS	180	Calculates the ASCII FCS value for the specified range.
STACK SIZE READ	SNUM	638	Counts the amount of stack data (number of words) in the specified stack.
STACK DATA READ	SREAD	639	Reads the data from the specified data element in the stack. The offset value indicates the location of the desired data element (how many data elements before the current pointer position).
STACK DATA OVERWRITE	SWRIT	640	Writes the source data to the specified data element in the stack (overwriting the existing data). The offset value indicates the location of the desired data element (how many data elements before the current pointer position).
STACK DATA INSERT	SINS	641	Inserts the source data at the specified location in the stack and shifts the rest of the data in the stack downward. The offset value indicates the location of the insertion point (how many data elements before the current pointer position).
STACK DATA DELETE	SDEL	642	Deletes the data element at the specified location in the stack and shifts the rest of the data in the stack upward. The offset value indicates the location of the deletion point (how many data elements before the current pointer position).

Data Control Instructions

Name	Mnemonic	Function code	Function
PID CONTROL	PID	190	Executes PID control according to the specified parameters.
PID CONTROL WITH AUTO TUNING	PIDAT	191	Executes PID control according to the specified parameters. The PID constants can be autotuned.
LIMIT CONTROL	LMT	680	Controls output data according to whether or not input data is within upper and lower limits.
DEAD BAND CONTROL	BAND	681	Controls output data according to whether or not input data is within the dead band range.

Name	Mnemonic	Function code	Function
DEAD ZONE CONTROL	ZONE	682	Adds the specified bias to input data and outputs the result.
TIME-PROPORTIONAL OUTPUT (Unit Ver. 2.0 or later only)	TPO	685	Inputs the duty ratio or manipulated variable from the specified word, converts the duty ratio to a time-proportional output based on the specified parameters, and outputs the result from the specified output.
SCALING	SCL	194	Converts unsigned binary data into unsigned BCD data according to the specified linear function.
SCALING 2	SCL2	486	Converts signed binary data into signed BCD data according to the specified linear function. An offset can be input in defining the linear function.
SCALING 3	SCL3	487	Converts signed BCD data into signed binary data according to the specified linear function. An offset can be input in defining the linear function.
AVERAGE	AVG	195	Calculates the average value of an input word for the specified number of cycles.

Subroutines Instructions

Name	Mnemonic	Function code	Function
SUBROUTINE CALL	SBS	091	Calls the subroutine with the specified subroutine number and executes that program.
SUBROUTINE ENTRY	SBN	092	Indicates the beginning of the subroutine program with the specified subroutine number.
SUBROUTINE RETURN	RET	093	Indicates the end of a subroutine program.
MACRO	MCRO	099	Calls the subroutine with the specified subroutine number and executes that program using the input parameters in S to S+3 and the output parameters in D to D+3.
GLOBAL SUB-ROUTINE ENTRY	GSBN	751	Indicates the beginning of a global subroutine program with the specified subroutine number.
GLOBAL SUB-ROUTINE RETURN	GRET	752	Indicates the end of a global subroutine program.
GLOBAL SUB-ROUTINE CALL	GSBS	750	Calls the global subroutine with the specified subroutine number and executes that program.

Interrupt Control Instructions

Name	Mnemonic	Function code	Function
SET INTERRUPT MASK	MSKS	690	Sets up interrupt processing for scheduled interrupts. Scheduled interrupt tasks are masked (disabled) when the PLC is first turned on. MSKS(690) can be used to set the time intervals for scheduled interrupts.
READ INTERRUPT MASK	MSKR	692	Reads the current interrupt processing settings that were set with MSKS(690).
CLEAR INTERRUPT	CLI	691	Sets the time to the first scheduled interrupt.
DISABLE INTERRUPTS	DI	693	Disables execution of all interrupt tasks except the power OFF interrupt.
ENABLE INTERRUPTS	EI	694	Enables execution of all interrupt tasks that were disabled with DI(693).

High-speed Counter and Pulse Output Instructions (CJ1M-CPU21/22/23 Only)

Name	Mnemonic	Function code	Function
MODE CONTROL	INI	880	Used to start and stop target value comparison, to change the present value (PV) of a high-speed counter, to change the PV of an interrupt input (counter mode), to change the PV of a pulse output (origin set to 0), or to stop pulse output.
HIGH-SPEED COUNTER PV READ	PRV	881	Used to read the present value (PV) of a high-speed counter, pulse output, or interrupt input (counter mode).
COUNTER FREQUENCY CONVERT (Unit Ver. 2.0 or later only)	PRV2	883	Reads the pulse frequency input from a high-speed counter and either converts the frequency to a rotational speed (number of revolutions) or converts the counter PV to the total number of revolutions. The result is output to the destination words as 8-digit hexadecimal. Pulses can be input from high-speed counter 0 only.
COMPARISON TABLE LOAD	CTBL	882	Used to perform target value or range comparisons for the present value (PV) of a high-speed counter.
SPEED OUTPUT	SPED	885	Used to specify the frequency and perform pulse output without acceleration or deceleration.
SET PULSES	PULS	886	Used to set the number of pulses for pulse output.
PULSE OUTPUT	PLS2	887	Used to set the pulse frequency and acceleration/deceleration rates, and to perform pulse output with acceleration/deceleration (with different acceleration/deceleration rates). Only positioning is possible.
ACCELERATION CONTROL	ACC	888	Used to set the pulse frequency and acceleration/deceleration rates, and to perform pulse output with acceleration/deceleration (with the same acceleration/deceleration rate). Both positioning and speed control are possible.
ORIGIN SEARCH	ORG	889	Used to perform origin searches and returns.
PULSE WITH VARIABLE DUTY FACTOR	PWM	891	Used to output pulses with a variable duty factor.

Step Instructions

Name	Mnemonic	Function code	Function
STEP DEFINE	STEP	008	Functions in following two ways, depending on its position and whether or not a control bit has been specified. (1) Starts a specific step. (2) Ends the step programming area (i.e., step execution). The step programming area is from the first STEP(008) instruction (which always takes a control bit) to the last STEP(008) instruction (which never takes a control bit).
STEP START	SNXT	009	Used in the following three ways, depending on its position: (1) To start step programming execution. (2) To proceed to the next step control bit. (3) To end step programming execution.

Basic I/O Unit Instructions

Name	Mnemonic	Function code	Function
I/O REFRESH	IORF	097	Refreshes the specified I/O words between the starting word and end word, inclusively. IORF(097) is used to refresh words allocated to Basic I/O Units or Special I/O Units mounted on the CPU Rack or Expansion Racks.
7-SEGMENT DECODER	SDEC	078	Converts the contents (0 to F) of the 4 bits for the designated digit(s) of word data into 8-bit, 7-segment display code and places it into the upper or lower 8-bits of the specified destination words.
DIGITAL INPUT SWITCH (Unit Ver. 2.0 or later only)	DSW	210	Reads the value set on an external digital switch (or thumbwheel switch) connected to an Input Unit or Output Unit and stores the 4-digit or 8-digit BCD data in the specified words.
TEN KEY INPUT (Unit Ver. 2.0 or later only)	TKY	211	Reads numeric data from a ten-key keypad connected to an Input Unit and stores up to 8 digits of BCD data in the specified words.

Name	Mnemonic	Function code	Function
HEXADECIMAL KEY INPUT (Unit Ver. 2.0 or later only)	HKY	212	Reads numeric data from a hexadecimal keypad connected to an Input Unit or Output Unit and stores up to 8 digits of hexadecimal data in the specified words.
MATRIX INPUT (Unit Ver. 2.0 or later only)	MTR	213	Inputs up to 64 signals from an 8 × 8 matrix connected to an Input Unit or Output Unit (using 8 input points and 8 output points) and stores that 64-bit data in the 4 destination words (64 bits).
7-SEGMENT DISPLAY OUTPUT (Unit Ver. 2.0 or later only)	7SEG	214	Converts the source data (either 4-digit or 8-digit BCD) to 7-segment display data, and outputs that data to the specified output word.
INTELLIGENT I/O READ	IORD	222	Reads the contents of the I/O Unit's memory area.
INTELLIGENT I/O WRITE	IOWR	223	Outputs the contents of the CPU Unit's I/O memory area to the Special I/O Unit.
CPU BUS UNIT I/O REFRESH	DLNK	226	Immediately refreshes the I/O in the CPU Bus Unit with the specified unit number.

Serial Communications Instructions

Name	Mnemonic	Function code	Function
PROTOCOL MACRO	PMCR	260	Calls and executes a communications sequence (protocol data) registered in a Serial Communications Unit.
TRANSMIT	TXD	236	Converts the specified number of bytes of data into ASCII and sends it from the RS-232C port built into the CPU Unit (no-protocol mode) according to the start code and end code specified for no-protocol mode in the PLC Setup.
RECEIVE	RXD	235	Outputs the specified number of bytes of data sent from the RS-232C port built into the CPU Unit (no-protocol mode) according to the start code and end code specified for no-protocol mode in the PLC Setup.
TRANSMIT VIA SERIAL COMMUNICATIONS UNIT (Unit Ver 3.0 or later)	TXDU	256	Outputs the specified number of bytes of data without conversion from the serial port of a Serial Communications Unit (Ver. 1.2 or later). The data is output in no-protocol mode with the start code and end code (if any) specified in the allocated DM Setup Area.
RECEIVE VIA SERIAL COMMUNICATIONS UNIT (unit version 3.0 or later)	RXDU	255	Reads the specified number of bytes of data starting with the specified start word from the serial port of a Serial Communications Unit (Ver. 1.2 or later). The data is read in no-protocol mode with the start code and end code (if any) specified in the allocated DM Setup Area.
CHANGE SERIAL PORT SETUP	STUP	237	Changes the communications parameters of a serial port (including peripheral ports) on the CPU Unit, Serial Communications Unit, or Serial Communications Board.

Network Instructions

Name	Mnemonic	Function code	Function
NETWORK SEND	SEND	090	Transmits data to a node in the network.
NETWORK RECEIVE	RECV	098	Requests data to be transmitted from a node in the network and receives the data.
DELIVER COMMAND	CMND	490	Sends FINS commands and receives the response.
EXPLICIT MESSAGE SEND (Unit Ver. 2.0 or later only)	EXPLT	720	Sends an explicit message with any Service Code.
EXPLICIT GET ATTRIBUTE (Unit Ver. 2.0 or later only)	EGATR	721	Reads status information with an explicit message (Get Attribute Single, Service Code: 0E hex).
EXPLICIT SET ATTRIBUTE (Unit Ver. 2.0 or later only)	ESATR	722	Writes status information with an explicit message (Set Attribute Single, Service Code: 0E hex).

Name	Mnemonic	Function code	Function
EXPLICIT WORD READ (Unit Ver. 2.0 or later only)	ECHRD	723	Reads data to the local CPU Unit from a remote CPU Unit in the network. (The remote CPU Unit must support explicit messages.)
EXPLICIT WORD WRITE (Unit Ver. 2.0 or later only)	ECHWR	724	Writes data from the local CPU Unit to a remote CPU Unit in the network. (The remote CPU Unit must support explicit messages.)

File Memory Instructions

Name	Mnemonic	Function code	Function
READ DATA FILE	FREAD	700	Reads the specified data or amount of data from the specified data file (I/O memory file) in file memory to the specified I/O memory data area in the CPU Unit.
WRITE DATA FILE	FWRIT	701	Writes to the specified data file (I/O memory file) with the specified data from the specified I/O memory area.

Display Instructions

Name	Mnemonic	Function code	Function
DISPLAY MESSAGE	MSG	046	Reads the specified sixteen words of extended ASCII and displays the message on a Programming Device such as a Programming Console.

Clock Instructions

Name	Mnemonic	Function code	Function
CALENDAR ADD	CADD	730	Adds time to the calendar data in the specified words.
CALENDAR SUBTRACT	CSUB	731	Subtracts time from the calendar data in the specified words.
HOURS TO SECONDS	SEC	065	Converts time data in hours/minutes/seconds format to an equivalent time in seconds only.
SECONDS TO HOURS	HMS	066	Converts seconds data to an equivalent time in hours/minutes/seconds format.
CLOCK ADJUSTMENT	DATE	735	Changes the internal clock setting to the setting in the specified source words.

Debugging Instructions

Name	Mnemonic	Function code	Function
TRACE MEMORY SAMPLING	TRSM	045	When TRSM(045) is executed, the status of a preselected bit or word is sampled and stored in Trace Memory. TRSM(045) can be used anywhere in the program, any number of times.

Failure Diagnosis Instructions

Name	Mnemonic	Function code	Function
FAILURE ALARM	FAL	006	Generates or clears user-defined non-fatal errors. Non-fatal errors do not stop PLC operation. Can also be used to simulate non-fatal system errors with the CJ-series CPU Units.
SEVERE FAILURE ALARM	FALS	007	Generates user-defined fatal errors. Fatal errors stop PLC operation. Can also be used to simulate fatal system errors with the CJ-series CPU Units.
FAILURE POINT DETECTION	FPD	269	Diagnoses a failure in an instruction block by monitoring the time between execution of FPD(269) and execution of a diagnostic output and finding which input is preventing an output from being turned ON.

Other Instructions

Name	Mnemonic	Function code	Function
SET CARRY	STC	040	Sets the Carry Flag (CY).
CLEAR CARRY	CLC	041	Turns OFF the Carry Flag (CY).
SELECT EM BANK	EMBC	281	Changes the current EM bank.
EXTEND MAXIMUM CYCLE TIME	WDT	094	Extends the maximum cycle time, but only for the cycle in which this instruction is executed.
SAVE CONDITION FLAGS	CCS	282	Saves the status of the condition flags.
LOAD CONDITION FLAGS	CCL	283	Reads the status of the condition flags that was saved.
CONVERT ADDRESS FROM CV	FRMCV	284	Converts a CV-series PC memory address to its equivalent CS-series PC memory address.
CONVERT ADDRESS TO CV	TOCV	285	Converts a CS-series PC memory address to its equivalent CV-series PC memory address.
DISABLE PERIPHERAL SERVICING	IOSP	287	Disables peripheral servicing during program execution in Parallel Processing Mode or Peripheral Servicing Priority Mode.
ENABLE PERIPHERAL SERVICING	IORS	288	Enables peripheral servicing that was disabled by IOSP(287) for program execution in Parallel Processing Mode or Peripheral Servicing Priority Mode.

Block Programming Instructions

Name	Mnemonic	Function code	Function
BLOCK PROGRAM BEGIN	BPRG	096	Define a block programming area. For every BPRG(096) there must be a corresponding BEND(801).
BLOCK PROGRAM END	BEND	801	Define a block programming area. For every BPRG(096) there must be a corresponding BEND(801).
BLOCK PROGRAM PAUSE	BPPS	811	Pause and restart the specified block program from another block program.
BLOCK PROGRAM RESTART	BPRS	812	Pause and restart the specified block program from another block program.
CONDITIONAL BLOCK EXIT	*input_condition* EXIT	806	EXIT(806) without an operand bit exits the program if the execution condition is ON.
CONDITIONAL BLOCK EXIT	EXIT *bit_address*	806	EXIT(806) without an operand bit exits the program if the execution condition is ON.
CONDITIONAL BLOCK EXIT (NOT)	EXIT NOT *bit_address*	806	EXIT(806) without an operand bit exits the program if the execution condition is ON.
CONDITIONAL BLOCK BRANCHING	*input_condition* IF	802	If the execution condition is ON, the instructions between IF(802) and ELSE(803) will be executed and if the execution condition is OFF, the instructions between ELSE(803) and IEND(804) will be executed.
CONDITIONAL BLOCK BRANCHING	IF *bit_address*	802	If the operand bit is ON, the instructions between IF(802) and ELSE(803) will be executed. If the operand bit is OFF, the instructions between ELSE(803) and IEND(804) will be executed.
CONDITIONAL BLOCK BRANCHING (NOT)	IF NOT *bit_address*	802	The instructions between IF(802) and ELSE(803) will be executed and if the operand bit is ON, the instructions be ELSE(803) and IEND(804) will be executed is the operand bit is OFF.
CONDITIONAL BLOCK BRANCHING (ELSE)	ELSE	803	If the ELSE(803) instruction is omitted and the operand bit is ON, the instructions between IF(802) and IEND(804) will be executed
CONDITIONAL BLOCK BRANCHING END	IEND	804	If the operand bit is OFF, only the instructions after IEND(804) will be executed.
ONE CYCLE AND WAIT	*input_condition* WAIT	805	If the execution condition is ON for WAIT(805), the rest of the instruction in the block program will be skipped.
ONE CYCLE AND WAIT	WAIT *bit_address*	805	If the operand bit is OFF (ON for WAIT NOT(805)), the rest of the instructions in the block program will be skipped. In the next cycle, none of the block program will be executed except for the execution condition for WAIT(805) or WAIT(805) NOT. When the execution condition goes ON (OFF for WAIT(805) NOT), the instruction from WAIT(805) or WAIT(805) NOT to the end of the program will be executed.
ONE CYCLE AND WAIT (NOT)	WAIT NOT *bit_address*	805	If the operand bit is OFF (ON for WAIT NOT(805)), the rest of the instructions in the block program will be skipped. In the next cycle, none of the block program will be executed except for the execution condition for WAIT(805) or WAIT(805) NOT. When the execution condition goes ON (OFF for WAIT(805) NOT), the instruction from WAIT(805) or WAIT(805) NOT to the end of the program will be executed.

Name	Mnemonic	Function code	Function
BCD TIMER WAIT	TIMW	813	Delays execution of the rest of the block program until the specified time has elapsed. Execution will be continued from the next instruction after TIMW(813) when the timer times out. Setting range for Set Value (SV): BCD: 0 to 999.9 s Binary: 0 to 6,553.5 s
BINARY TIMER WAIT	TIMWX	816	
BCD COUNTER WAIT	CNTW	814	Delays execution of the rest of the block program until the specified count has been achieved. Execution will be continued from the next instruction after CNTW(814) when the counter counts out. Setting range for Set Value (SV): BCD: 0 to 9999 counts Binary: 0 to 65,535 counts
BINARY COUNTER WAIT	CNTWX	817	
BCD HIGH-SPEED TIMER WAIT	TMHW	815	Delays execution of the rest of the block program until the specified time has elapsed. Execution will be continued from the next instruction after TMHW(815) when the timer times out. Setting range for Set Value (SV): BCD: 0 to 99.99 s Binary: 0 to 655.35 s
BINARY HIGH-SPEED TIMER WAIT	TMHWX	818	
LOOP	LOOP	809	LOOP(809) designates the beginning of the loop program.
LEND	*input_condition* LEND	810	LEND(810) or LEND(810) NOT specifies the end of the loop. When LEND(810) or LEND(810) NOT is reached, program execution will loop back to the next previous LOOP(809) until the operand bit for LEND(810) or LEND(810) NOT turns ON or OFF (respectively) or until the execution condition for LEND(810) turns ON.
LEND	LEND *bit_address*	810	If the operand bit is OFF for LEND(810) (or ON for LEND(810) NOT), execution of the loop is repeated starting with the next instruction after LOOP(809). If the operand bit is ON for LEND(810) (or OFF for LEND(810) NOT), the loop is ended and execution continues to the next instruction after LEND(810) or LEND(810) NOT.
LEND NOT	LEND NOT *bit_address*	810	LEND(810) or LEND(810) NOT specifies the end of the loop. When LEND(810) or LEND(810) NOT is reached, program execution will loop back to the next previous LOOP(809) until the operand bit for LEND(810) or LEND(810) NOT turns ON or OFF (respectively) or until the execution condition for LEND(810) turns ON.

Text String Processing Instructions

Name	Mnemonic	Function code	Function
MOV STRING	MOV$	664	Transfers a text string.
CONCATENATE STRING	+$	656	Links one text string to another text string.
GET STRING LEFT	LEFT$	652	Fetches a designated number of characters from the left (beginning) of a text string.
GET STRING RIGHT	RGHT$	653	Reads a designated number of characters from the right (end) of a text string.
GET STRING MIDDLE	MID$	654	Reads a designated number of characters from any position in the middle of a text string.
FIND IN STRING	FIND$	660	Finds a designated text string from within a text string.
STRING LENGTH	LEN$	650	Calculates the length of a text string.
REPLACE IN STRING	RPLC$	661	Replaces a text string with a designated text string from a designated position.
DELETE STRING	DEL$	658	Deletes a designated text string from the middle of a text string.
EXCHANGE STRING	XCHG$	665	Replaces a designated text string with another designated text string.
CLEAR STRING	CLR$	666	Clears an entire text string with NUL (00 hex).
INSERT INTO STRING	INS$	657	Deletes a designated text string from the middle of a text string.
String Comparison	LD, AND, OR + =$, <>$, <$, <=$, >$, >=$	670 (=$) 671 (<>$) 672 (<$) 673 (<=$) 674 (>$) 675 (>=$	Sting comparison instructions (=$, <>$, <$, <=$, >$, >=$) compare two text strings from the beginning, in terms of value of the ASCII codes. If the result of the comparison is true, an ON execution condition is created for a LOAD, AND, or OR.

Task Control Instructions

Name	Mnemonic	Function code	Function
TASK ON	TKON	820	Makes the specified task executable.
TASK OFF	TKOF	821	Puts the specified task into standby status.

Model Conversion Instructions

Name	Mnemonic	Function code	Function
BLOCK TRANSFER (unit version 3.0 or later)	XFERC	565	Transfers the specified number of consecutive words.
SINGLE WORD DISTRIBUTE (unit version 3.0 or later)	DISTC	566	Transfers the source word to a destination word calculated by adding an offset value to the base address.
DATA COLLECT (unit version 3.0 or later)	COLLC	567	Transfers the source word (calculated by adding an offset value to the base address) to the destination word.
MOVE BIT (unit version 3.0 or later)	MOVBC	568	Transfers the specified bit.
BIT COUNTER (unit version 3.0 or later)	BCNTC	621	Counts the total number of ON bits in the specified word(s).

Special Function Block Instructions

Name	Mnemonic	Function code	Function
GET VARIABLE ID (unit version 3.0 or later)	GETID	286	Outputs the FINS command variable type (data area) code and word address for the specified variable or address. This instruction is generally used to get the assigned address of a variable in a function block.

Programming Device Descriptions

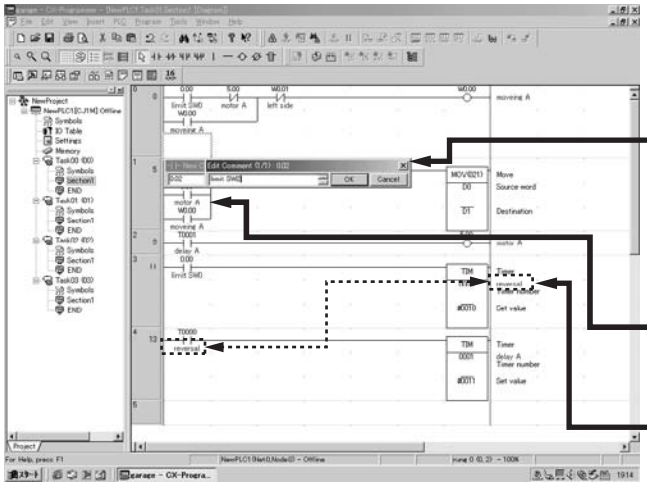
CX-Programmer

Greatly improved functionality, ease-of-operation, debugging, and maintenance efficiency. Connections with the CX-Simulator have also been improved.

Note: CJ1M PLCs are supported from version 3 of the CX-Programmer (version 3.3 of the CX-Programmer is required for CJ1M-CPU□1). CJ1G and CJ1H PLCs are supported from version 2.1. Version 4 of CX-Programmer also provides a ladder editing function and more effective reusability, greatly improving programming, debugging, and maintenance efficiency.

■ Programming

Easy programming with fewer key inputs.



Short-cut keys enable easy operation.
NC contact: C key, OUT instruction: O key, Special instructions: I key. Makes programming easier with key inputs.

Input is as easy as this: C key, address, ↵ key, comment, and then ↵ key.
Special instructions can be input as follows:

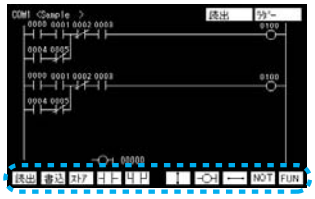
Simple key inputs are also available to connect lines:

Ctr + ← ↑ → ↓

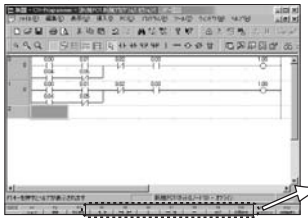
Comments also appear with timer and counter instructions through links to timer and counter contacts.

Advanced Users of SYSMAC Support Software

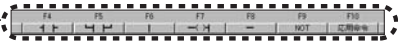
SYSMAC Support Software



CX-Programmer



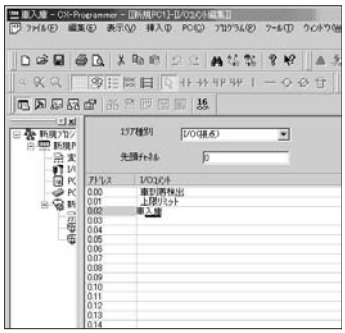
SYSMAC Support Software key alloca-tions can also be changed using *Shortcut Key Allocations.*



■ Editing

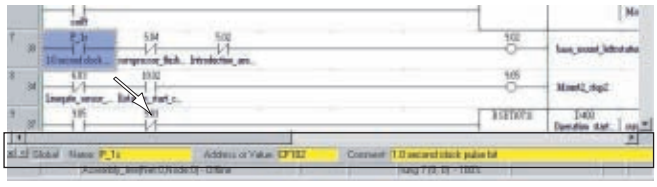
Editing I/O Comments

Editing only I/O comments is easy.



Displaying Comments at the Cursor Position

The symbol comment at the cursor position and corresponding address are displayed at the bottom of Ladder View to improve program legibility.



Programming Device Descriptions

Switching between Multiple Comments

Multiple symbol comments (up to 16) can be registered for a single address. This function enables different comments for a single program—for designing, factory, each engineer, or each language—and makes the program easier to understand for the corresponding purpose.

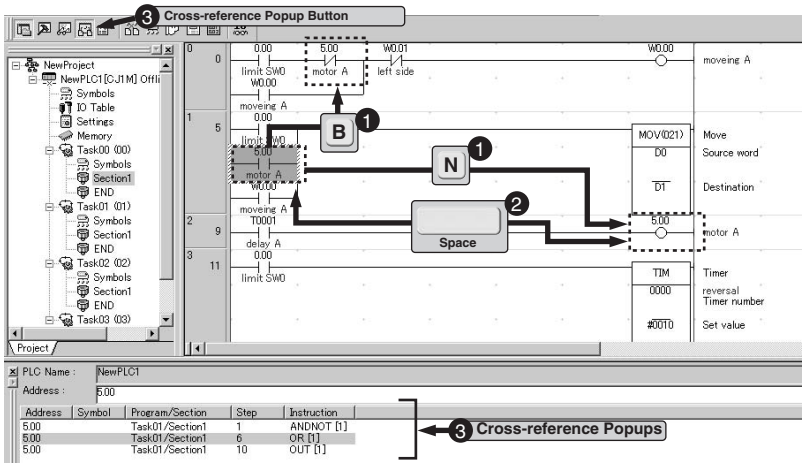
Changing Data in a Batch

Words, including bits and bit addresses can be changed all at once.

Check setting methods in *Input Examples*.

■ Searching

Convenient search functions simplify debugging and program maintenance.



① Consecutive Address Searches

N The N key (next) finds the next contact or coil with the specified address.

B The B key (back) finds the previous contact or coil with the specified address.

② Trace Searches

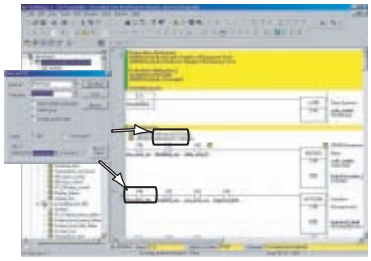
Pressing the Space Bar from a contact will jump to the coil with the same address.
Pressing the Space Bar from a coil will jump to the contact with the same address.

③ Cross-reference Popups

Cross-reference information can be displayed for the coil at the cursor to easily see where the address of the coil is used in the program. Just click a cross-reference to jump to it in the actual program.

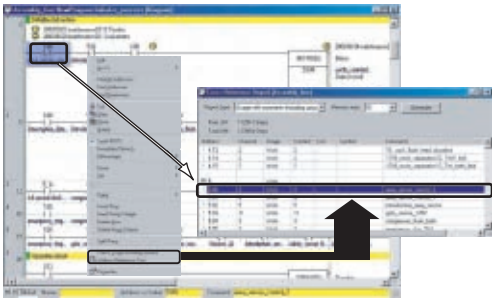
Enhanced Search Functions

"All" has been added as a target of searching. Any strings can be entered as a keyword for searching.



Easily Search Usages Overview on Ladder Diagrams

The usage overview can be launched from the a popup menu or Ladder View. This enables the user to easily check the usage of addresses at the cursor position and to easily check the usage of contacts/coils.

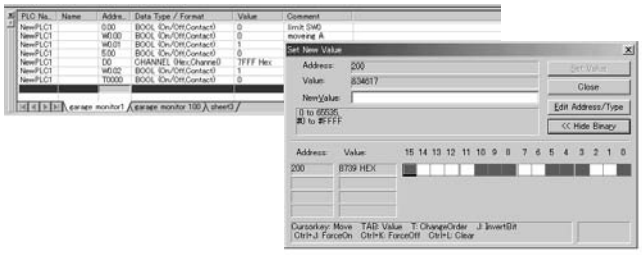


Programming Device Descriptions

■ Monitoring

Watch Window for I/O Monitoring

Display data in decimal, hexadecimal, signed, ASCII, or floating-point form. Register consecutive addresses merely by pressing the Enter key.Use a graphical bit monitor to check program connections.



Online Editing

Edit multiple consecutive program sections at the same time. (Select the program sections before executing online editing.)

■ Going Online with a PLC

Ladder monitoring status can be achieved automatically without setting the PLC model to be connected and without setting communications conditions. Just select the automatic online connection function.

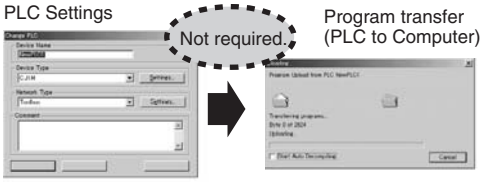
Select the automatic online connection function.

Connection is automatically processed.

PLC Settings

Not required.

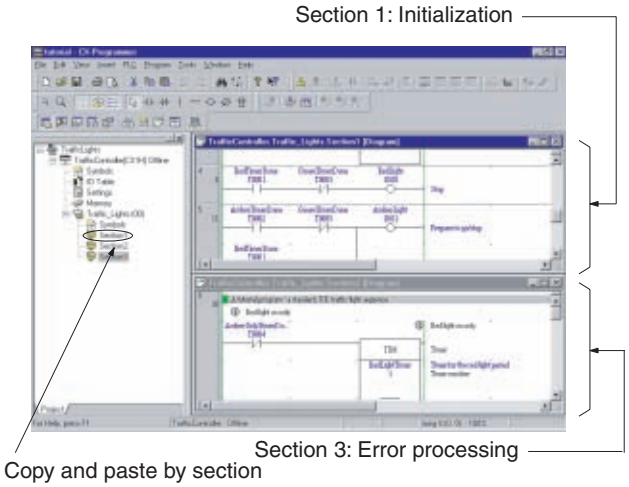
Program transfer (PLC to Computer)



Online Ladder Monitoring

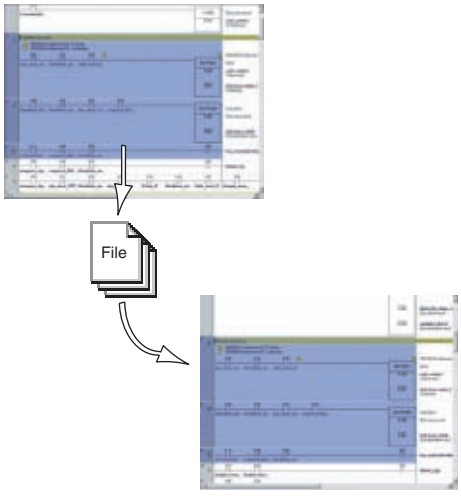
■ Divide Programs into Sections for Easier Visual Confirmation and Reuse

Programs can be created and displayed in as many sections as required to make them easier to confirm visually. Program sections can also be moved or copied on the project tree to make them easier to reuse. Programs can also be uploaded by sections (CVM1, CV, CS, and CJ-series PLCs only) or edited online by section.



■ Improved Ladder Program Reusability

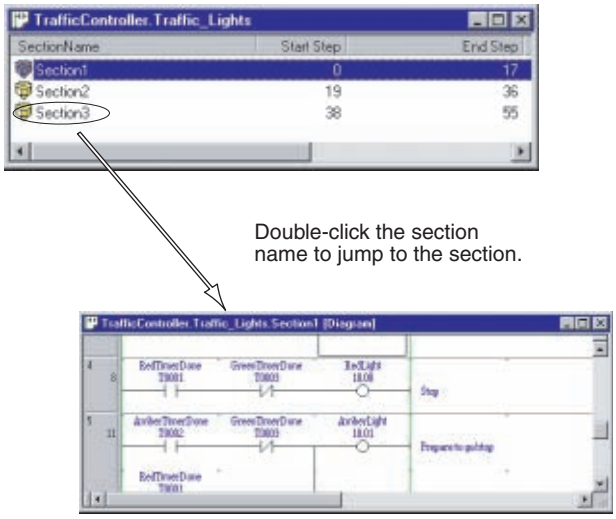
Parts of the program can be saved or additions can be loaded in section, ladder rung, or symbols table units. This allows programs to be easily split into smaller parts, and then integrated, thereby improving reusability of the program.



Programming Device Descriptions

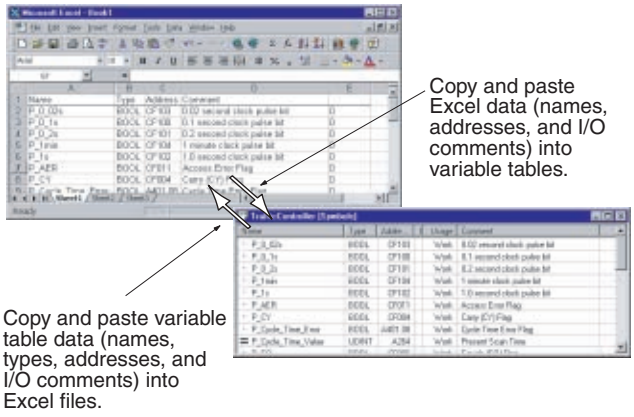
■ Jump to Sections from the Section List

You can understand of overall program structure from the section list and then jump to the required section.



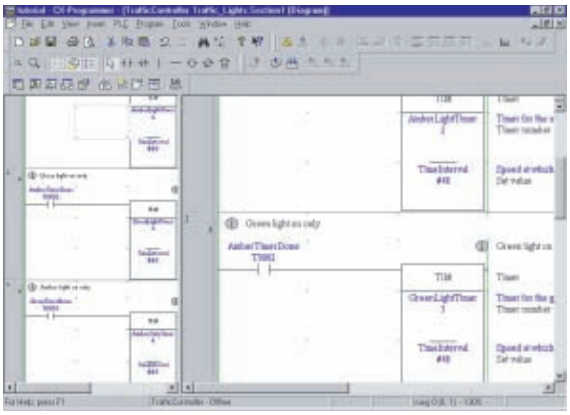
■ Output I/O Allocations to or Input I/O Allocations from Spreadsheets

- I/O allocations tables, including symbols, address, and I/O comments, can be input into standard spreadsheets, such as MS-Excel, and then used with the CX-Programmer. CX-Programmer I/O allocations tables can also be output in tab-delineated form for pasting into spreadsheets.



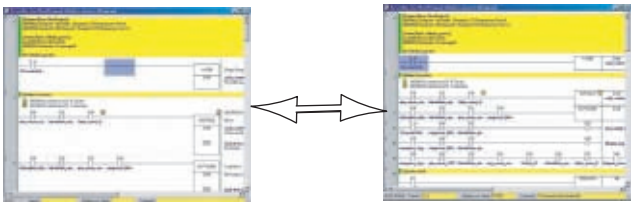
■ Efficient Programming or Monitoring Switching to Split Screens

A ladder programming screen can be split into 2-way or 4-way screen. This allows monitoring different parts of the same program in separate areas of the screen.



■ Display Special Instructions Vertically or Horizontally

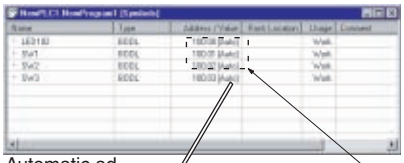
The user can select whether to display special instructions vertically or horizontally, improving display and printing efficiency.



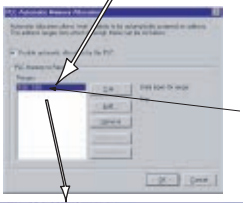
■ Automatic Address Allocations for Increased Efficiency

Addresses can be automatically allocated to bits whose addresses do not require any special consideration, such as temporary bits. This feature enables greater design efficiency. With version 2.00, it is possible to specify ranges for automatic address allocation that contain words from different areas. Also, certain areas can be automatically specified for specific data types (e.g., input bit = Boolean).

Local or global variable table



Automatic address allocation dialog box

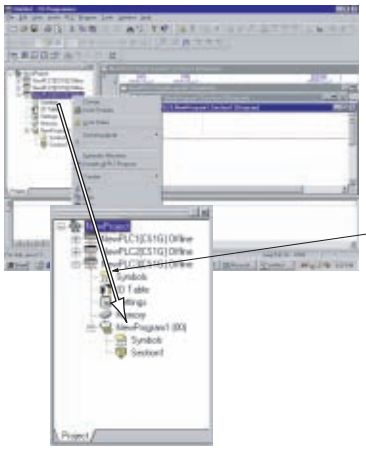


1. Input symbols into the variable table, omitting specific addresses.

2. Specify allocation word ranges in the automatic address allocation dialog box.

3. Addresses will be automatically allocated to local or global variables.

Programs can be easily reused simply by dragging and dropping



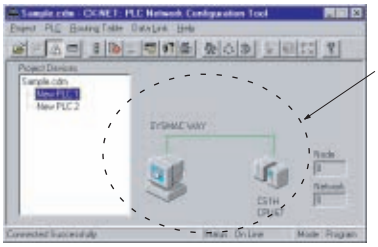
Copy and paste programs to easily reuse them using menu commands or drag and drop.

If addresses have been automatically allocated when programs are copied, the automatic allocations will still be effective, allowing similar program sections to be easily created.

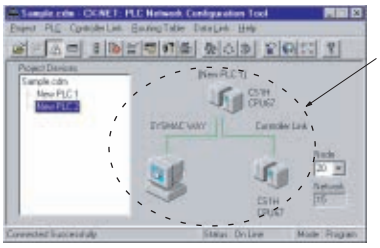
■ Easy Online Connections

Connect to a PLC on a Network Simply by Inputting Its Name

You can connect to any PLC on a network simply by inputting the PLC name of the target and gateway PLC to access or monitor not only the local, but also remote PLCs.



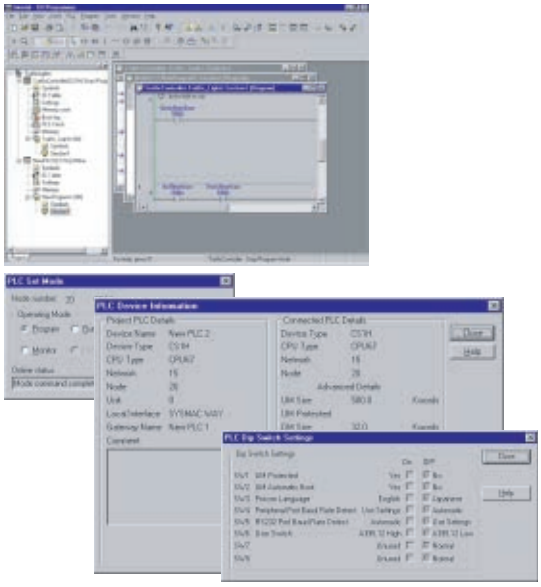
Easily connect to local PLCs...



Or connect just as easily to PLCs on complex networks using PLC names.

Access Information from or Control Remote PLCs

You can access the DIP switch settings, operating modes, or other information from PLCs on remote networks. You can also go online with more than one PLC at the same time, enabling simultaneous monitoring of the ladder programs or I/O memory data for more than one PLC.



CX-Simulator

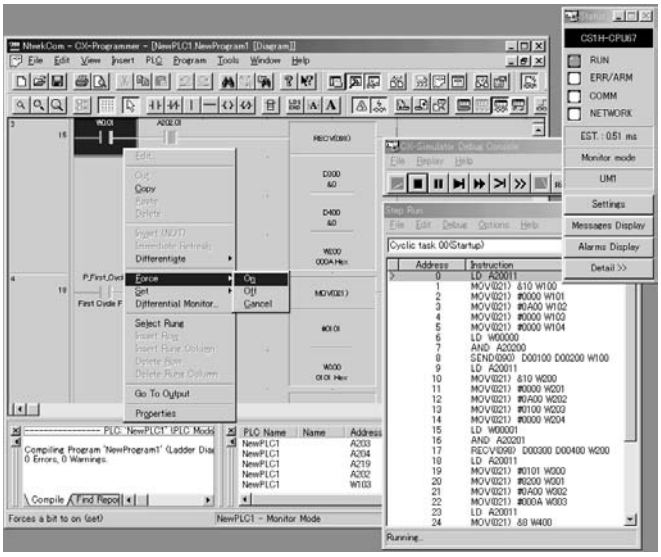
Online Debugging of Virtual PLCs in the Computer

■ Supports Online Connection with CX-Programmer Installed in Same Computer

A wide range of CX-Programmer online functions can be used without modification.

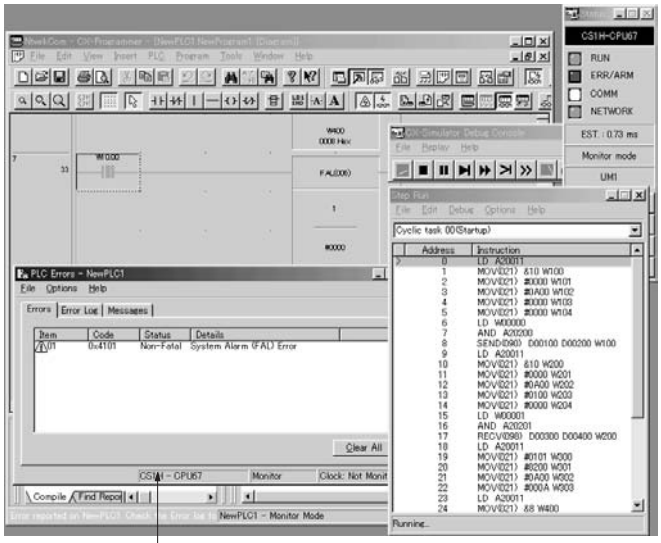
Force Set/Reset

Force ON/OFF the bits in the CX-Programmer ladder programming window or Watch Window, just like actual PLC operations.



Display Error Data

Use ladder program simulation to confirm or clear data from execution of failure diagnosis instructions or display instructions (FAL(006)/MSG(046)) in the CX-Programmer's PLC error window.



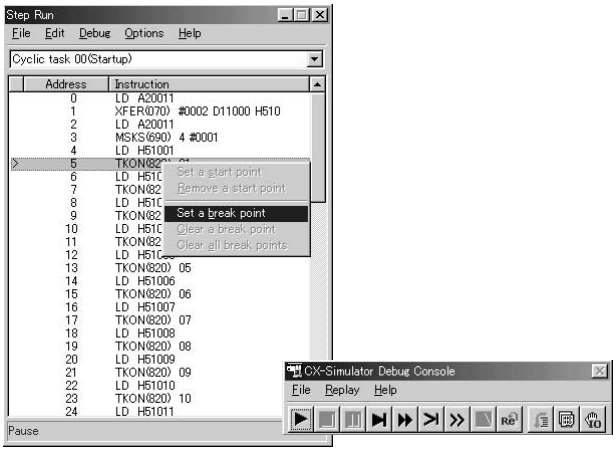
Confirm or clear PLC errors.

■ Wide Range of Debugging Functions

Debugging ladder programs is easier with a broad range of functions including functions for stopping a program at specified program address (instruction break), stopping a program when data in I/O memory satisfies specified conditions (I/O break), starting a program execution from a set address (start point), and re-executing scan processing (scan replay).

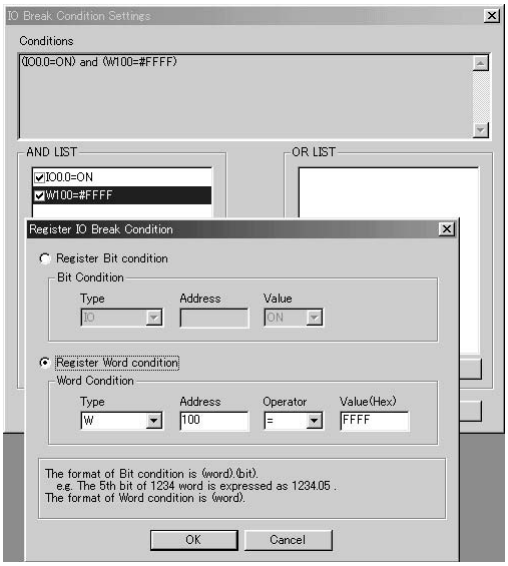
Setting Instruction Breaks

A break point can be set for an instruction at any program address in the Step Run Window. This enables the program to be temporarily interrupted and the values in I/O memory at that point in the program to be monitored.



Setting I/O Break Conditions

Program execution is temporarily stopped when the various I/O memory data reaches specified values, so that other I/O memory values at that point in the program can be checked.



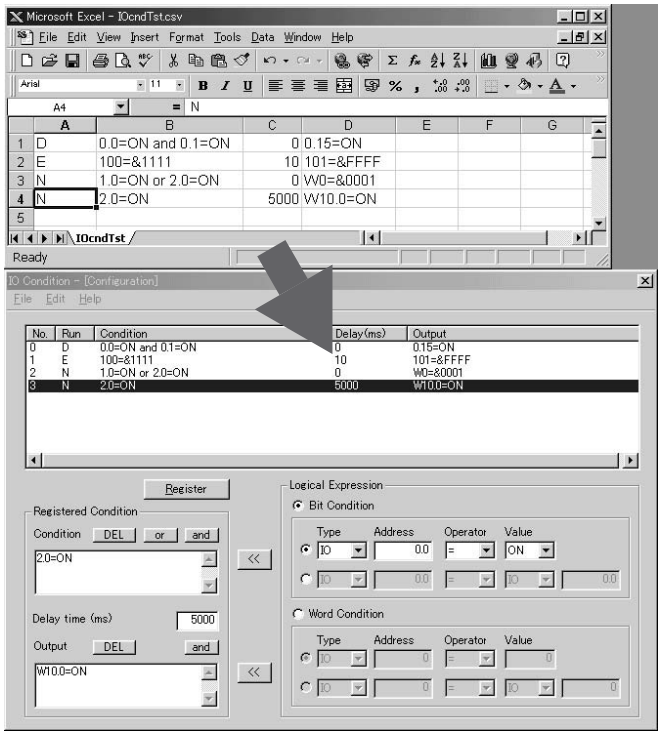
Programming Device Descriptions

■ Create Virtual External Inputs Using Spreadsheet Software

Virtual external inputs can be created using Microsoft Excel or other spreadsheet software and the data can be used by the CX-Simulator.

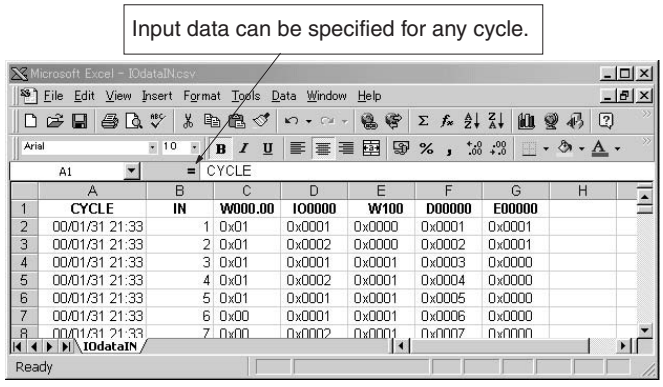
I/O Condition Tool

The CSV file containing the I/O conditions created using spreadsheet software, output data when conditions are met, and the delay times can be replayed using the I/O Condition Tool and used as input to the CX-Simulator.



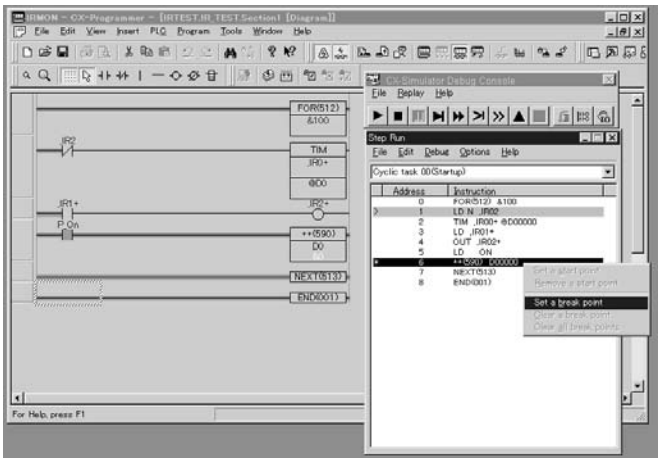
Data Replay Tool

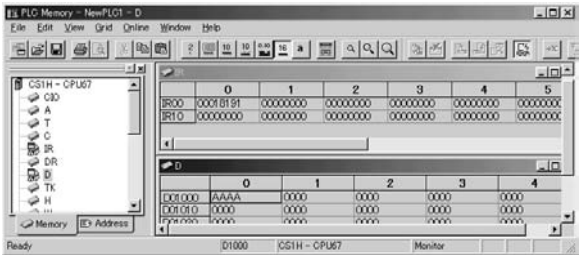
The CSV file containing data from each cycle for bits/words created using spreadsheet software can be regenerated using the Data Replay Tool and used as input to the CX-Simulator.



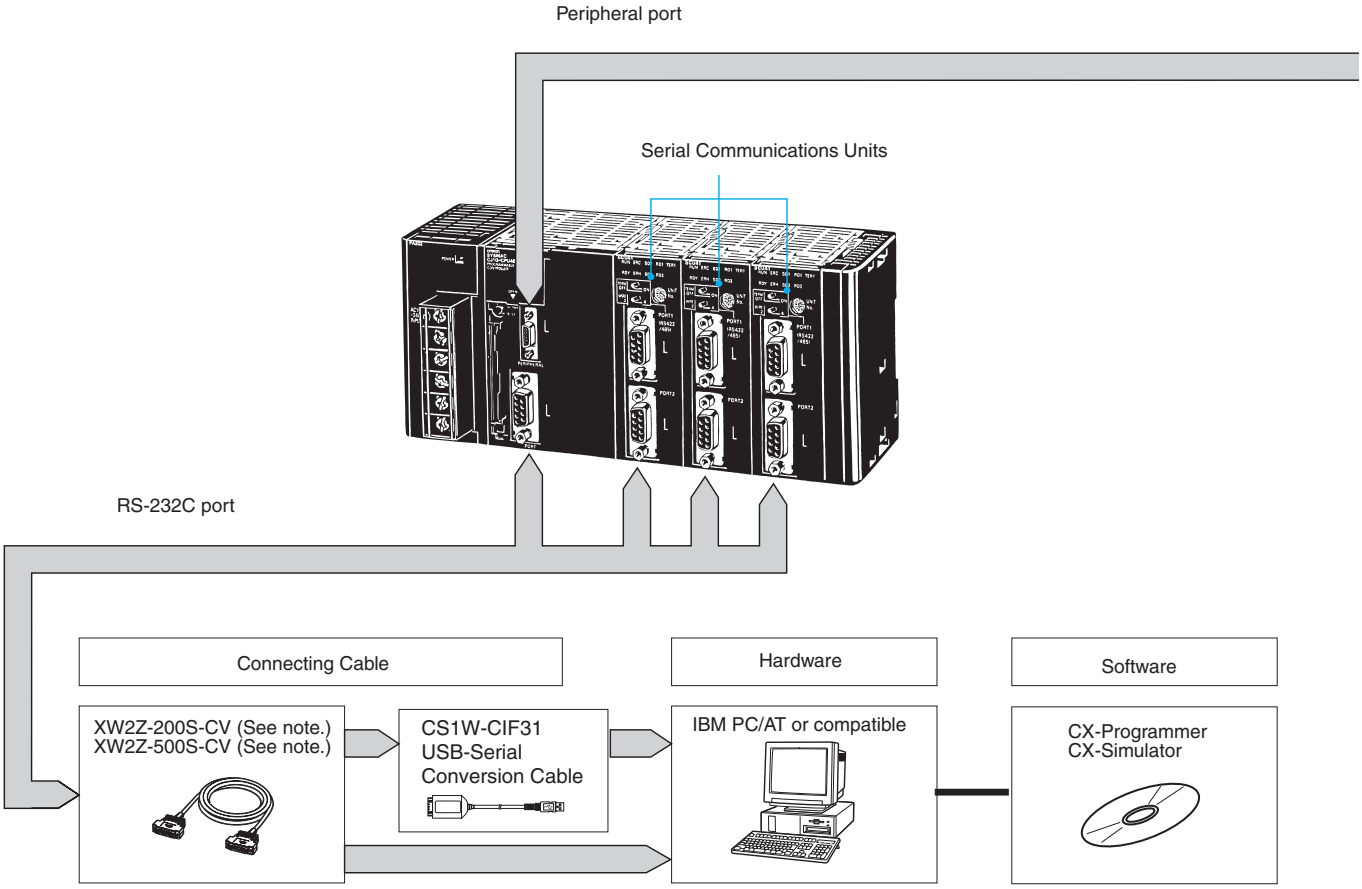
■ Changes in the IR value used between FOR and NEXT in each task can be monitored.

Step Run can be used to temporarily stop execution to monitor the contents of index and data registers in each task and changes in the values within the FOR to NEXT loops. This monitoring is not possible in the actual PLC.





Connections to Programming Devices



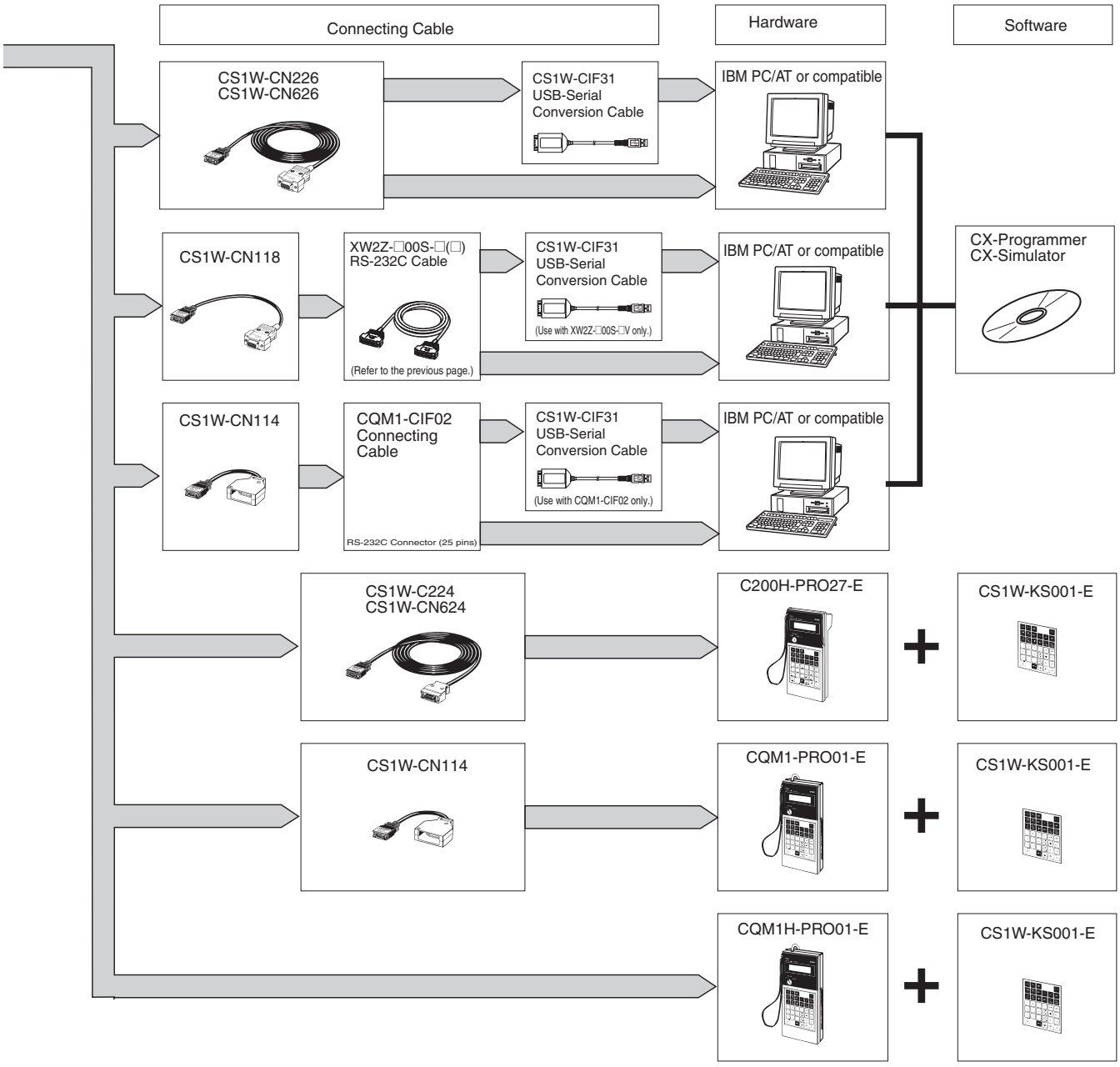
Note: 1. Refer to pages 70 and 71 for details of cables for connecting to computers. Chose the appropriate cable for the communications mode.

2. The following cables can be used for a Host Link connection (but not a peripheral bus connection): XW2Z-200S-V or XW2Z-500S-V

3. CJ1M PLCs are supported from version 3 of the CX-Programmer. (CJ1M-CPU□1 are supported from version 3.3.) CJ1G and CJ1H PLCs are supported from version 2.1.

4. CJ1M PLCs are supported from version 1.3 of the CX-Simulator. CJ1G and CJ1H PLCs are supported from version 1.2.

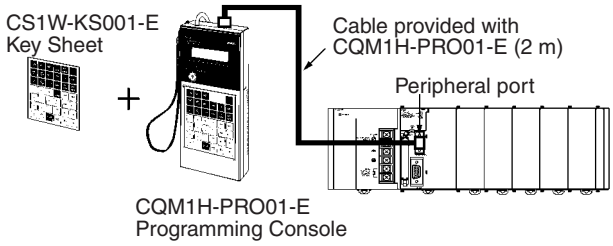
Programming Device Descriptions



Programming Device Descriptions

■ Programming Consoles

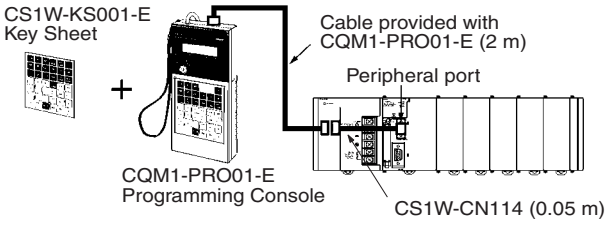
CQM1H-PRO01-E



Model	Cable	Cable length
CQM1H-PRO01-E	Not required.	---

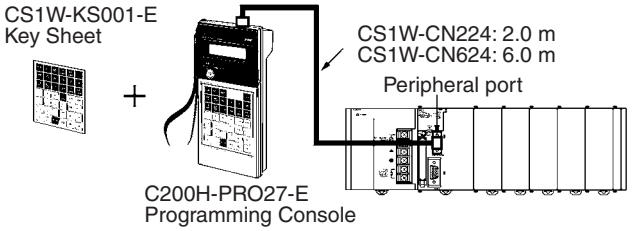
CQM1-PRO01-E

(Including cases where C200H-PRO027 is connected to the C200H-CN222 Cable.)



Model	Cable	Cable length
CQM1-PRO01-E	CS1W-CN114	0.05 m

C200H-PRO27-E



Model	Cable	Cable length
C200H-PR027-E	CS1W-CN224	2.0 m
	CS1W-CN624	6.0 m

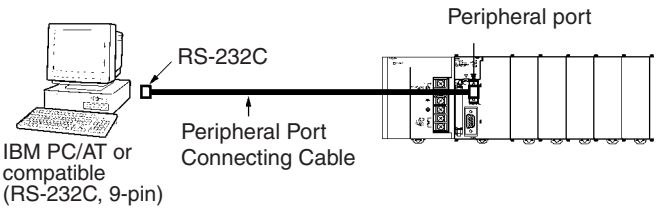
■ Windows-based Programming Software: CX-Programmer

Name	Model	Specifications
CX-Programmer	WS02-CXPC1-E-V31	OS: Windows 95, 98, NT, Me, 2000, or XP

The following serial communications modes can be used to connect a computer with the CX-Programmer to a CJ-series PLC.

Mode	Features
Peripheral Bus	The faster mode, peripheral bus is generally used for CX-Programmer connections. Only 1:1 connections are possible. The baud rate is automatically detected.
Host Link (SYSWAY)	A standard protocol for host computers with either 1:1 or 1:N connections. Slower than peripheral bus, but allows modem or optical adapter connections, or long-distance or 1:N connections via RS-422A/485.

Connecting to the Peripheral Port

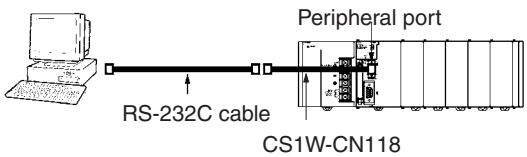


Peripheral Port Connecting Cables

Mode	Cable	Length	Computer connector
Peripheral Bus or Host Link	CS1W-CN226	2.0 m	D-sub, 9-pin, male
	CS1W-CN626	6.0 m	

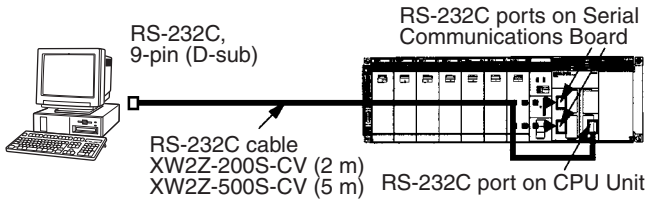
The following cables can be used for an RS-232C connection from the computer to the peripheral port.

Mode	Connecting cables		Length	Computer connector
Peripheral bus or Host Link (SYSWAY)	XW2Z-200S-CV or XW2Z-500S-CV	CS1W-CN118	2 or 5 m + 0.1 m	D-sub, 9-pin, male
Host Link (SYSWAY)	XW2Z-200S-V or XW2Z-500S-V			



Programming Device Descriptions

Connecting to the RS-232C Port



RS-232C Port Connecting Cables

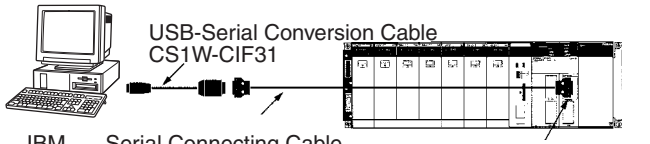
Mode	Cable	Length	Computer connector
Peripheral bus or Host Link (SYSWAY)	XW2Z-200S-CV	2.0 m	D-sub, 9-pin, male
	XW2Z-500S-CV	5.0 m	

Note: Cables with model numbers ending in “CV” are antistatic.

The following cables can be used for an RS-232C connection from the computer to an RS-232C port. (Unlike cables with model numbers ending in “-CV,” however, these cables do not support peripheral bus connection and do not have anti-static specifications.)

Mode	Cable	Length	Computer connector
Host Link	XW2Z-200S-V	2.0 m	D-sub, 9-pin, male
	XW2Z-500S-V	5.0 m	

Using the USB-Serial Conversion Cable



USB–Serial Conversion Cable General Specifications

USB interface standard		USB Specification 1.1
DTE speed		115.2 kbps
Connector specifications	Computer end	USB (type A plug, male)
	PLC end	RS-232C (D-sub, 9-pin, male)
Power supply		Bus power (supplied from upstream, 5 VDC)
Current consumption		35 mA
Operating environment	Ambient temperature	0 to 55°C
	Ambient humidity	10% to 90% (no condensation)
	Atmosphere	No corrosive gas
Weight		50 g

OS Supporting Drivers for the USB–Serial Conversion Cable

Windows 98, Me, 2000, and XP

- **Applicable Software**
- CX-Programmer, CX-Simulator, CX-Protocol, CX-Motion
- CX-Position, CX-Process, DeviceNet Configurator, PLC Reporter 32
- NS-Designer, NT Support Tool for Windows (NTST)

Note: There are restrictions in the COM port that can be used for the NTST.

- **Applicable Communications Middleware**

FinsGateway, CX-Server

Models

The applicable software supports the following PLCs and PTs.

- **PLCs**

CS Series, CJ Series, C Series (C200HS, C200HX/HG/HE, C200H, C1000H, C2000H, CQM1, CPM1, CPM1A, CPM2A, SRM1, CQM1H, CPM2C), CVM1, CV Series

- **PTs**

NS Series, NT Series

Connecting Cables for Peripheral Port

Computer	Serial Communications Mode	Connecting Cable model numbers			Lengths	Computer end
IBM PC/AT or compatible	Tool bus or Host Link (SYSWAY)	CS1W-CIF31	CS1W-CN226		0.5 m + 2.0 m	USB (type A plug)
			CS1W-CN626		0.5 m + 6.0 m	
		CS1W-CIF31	XW2Z-200S-CV/500S-CV	CS1W-CN118	0.5 m + (2.0 m or 5.0 m) + 0.1 m	
	Host Link (SYSWAY)	CS1W-CIF31	XW2Z-200S-V/500S-V		0.5 m + (2.0 m or 5.0 m) + 0.1 m	

Connecting Cables for RS-232C Port

Computer	Serial Communications Mode	Connecting Cable model numbers		Lengths	Computer end
IBM PC/AT or compatible	Tool bus or Host Link (SYSWAY)	CS1W-CIF31	XW2Z-200S-CV	0.5 m + 2.0 m	USB (type A plug)
			XW2Z-500S-CV	0.5 m + 5.0 m	
	Host Link (SYSWAY)	CS1W-CIF31	XW2Z-200S-V (See note.)	0.5 m + 2.0 m	
			XW2Z-500S-V (See note.)	0.5 m + 5.0 m	

Note: Tool bus connections are not possible and connectors without ESD measures are used.

Unit Descriptions

Table of Units

Unit		Classification	Model	Page
I/O Units	Input Units	Basic I/O Unit	CJ1W-ID2□□/IA□□□	79
	Output Units		CJ1W-OD2□□/OC2□□/OA□□□	
	I/O Units		CJ1W-MD□□□	
Interrupt Input Unit		Basic I/O Unit	CJ1W-INT01	93
High-speed Input Units		Basic I/O Unit	CJ1W-IDP01	94
B7A Interface Units		Basic I/O Unit	CJ1W-B7A□□	95
Analog I/O Units	Input Units	Special I/O Unit	CJ1W-AD□□□	97
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Position Control Units		Special I/O Unit	CJ1W-NC□□□	109
High-speed Counter Unit		Special I/O Unit	CJ1W-CT021	111
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Serial Communications				116
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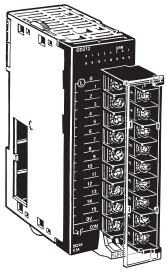
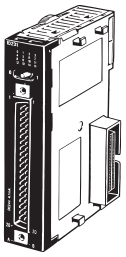
	Controller Link Boards	Personal computer ISA board (for PCI bus)	3G8F7-CLK21-EV1	
	Repeater Units	Twisted-pair cable	CS1W-RPT01	
		Optical ring (H-PCF cable)	CS1W-RPT02	
		Optical ring (GI cable)	CS1W-RPT03	
FL-net Unit (100Base-TX)		CPU Bus Unit	CJ1W-FLN22	135
DeviceNet Units	DeviceNet Units	Special I/O Unit	CJ1W-DRM21	138
	Slaves	---	DRT1 Series	
			DRT2 Series	
	MULTIPLE I/O TERMINALs	---	GT1 Series	140
CompoBus/S Units	Master Unit	CPU Bus Unit	CJ1W-SRM21	141
	Slaves	---	SRT2 Series	142

I/O Units
CJ1W-ID/IA/OC/OD/OA/MD

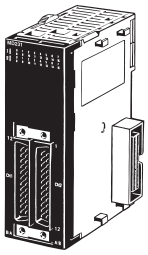
■ I/O Units



Input Unit (8/16 points)
CJ1W-ID201
CJ1W-ID211
CJ1W-IA□□□
Output Units (8/16 points)
CJ1W-OD2□□
CJ1W-OA201

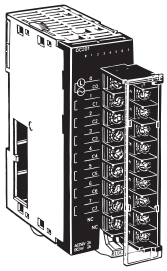


Input Units (32 points)
CJ1W-ID23□
Output Units (32 points)
CJ1W-OD23□



I/O Units (32 points)
CJ1W-MD23□

Input Units (64 points)
CJ1W-ID26□
Output Units (64 points)
CJ1W-OD26□
I/O Units (64 points)
CJ1W-MD26□
CJ1W-MD563



Relay Contact Output Units
(8 independent contacts)
CJ1W-OC201
Relay Contact Output Units
(16 points)
CJ1W-OC211

DC Input Units

Classification	Input voltage	Inputs	Input current (typical)	Connections	Model
Basic I/O Unit	24 VDC	8 pts	10 mA	Removeable terminal block	CJ1W-ID201
		16 pts	7 mA		CJ1W-ID211
		32 pts	4.1 mA	Fujitsu-compatible connector	CJ1W-ID231
		32 pts	4.1 mA	MIL connector	CJ1W-ID232
		64 pts	4.1 mA	Fujitsu-compatible connector	CJ1W-ID261
		64 pts	4.1 mA	MIL connector	CJ1W-ID262

AC Input Units

Classification	Inputs	Input voltage	Input current (typical)	Connections	Model
Basic I/O Unit	16 pts	100 to 120 VAC	7 mA (100 V, 50 Hz)	Removeable terminal block	CJ1W-IA111
	8 pts	200 to 240 VAC	9 mA (200 V, 50 Hz)		CJ1W-IA201

Relay Contact Output Units

Classification	Outputs	Connections	Model
Basic I/O Unit	8 pts (independent contacts)	Removeable terminal block	CJ1W-OC201
	16 pts		CJ1W-OC211

Transistor Output Units

Classification	Outputs	Maximum switching capacity	Connections	Model
Basic I/O Unit	8 pts	12 to 24 VDC, 2 A/pt, 8 A/Unit sinking	Removeable terminal block	CJ1W-OD201
		24 VDC, 2 A/pt, 8 A/Unit, sourcing, load short protection, disconnection detection, alarm		CJ1W-OD202
		12 to 24 VDC, 0.5 A/pt, 4.0 A/Unit sinking		CJ1W-OD203
		24 VDC, 0.5 A/pt, 4.0 A/Unit, sourcing, load short protection, disconnection detection, alarm		CJ1W-OD204
	16 pts	12 to 24 VDC, 0.5 A/pt, 5 A/Unit sinking	Removeable terminal block	CJ1W-OD211
		24 VDC, 0.5 A/pt, 5 A/Unit, sourcing, load short protection, alarm		CJ1W-OD212
	32 pts	12 to 24 VDC, 0.5 A/pt, 4 A/Unit, sinking	Fujitsu-compatible connector	CJ1W-OD231
		24 VDC, 0.5 A/pt, 4 A/Unit, sourcing, load short protection, alarm	MIL connector	CJ1W-OD232
		12 to 24 VDC, 0.5 A/pt, 4 A/Unit, sinking		CJ1W-OD233
	64 pts	12 to 24 VDC, 0.3 A/pt, 6.4 A/Unit, sinking	Fujitsu-compatible connector	CJ1W-OD261
		24 VDC, 0.3 A/pt, 6.4 A/Unit, sourcing	MIL connector	CJ1W-OD262
		12 to 24 VDC, 0.3 A/pt, 6.4 A/Unit, sinking		CJ1W-OD263

Triac Output Units

Classification	Outputs	Maximum switching capacity	Connections	Model
Basic I/O Unit	8 pts	250 V AC, 0.6 A/pt. 2.4 A/Unit, 50/60 Hz	Removeable terminal block	CJ1W-OA201

DC Input/Transistor Output Units

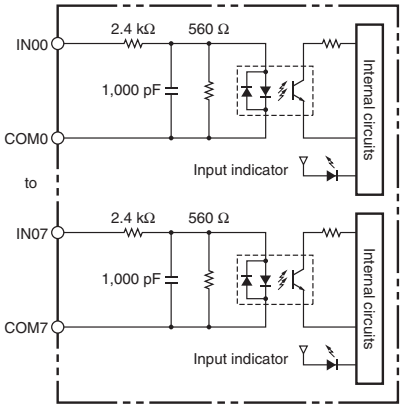
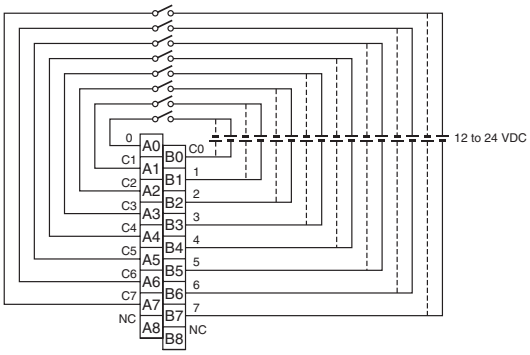
Classification	Inputs/ Outputs	Input voltage	Input current (typical)	Max. output switching capacity	Connections	Model
Basic I/O Unit	16 inputs/ 16 outputs	24 V DC	7 mA	12 to 24 V DC, 0.5 A/pt. 2.0 A/Unit, sinking outputs	Fujitsu-compatible connector	CJ1W-MD231
				24 VDC, 0.5 A/pt. 2.0 A/Unit, sourcing outputs, with load short-circuit protection and alarm functions	MIL connector	CJ1W-MD232
				12 to 24 V DC, 0.5 A/pt. 2.0 A/Unit, sinking outputs		CJ1W-MD233
	32 inputs/ 32 outputs		4.1 mA	12 to 24 V DC, 0.3 A/pt. 3.2 A/Unit, sinking outputs	Fujitsu-compatible connector	CJ1W-MD261
					MIL connector	CJ1W-MD263

TTL I/O Units

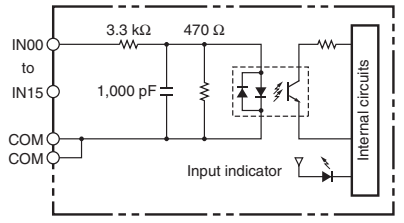
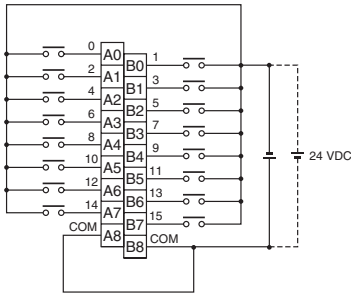
Classification	Inputs/ Outputs	Input voltage	Input current (typical)	Max. output switching capacity	Connections	Model
Basic I/O Unit	32 inputs/ 32 outputs	5 V DC	3.5 mA	5 V DC, 35 mA/pt. 1.12 A/Unit	MIL connector	CJ1W-MD563

Circuit Configuration and Terminal Arrangement

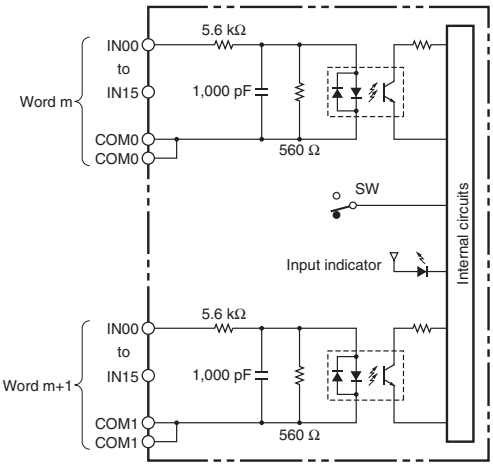
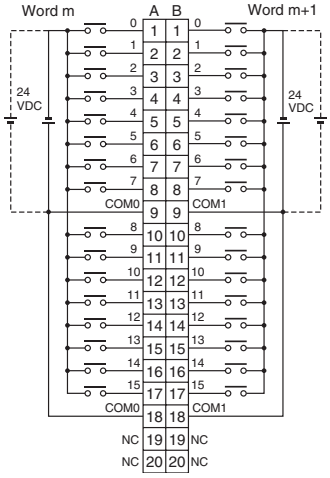
CJ1W-ID201

Circuit configuration	Terminal arrangement
	

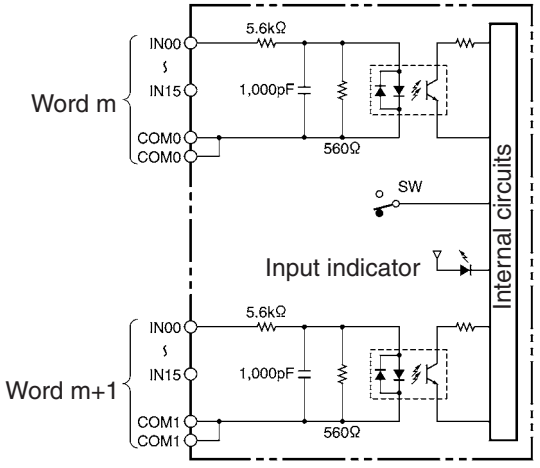
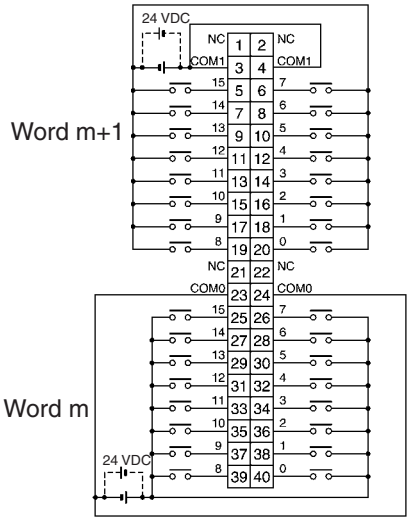
CJ1W-ID211

Circuit configuration	Terminal arrangement
	

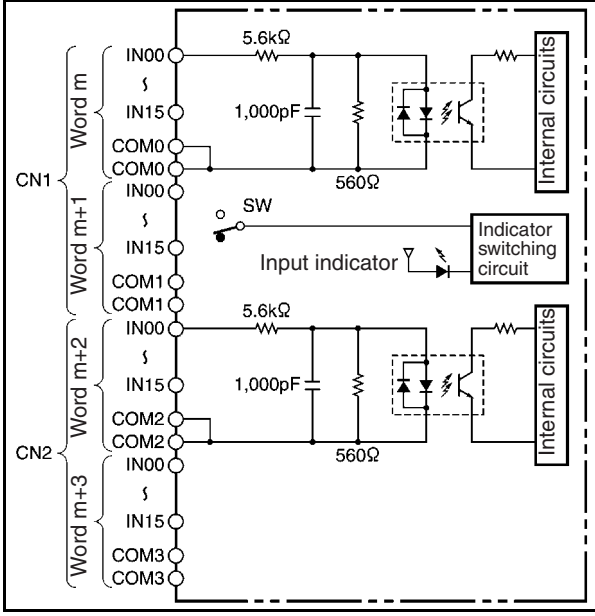
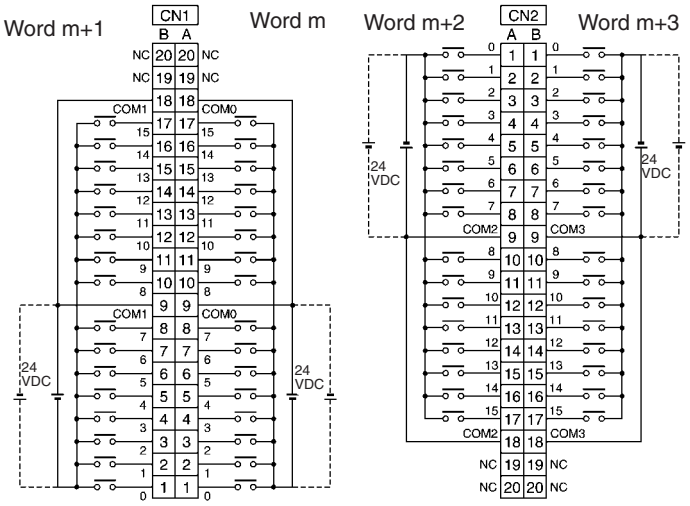
CJ1W-ID231

Circuit configuration	Terminal arrangement
	

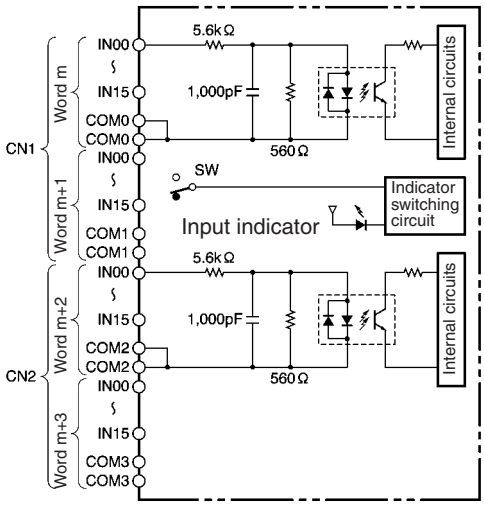
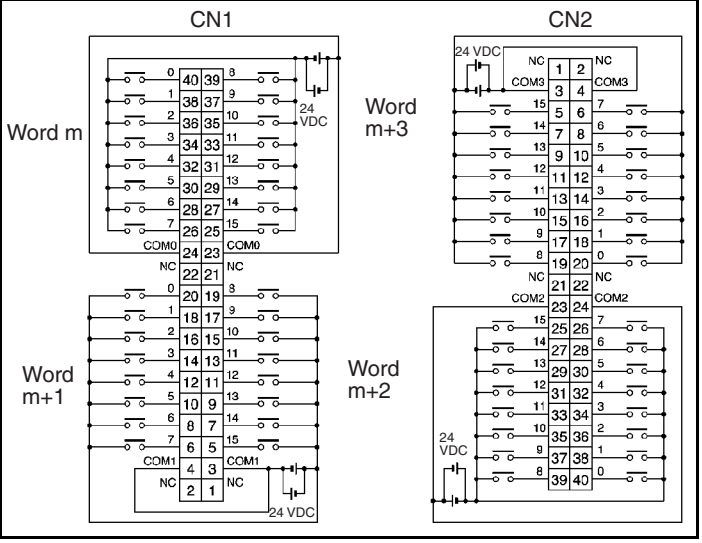
CJ1W-ID232

Circuit configuration	Terminal arrangement
	

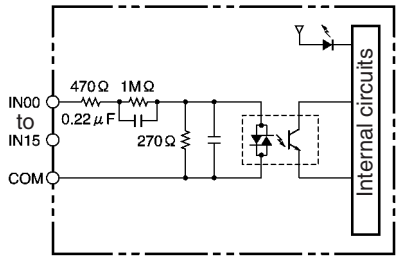
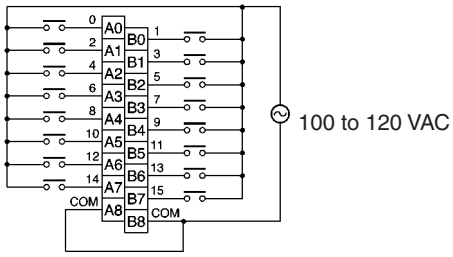
CJ1W-ID261

Circuit configuration	Terminal arrangement
	

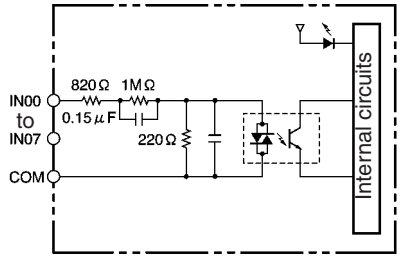
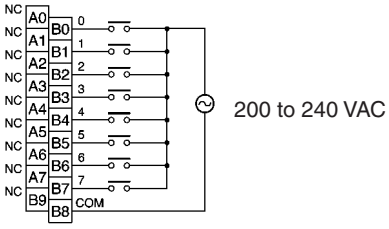
CJ1W-ID262

Circuit configuration	Terminal arrangement
	

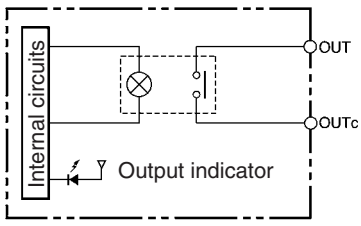
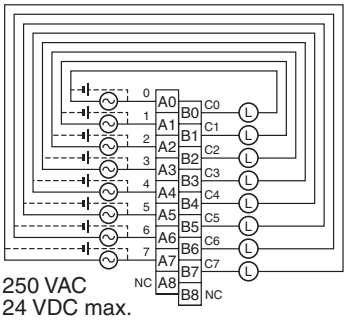
CJ1W-IA111

Circuit configuration	Terminal arrangement
	

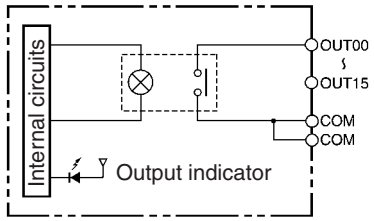
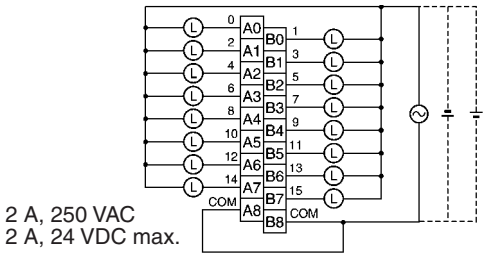
CJ1W-IA201

Circuit configuration	Terminal arrangement
	

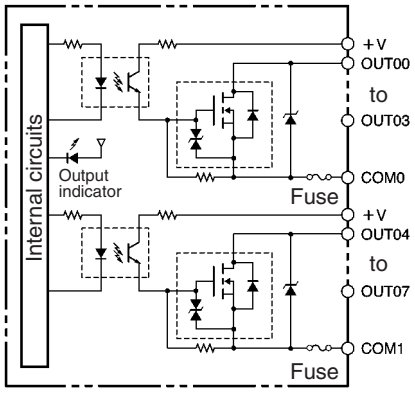
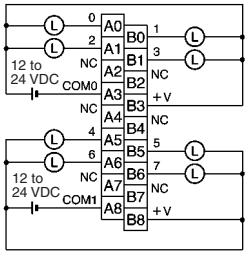
CJ1W-OC201

Circuit configuration	Terminal arrangement
	

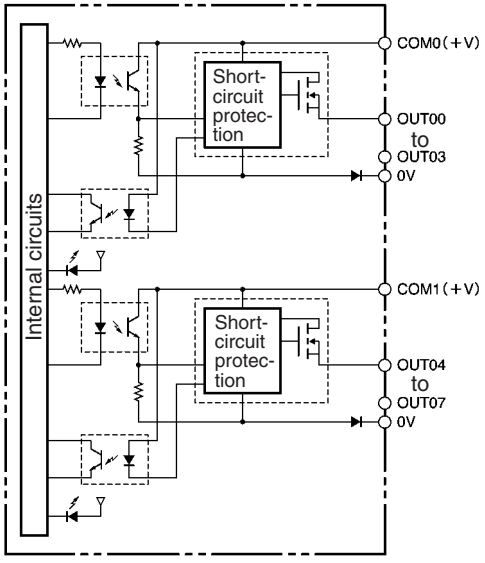
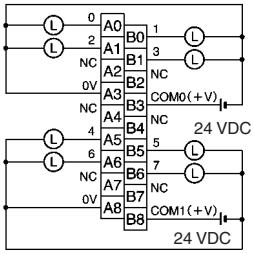
CJ1W-OC211

Circuit configuration	Terminal arrangement
	

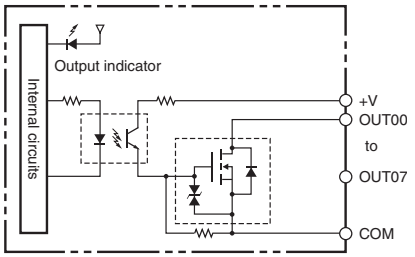
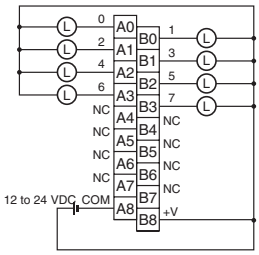
CJ1W-OD201

Circuit configuration	Terminal arrangement
	

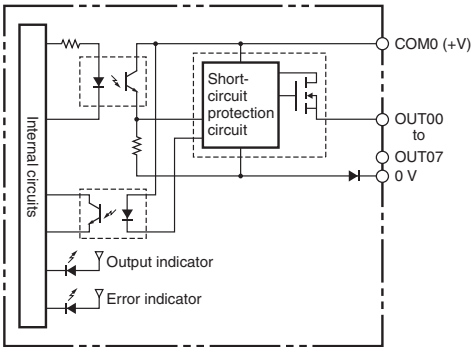
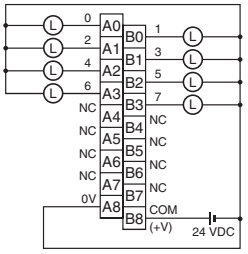
CJ1W-OD202

Circuit configuration	Terminal arrangement
	

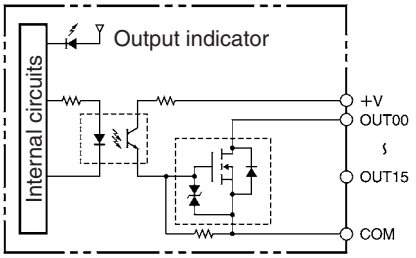
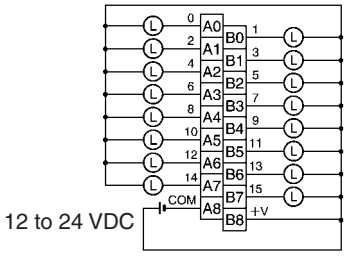
CJ1W-OD203

Circuit configuration	Terminal arrangement
	

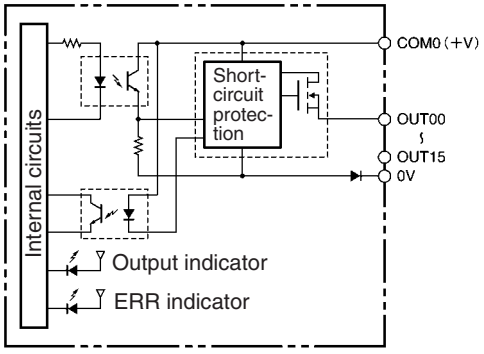
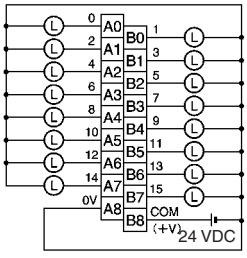
CJ1W-OD204

Circuit configuration	Terminal arrangement
	

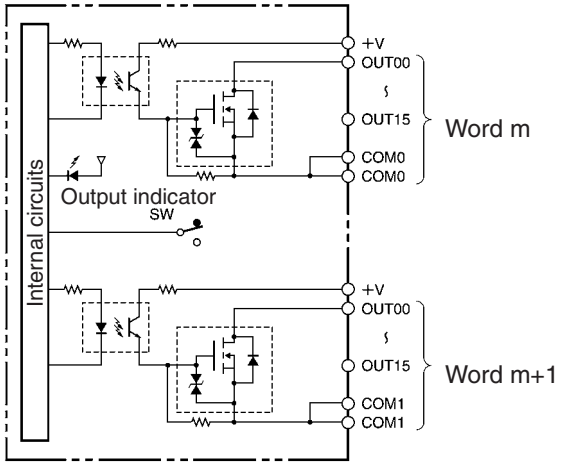
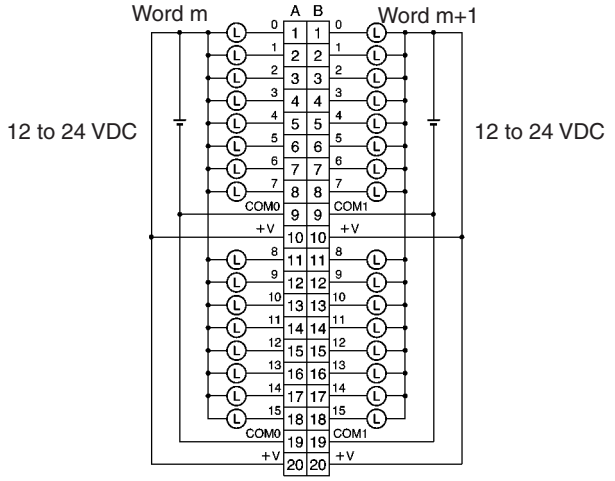
CJ1W-OD211

Circuit configuration	Terminal arrangement
	

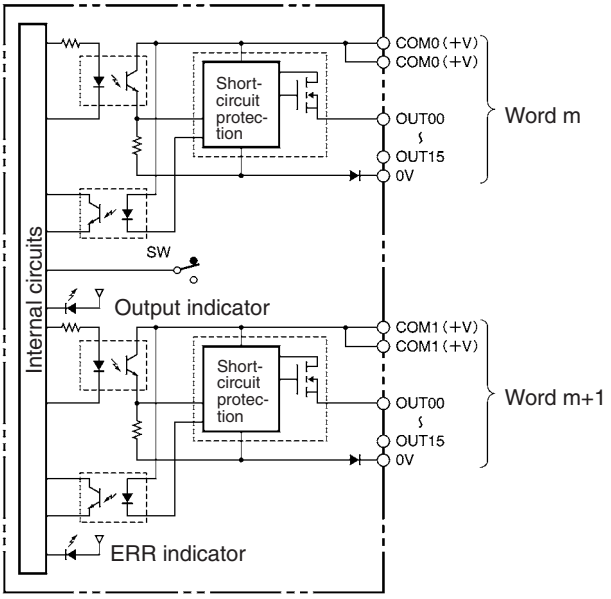
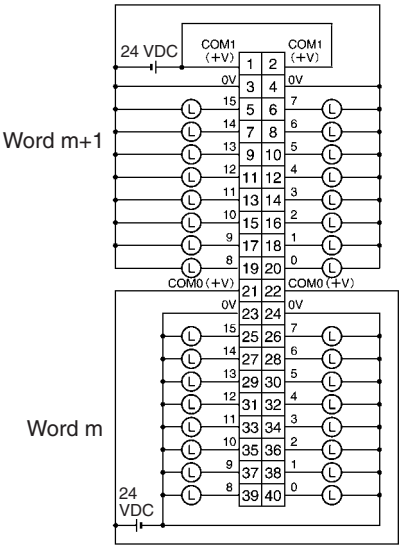
CJ1W-OD212

Circuit configuration	Terminal arrangement
	

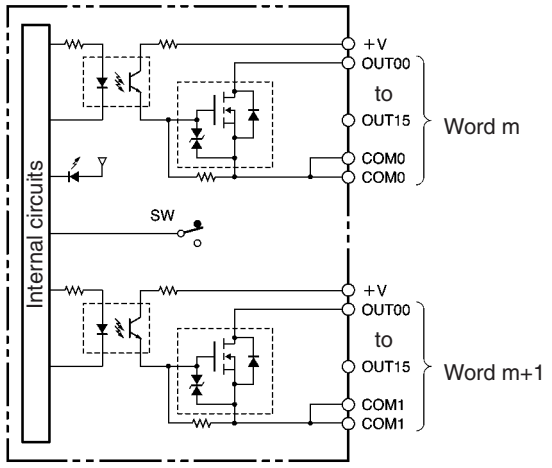
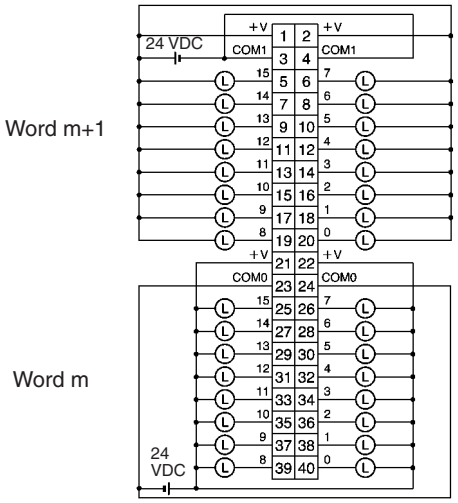
CJ1W-OD231

Circuit configuration	Terminal arrangement
	

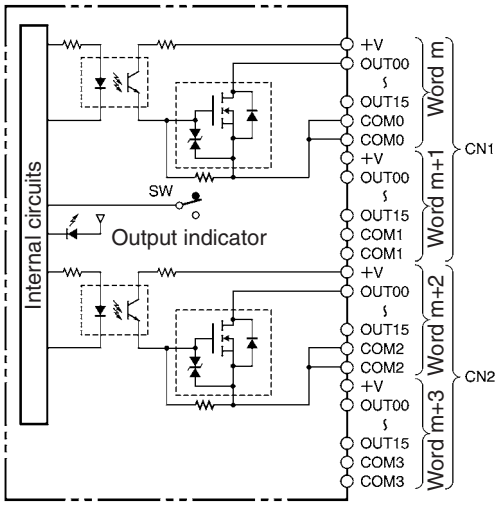
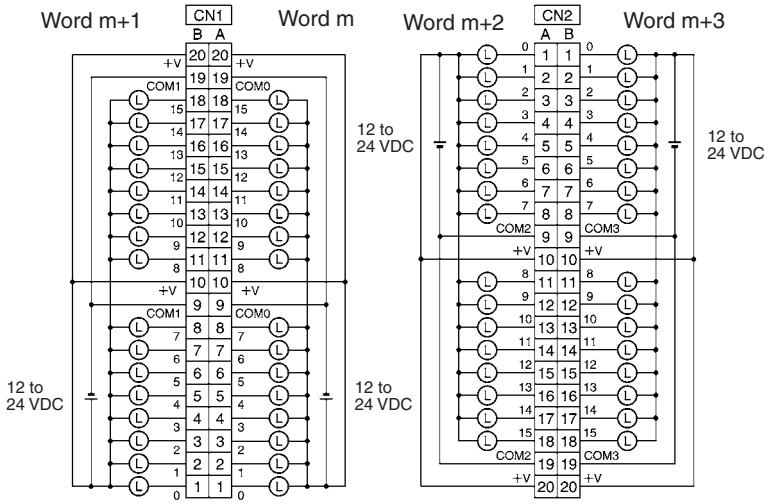
CJ1W-OD232

Circuit configuration	Terminal arrangement
	

CJ1W-OD233

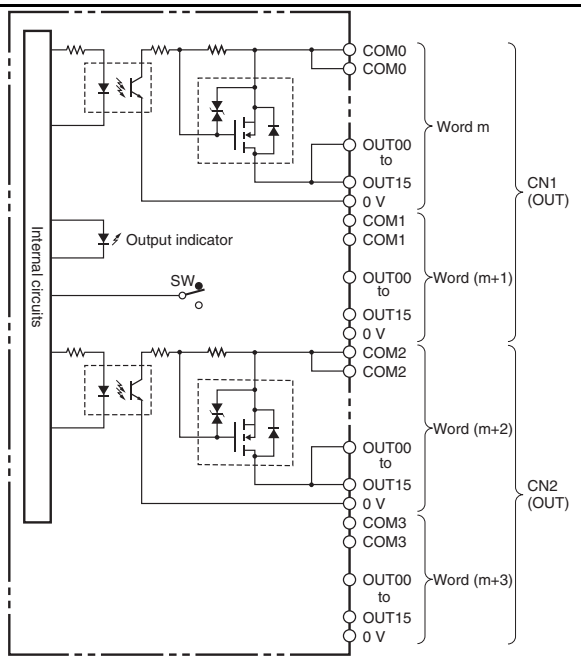
Circuit configuration	Terminal arrangement
	

CJ1W-OD261

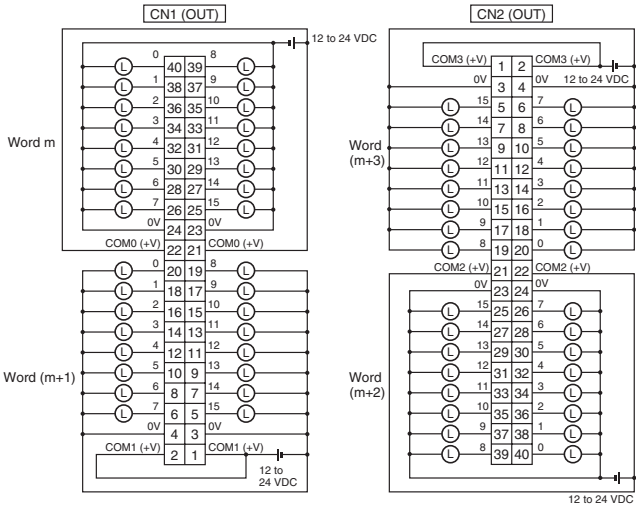
Circuit configuration	Terminal arrangement
	

CJ1W-OD262

Circuit configuration

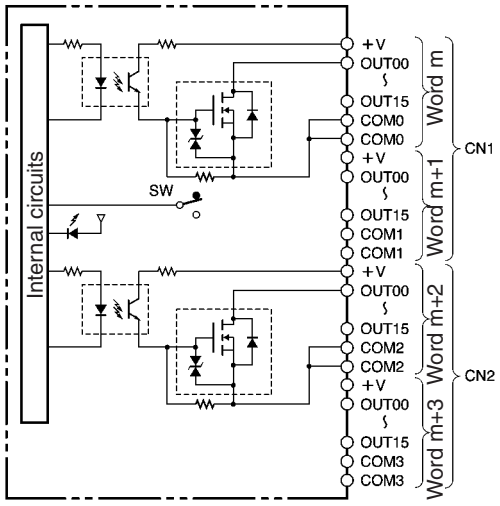


Terminal arrangement

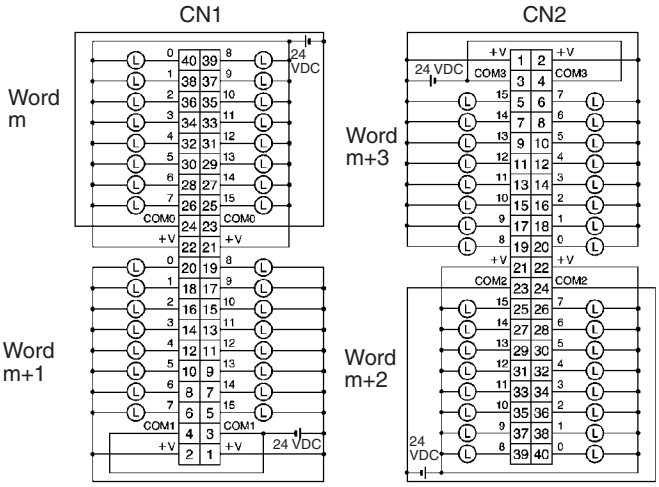


CJ1W-OD263

Circuit configuration

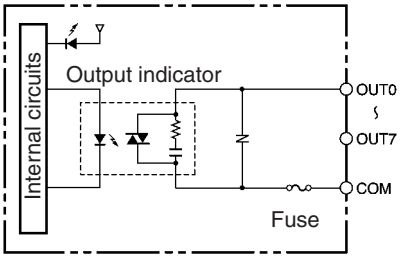


Terminal arrangement

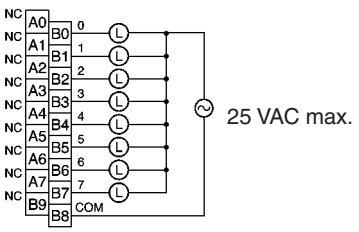


CJ1W-OA201

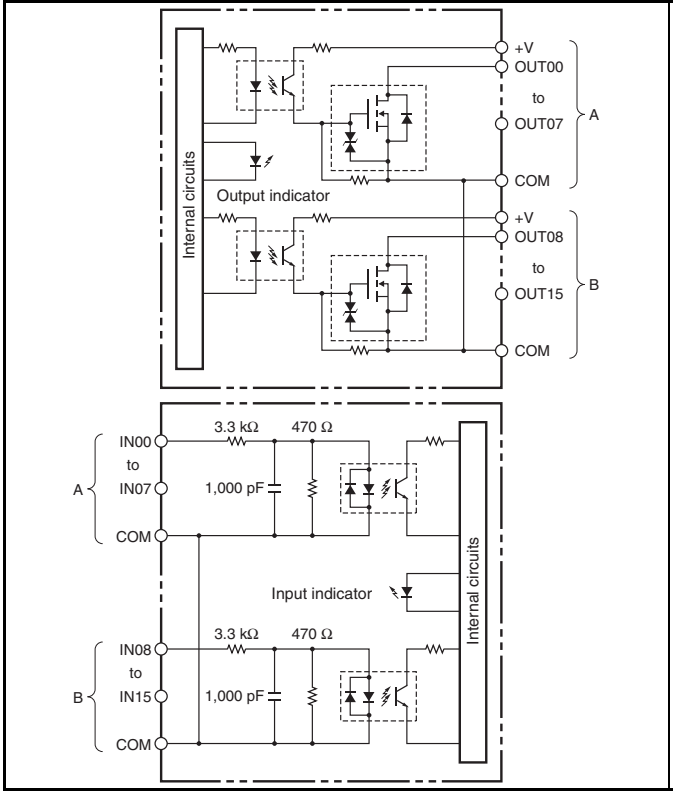
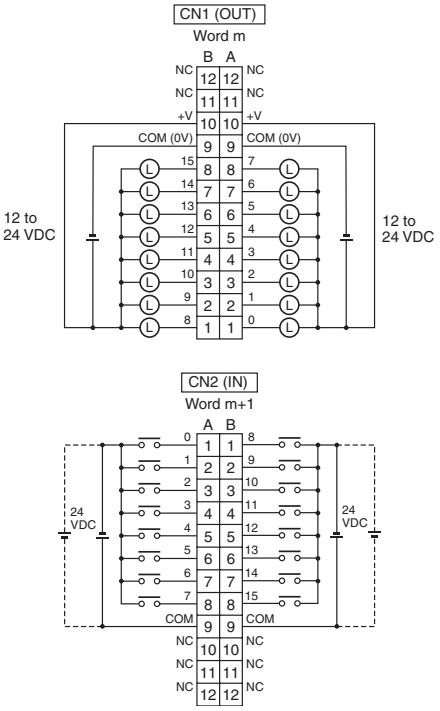
Circuit configuration



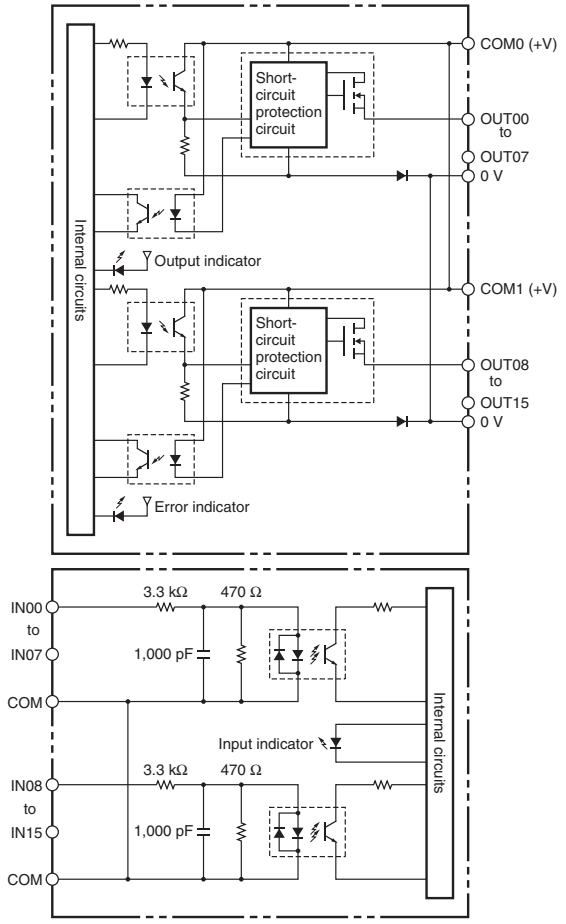
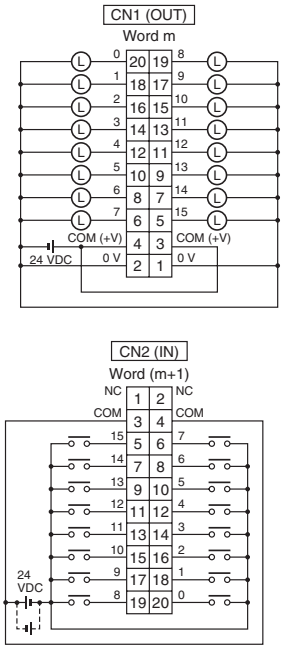
Terminal arrangement



CJ1W-MD231

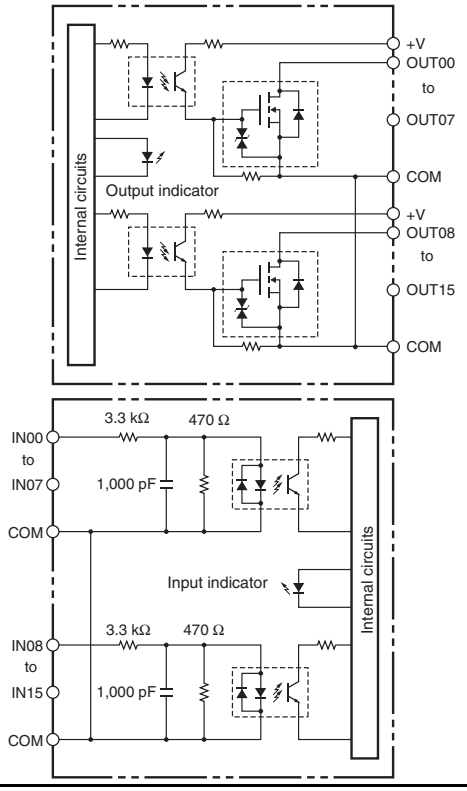
Circuit configuration	Terminal arrangement
	

CJ1W-MD232

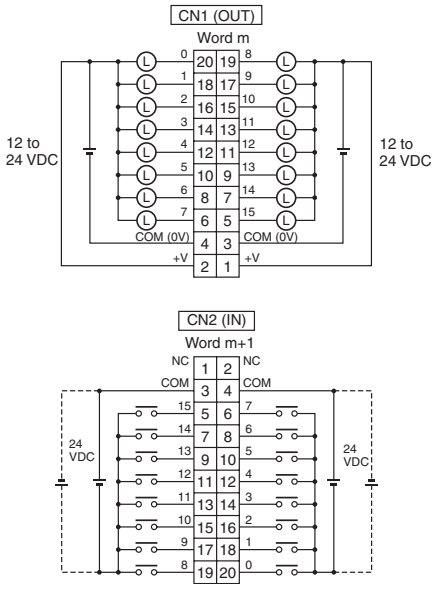
Circuit configuration	Terminal arrangement
	

CJ1W-MD233

Circuit configuration

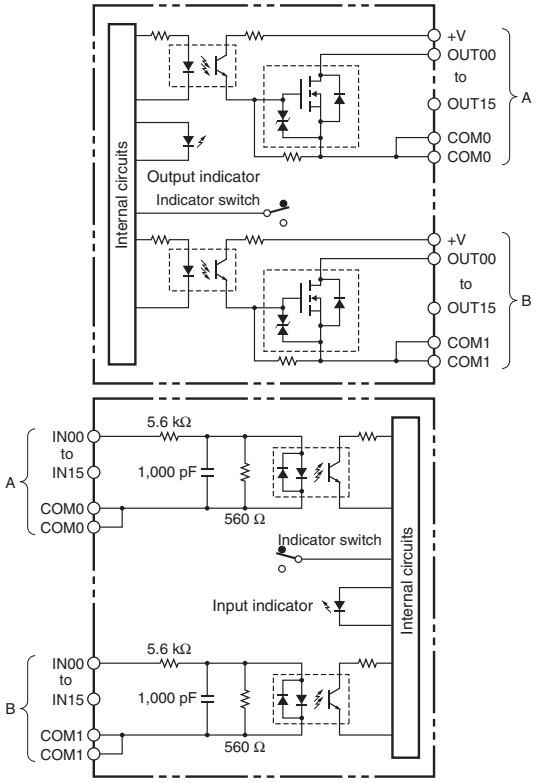


Terminal arrangement

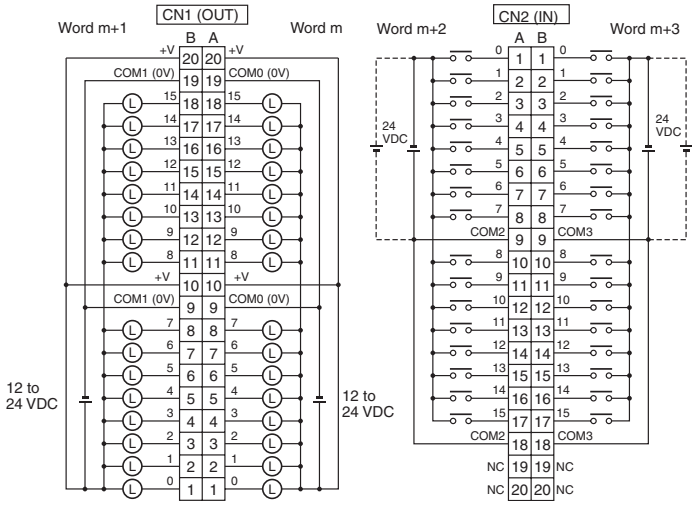


CJ1W-MD261

Circuit configuration

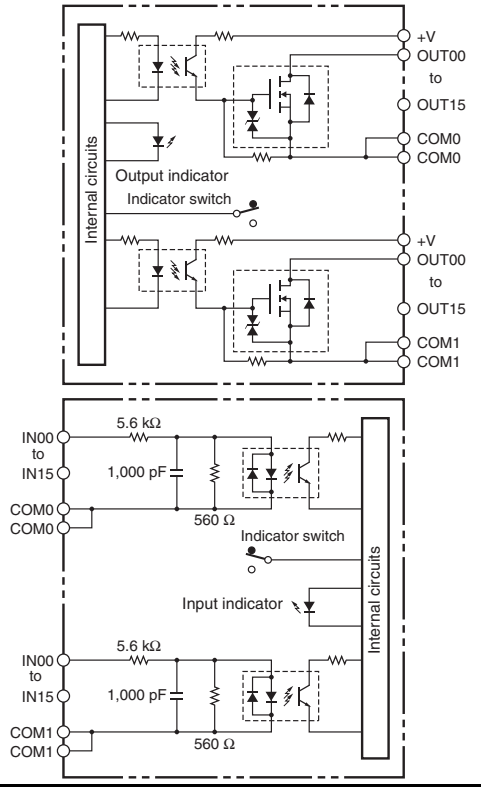


Terminal arrangement

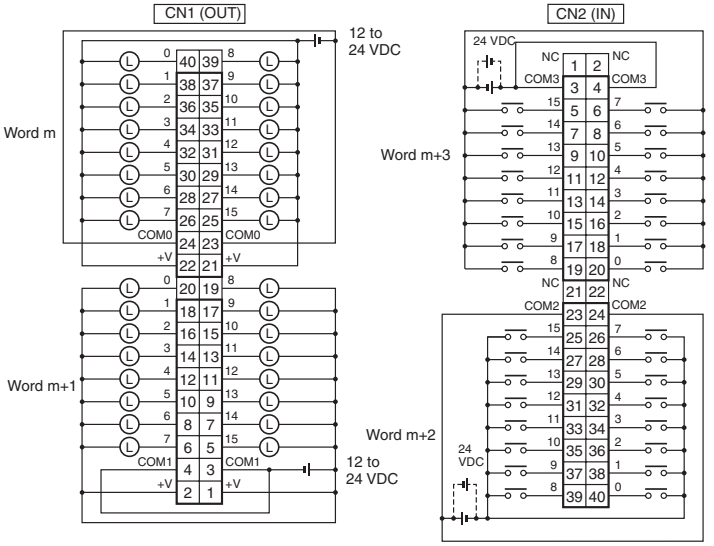


CJ1W-MD263

Circuit configuration

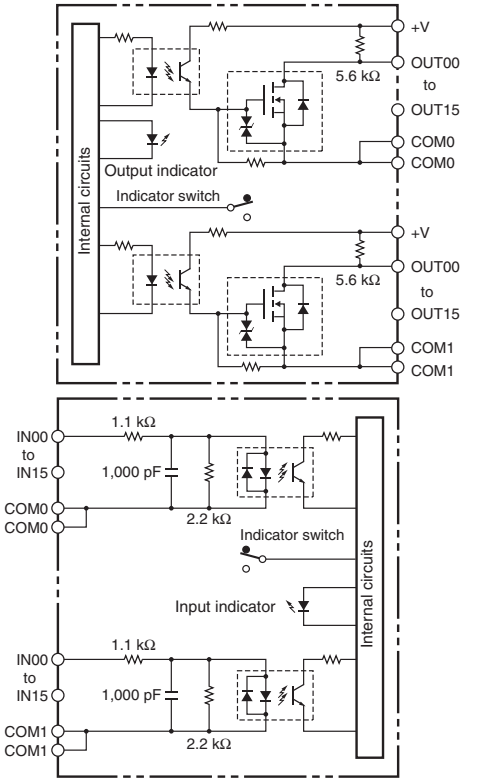


Terminal arrangement

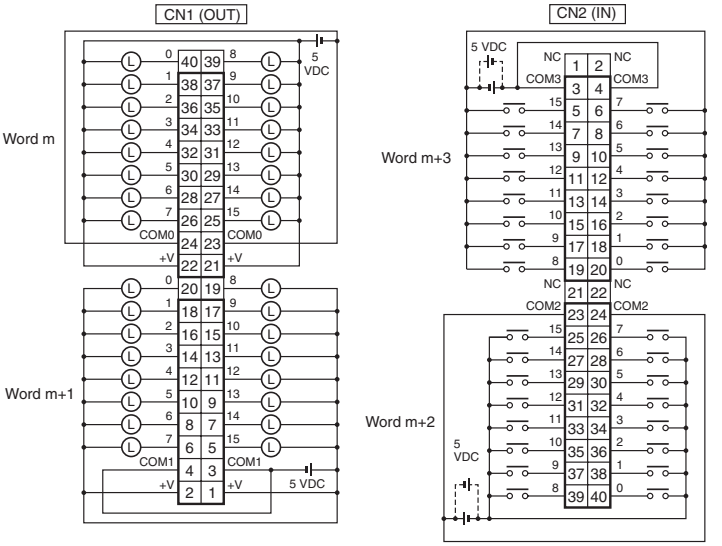


CJ1W-MD563

Circuit configuration



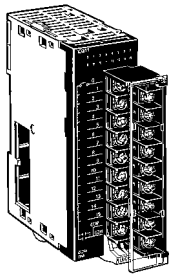
Terminal arrangement



Interrupt Input Unit
CJ1W-INT01

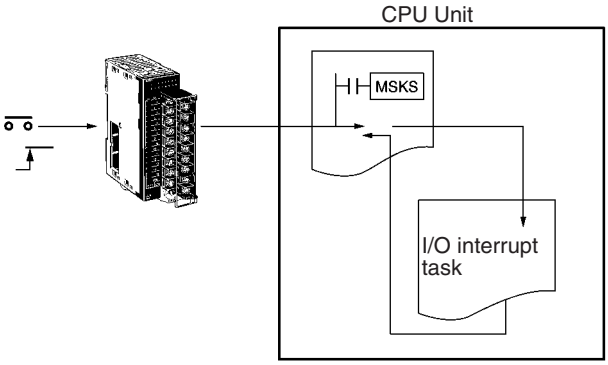
High-speed Response for Interrupt Task Execution: 0.37 ms OFF to ON and 0.82 ms ON to OFF

- An input to the Interrupt Input Unit immediately interrupts CPU Unit processing to stop execution of cyclic tasks (i.e., the normal programming) and execute an I/O interrupt task.



CJ1W-INT01

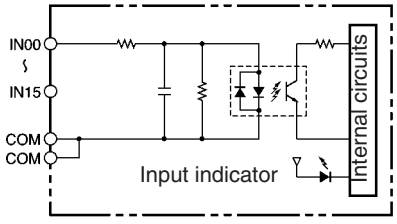
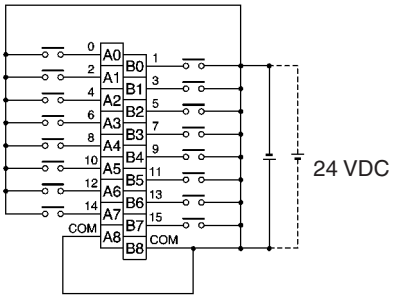
System Configuration



Specifications

Input voltage	Inputs	Input signal pulse width	No. of mountable Units	Mounting location	External connections
24 VDC	16 inputs	ON: 0.05 ms min. OFF: 0.5 ms min.	2 max.	CJ1G or CJ1H: Any of the 5 slots next to the CPU Unit on the CPU Rack. CJ1M: Any of the 3 slots next to the CPU Unit on the CPU Rack.	Removable terminal block

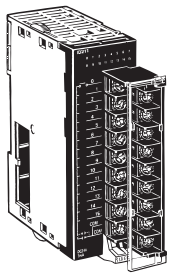
Circuit Configuration and Terminal Connections

Circuit configuration	Terminal connections
	

High-speed Input Unit
CJ1W-IDP01

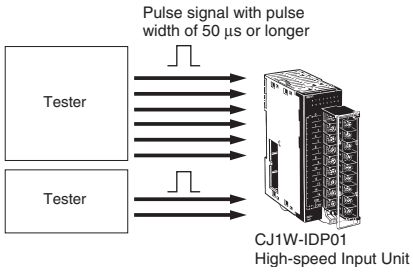
Input Signals as Short as 50 μs as Normal Inputs

- Reads pulses that are too fast for normal I/O, such as is often required for signal exchange with inspection devices.
- Reads pulse widths (ON time) as short as 0.05 ms.
- Inputs stored in the internal circuits are cleared in I/O refresh period.



CJ1W-IDP01

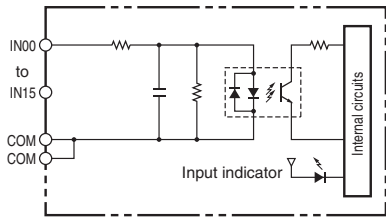
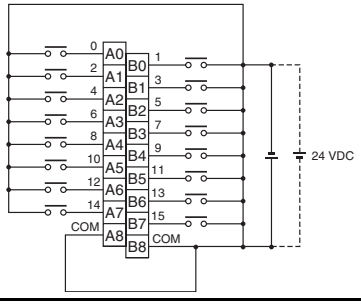
System Configuration



Specifications

Input voltage	Inputs	Input signal pulse width	No. of mountable Units	Mounting location	External connections
24 VDC	16 inputs	ON: 0.05 ms min. OFF: 0.5 ms min.	No restrictions beyond normal limits for CPU Unit	No restrictions	Removable terminal block

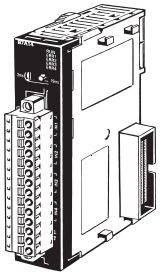
Circuit Configuration and Terminal Connections

Circuit configuration	Terminal connections
	

B7A Interface Units
CJ1W-B7A□□

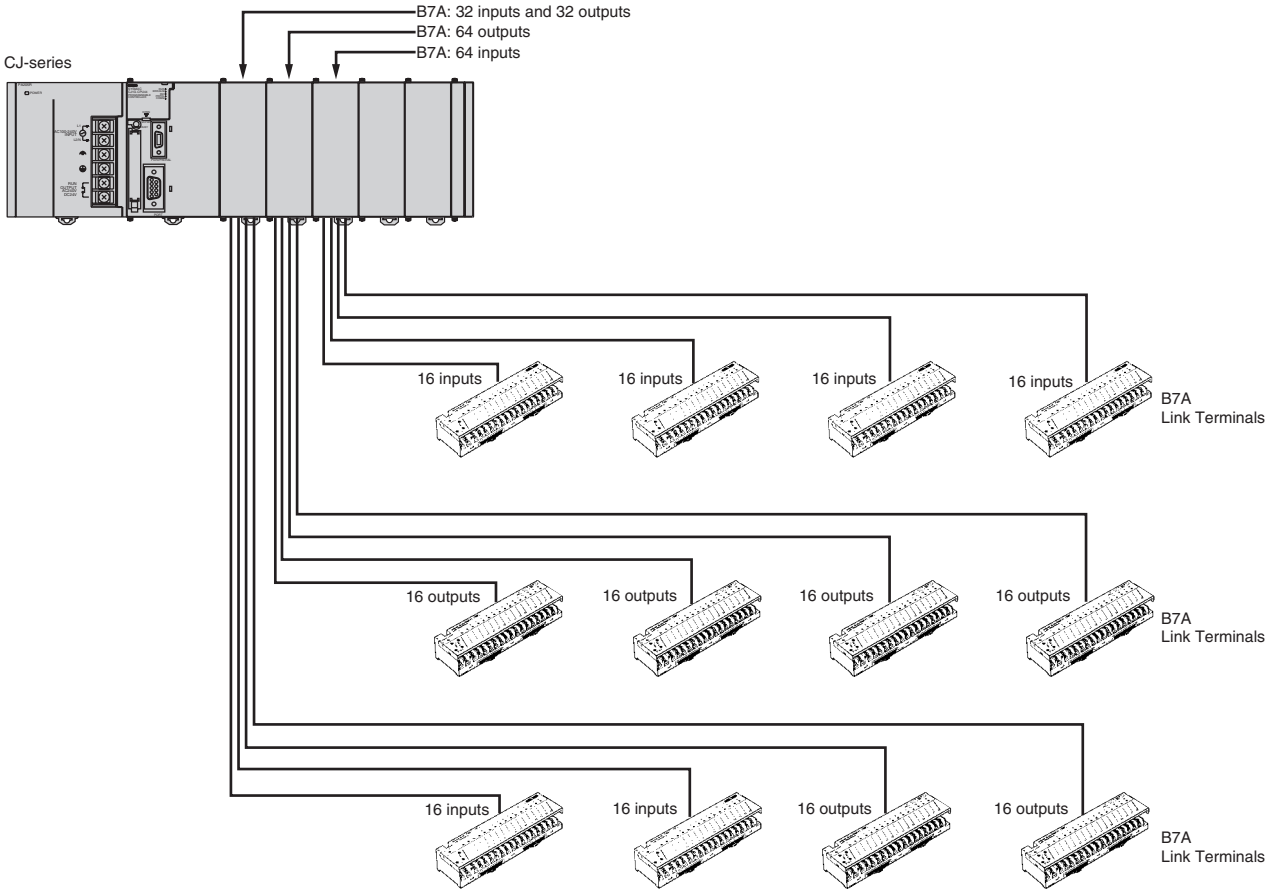
Wire-reduction Units That Transfer 16 Points of Information on Two Signal Wires

- Wire remote switches, lamps, and other devices without being concerned with communications while also reducing wiring both inside and outside the control panel.
- Handle up to 64 signals with each Unit.
- Communications possible for up to 500 m.
- No complicated settings or programming (operates as a Basic I/O Unit.)



CJ1W-B7A22
CJ1W-B7A14
CJ1W-B7A04

System Configuration



Specifications

Item			Specification		
			CJ1W-B7A22	CJ1W-B7A14	CJ1W-B7A04
Unit classification			Basic I/O Unit		
Inputs/outputs			32 inputs/32 outputs	64 inputs	64 outputs
Transmission distance	High-speed operation	Same power supply for Unit and Link Terminals	With 0.75 mm² or larger communications line Not shielded: 10 m max. Shielded: 50 m max.		
		Separate power supplies for Unit and Link Terminals	With 0.75 mm² or larger communications line Not shielded:10 m max. Shielded: 100 m max.		
	Normal operation	Same power supply for Unit and Link Terminals	With 0.75 mm² or larger communications line: 100 m max.		
		Separate power supplies for Unit and Link Terminals	With 0.75 mm² or larger communications line: 500 m max.		
Transmission delay			Normal operation: 19.2 ms (typical), High-speed operation: 3 ms (typical)		
Power supply voltage			12 to 24 V DC (allowable range: 10.8 to 26.4 V DC)		
I/O word allocations			Words are allocated according to the location the Unit is connected in the PLC. Four words (64 points) are allocated to each Unit.		

Applicable B7A Link Terminals

■ Input Terminals

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

■ Output Terminals

Type	Model	Transmission delay
Screw terminals	B7A-R6□□1	Normal (19.2 ms)
	B7AS-R6□□1	
	B7A-R6□□6	High-speed (3 ms)
	B7AS-R6□□6	
Relay outputs	G70D-R6R□1-B7A	Normal (19.2 ms)
	G70D-R6M□1-B7A	High-speed (3 ms)
Modules	B7A-R6A52	Normal (19.2 ms)
	B7A-R6A57	High-speed (3 ms)
PLC connectors	B7A-R□A□3	Normal (19.2 ms)
	B7A-R□A□8	High-speed (3 ms)

Note: 1. Use a B7A Link Terminal that has the same delay as the B7A Interface Unit.

2. B7A Link Terminals with 10 points cannot be connected.

■ I/O Terminal and Input Terminal with 32 Inputs

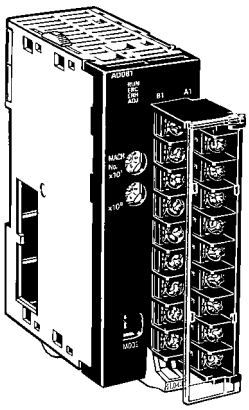
Type		Model	Transmission delay
Screw terminals	Mixed I/O	B7AM-6BS	Normal (19.2 ms) or High-speed (3 ms)
	32-point input	B7AS-T3BS	

Analog Input Units
CJ1W-AD

Convert Analog Signals to Binary Data

- Wire burnout detection
- Peak-hold function
- Mean function
- Offset gain setting

Note: Analog Input Terminals are also available as DeviceNet Slaves and for MULTIPLE I/O TERMINALs. Refer to pages 138 and 140 for details.

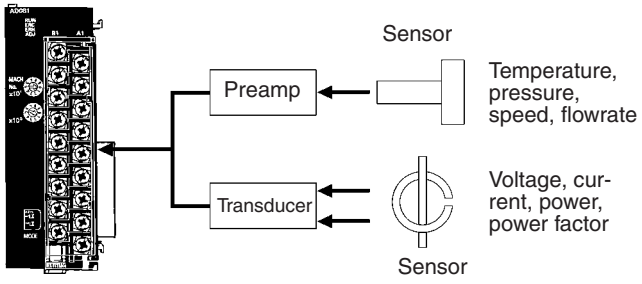


CJ1W-AD081-V1
CJ1W-AD041-V1

Function

Convert input signals such as 1 to 5 V or 4 to 20 mA to binary values between 0000 and 1F40 Hex and store the results in the allocated words each cycle. The ladder diagram can be used to transfer the data to the DM Area or the SCALING instructions (e.g., SCL(194)) can be sued to scale the data to the desired ranged.

System Configuration



Terminal Arrangement

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (–)	B2	A2	Input 1 (–)
Input 4 (+)	B3	A3	Input 3 (+)
Input 4 (–)	B4	A4	Input 3 (–)
AG	B5	A5	AG
Input 6 (+)	B6	A6	Input 5 (+)
Input 6 (–)	B7	A7	Input 5 (–)
Input 8 (+)	B8	A8	Input 7 (+)
Input 8 (–)	B9	A9	Input 7 (–)

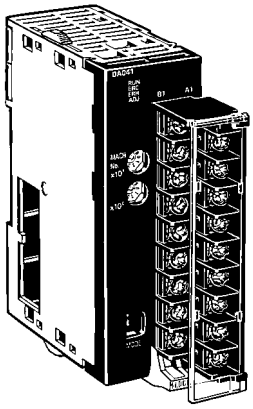
Specifications

Item			Classification: Special I/O Unit	
			CJ1W-AD081-V1	CH1W-AD041-V1
Inputs			8 pts	4 pts
Signal range	Voltages	1 to 5 V	Yes	
		0 to 10 V	Yes	
		0 to 5 V	Yes	
		–10 to 10 V	Yes	
	Currents	4 to 20 mA	Yes	
Signal range settings			8 settings (one for each point)	4 settings (one for each point)
Resolution			1/8000 (settable to 1/4000)	1/8000 (settable to 1/4000)
Conversion speed			250 μs/point max. (settable to 1 ms/point)	250 μs/point max. (settable to 1 ms/point)
Overall accuracy (at 23 °C)			Voltage: ±0.2% Current: ±0.4%	
Connections			Terminal block	
Features	Wire burnout detection		Yes	
	Peak-hold function		Yes	
	Averaging		Yes	
Unit No.			0 to 95	

Analog Output Units
CJ1W-DA

Convert Binary Data to Analog Signals

- Output hold
- Offset gain adjustment
- Scaling

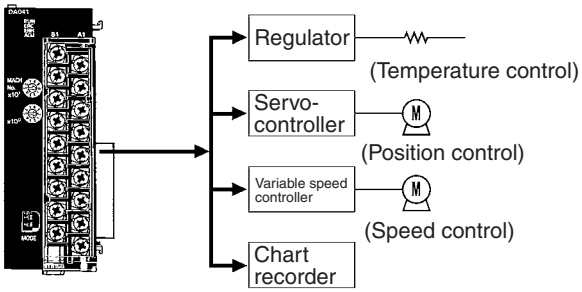


CJ1W-DA08V
CJ1W-DA08C
CJ1W-DA041
CJ1W-DA021

Function

Binary data between 0000 to 0FA0 Hex in the allocated words is convert to analog signals such as 1 to 5 V or 4 to 20 mA for output. All that is required in the ladder diagram is to place the data in the allocated words.

System Configuration



Terminal Arrangements

■ CJ1W-DA08V (Voltage Output) and CJ1W-DA08C (Current Output)

Output 2 (+)	B1	A1	Output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Output 4 (+)	B3	A3	Output 3 (+)
Output 4 (–)	B4	A4	Output 3 (–)
Output 6 (+)	B5	A5	Output 5 (+)
Output 6 (–)	B6	A6	Output 5 (–)
Output 8 (+)	B7	A7	Output 7 (+)
Output 8 (–)	B8	A8	Output 7 (–)
0 V	B9	A9	24 V

■ CJ1W-DA041

Voltage output 2 (+)	B1	A1	Voltage output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Current output 2 (+)	B3	A3	Current output 1 (+)
Voltage output 4 (+)	B4	A4	Voltage output 3 (+)
Output 4 (–)	B5	A5	Output 3 (–)
Current output 4 (+)	B6	A6	Current output 3 (+)
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
0 V	B9	A9	24 V

■ CJ1W-DA021

Voltage output 2 (+)	B1	A1	Voltage output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Current output 2 (+)	B3	A3	Current output 1 (+)
N.C.	B4	A4	N.C.
N.C.	B5	A5	N.C.
N.C.	B6	A6	N.C.
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
0 V	B9	A9	24 V

Specifications

Item			Classification: Special I/O Unit			
			CJ1W-DA08V	CJ1W-DA08C	CJ1W-DA041	CJ1W-DA021
Outputs			8 pts	8 pts	4 pts	2 pts
Signal range	**Voltages**	**1 to 5 V**	Yes	---	Yes	
		0 to 10 V	Yes	---	Yes	
		0 to 5 V	Yes	---	Yes	
		–10 to 10 V	Yes	---	Yes	
	Currents	**4 to 20 mA**	---	Yes		
Signal range settings			8 settings (one for each point)	8 settings (one for each point)	4 settings (one for each point)	2 settings (one for each point)
Resolution			1/4000 or 1/8000		1/4000	
Conversion speed			1.0 ms/pt max. or 250 μs/pt max.		1.0 ms/pt max.	
Overall accuracy (at 23 °C)			±0.3%			Voltage: ±0.3% Current: ±0.5%
Connections			Terminal block			
Unit No.			0 to 95			
Output functions	**Output hold**		Yes			
	Scaling		Yes		No	
External power supply			24 VDC +10%/–15%, 140 mA min.	24 VDC +10%/–15%, 170 mA min.	24 VDC +10%/–15%, 200 mA min.	24 VDC +10%/–15%, 140 mA min.

Analog I/O Unit
CJ1W-MAD42

Handle both Analog Input and Analog Outputs

Analog Inputs

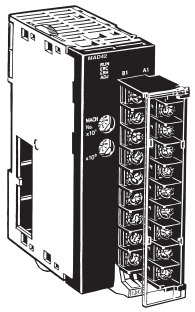
- Wire burnout detection
- Peak hold function
- Mean function
- Offset gain setting

Analog Outputs

- Output hold
- Offset gain adjustment

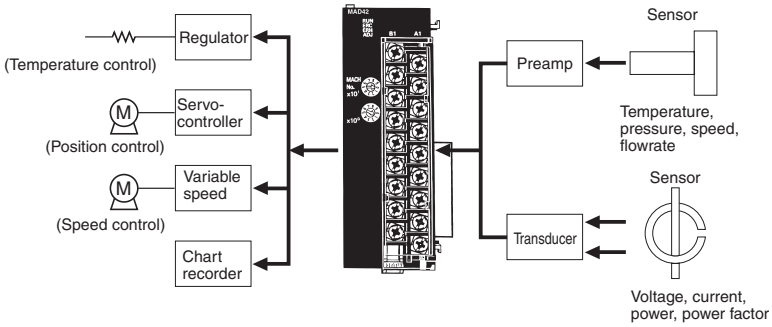
Other Features

- Scaling function



CJ1W-MAD42

System Configuration



Terminal Arrangement

Voltage output 2 (+)	B1
Output 2 (–)	B2
Current output 2 (+)	B3
N.C.	B4
Input 2 (+)	B5
Input 2 (–)	B6
AG	B7
Input 4 (+)	B8
Input 4 (–)	B9

A1	Voltage output 1 (+)
A2	Output 1 (–)
A3	Current output 1 (+)
A4	N.C.
A5	Input 1 (+)
A6	Input 1 (–)
A7	AG
A8	Input 3 (+)
A9	Input 3 (–)

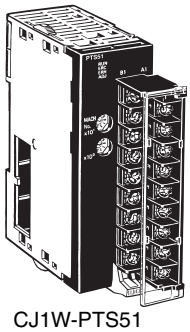
Specifications

Item			Classification: Special I/O Unit	
			Inputs	Outputs
Inputs/outputs			4 pts	2 pts
Signal range	Voltages	1 to 5 V	Yes	
		0 to 10 V	Yes	
		0 to 5 V	Yes	
		–10 to 10 V	Yes	
	Currents	4 to 20 mA	Yes	
Signal range settings			4 settings (one for each point)	2 settings (one for each point)
Resolution			1/4000 or 1/8000	
Conversion speed			1.0 ms/pt max. or 500 μs/pt max.	
Overall accuracy (at 23 °C)			Voltage: ±0.2% Current: ±0.2%	Voltage: ±0.3% Current: ±0.3%
Connections			Terminal block	
Functions		Wire burnout	Yes	---
		Peak hold	Yes	---
		Mean	Yes	---
		Output hold	---	Yes
		Scaling	Yes	
Unit No.			0 to 95	

Process Input Units
CJ1W-PTS5□

Directly Input Four Temperature Sensors

- Up to four temperature sensor inputs can be directly connected to a single Unit (input signal/range shared by the four inputs)
- Models with isolation between channels prevent unwanted current paths between Temperature Sensor inputs.
- Measurement value alarm with hysteresis/ON delay (two inputs per channel,one of which can be set as a DO output from the Unit).

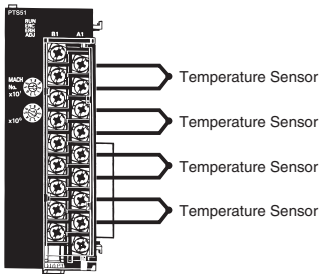


CJ1W-PTS51
CJ1W-PTS52

Function

Converts the measured value of thermocouple or platinum-resistance thermometer inputs (up to 4 points) into BCD and binary code, and stores in the allocated memory area every cycle. The ladder program can be used to transfer the data to a specified words in data memory for use.

System Configuration



Specifications

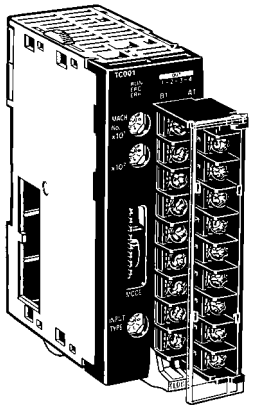
Item			Specification	
			CJ1W-PTS51	CJ1W-PTS52
Unit classification			CJ1-series Special I/O Unit	
Inputs			4 inputs	
Input signals	Thermocouple	R	Yes	No
		S	Yes	No
		K	Yes	No
		J	Yes	No
		T	Yes	No
		L	Yes	No
		B	Yes	No
	Platinum-resistance thermometer	JPt	No	Yes
		Pt	No	Yes
Input signal ranges			Same for all 4 inputs	
A/D conversion output data			Binary or BCD	
Conversion speed			250 ms/4 inputs	
Overall accuracy			Celsius setting: ±0.3% of PV or ±1°C, whichever is larger, ±1 digit max. Fahrenheit setting: ±0.3% of PV or ±2°F, whichever is larger, ±1 digit max.	Celsius setting: ±0.3% of PV or ±0.8°C, whichever is larger, ±1 digit max. Fahrenheit setting: ±0.3% of PV or ±1.6°F, whichever is larger, ±1 digit max.
Connections			Terminal block	
Unit No.			0 to 95	

Note: L and −100°C or less for K and T are ±2°C ±1 digit or max. and 200°C or less of R and S is ±3°C ±1 digit max. No accuracy is specified for 400°C or less of B.

Temperature Control Units
CJ1W-TC

One Unit Functions as Four Temperature Controllers

- Supports 2-loop or 4-loop PID control or ON/OFF control.
- Two-loop models are equipped with a heater burnout detection function.
- The PID constants for PID control can be set using auto-tuning (AT).
- Select either forward (cooling) operation or reverse (heating) operation.
- Input directly from temperature sensors. (Thermocouples: R, S, K, J, T, B, or L; or platinum resistance thermometers: JPt100 or Pt100.)
- Open collector output
- Sampling period: 500 ms
- RUN/STOP control.
- Two internal alarms per loop.
- With 2-loop models, a current transformer can be connected to each loop to detect heater burnout.
- Both inputs and outputs can be connected through a terminal block.

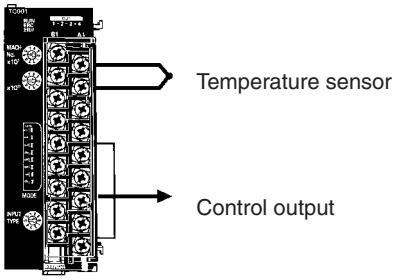


CJ1W-TC□□□

Function

Perform PID control (two degrees of freedom) or ON/OFF control based on inputs from thermocouples or platinum resistance thermometers to control open collector output. Four-loop models and two-loop models (with heater burnout detection function) are available. Words allocated to the Unit in memory can be manipulated from the ladder diagram to start/stop operation, set the target value, read the process value, or perform other operations.

System Configuration



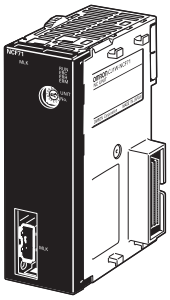
Specifications

Classification	Temperature sensor inputs	Number of loops	Control outputs	Unit numbers	Model
Special I/O Unit	Thermocouples (R, S, K, J, T, B, or L)	4 loops	Open collector NPN output (pulse)	0 to 94	CJ1W-TC001
			Open collector PNP output (pulse)		CJ1W-TC002
		2 loops (with heater burnout detection function)	Open collector NPN output (pulse)		CJ1W-TC003
			Open collector PNP output (pulse)		CJ1W-TC004
	Platinum resistance thermometers (JPt100 or Pt100)	4 loops	Open collector NPN output (pulse)		CJ1W-TC101
			Open collector PNP output (pulse)		CJ1W-TC102
		2 loops (with heater burnout detection function)	Open collector NPN output (pulse)		CJ1W-TC103
			Open collector PNP output (pulse)		CJ1W-TC104

Position Control Unit
CJ1W-NCF71

Equipped with MECHATROLINK-II high-speed motion field network. Multi-axis positioning with a single Unit for up to 16 axes.

- Devices can be connected using a single MECHATROLINK-II cable, offering wiring flexibility.
- Reads and writes Servo Driver parameters from the CPU Unit. All the device and setting information can be centrally controlled from the PLC.
- Direct operation (specification as needed from CPU Unit) can be used to easily perform positioning operations from the CPU the Unit's ladder program. Linear interpolation can be set for up to 4 axes.

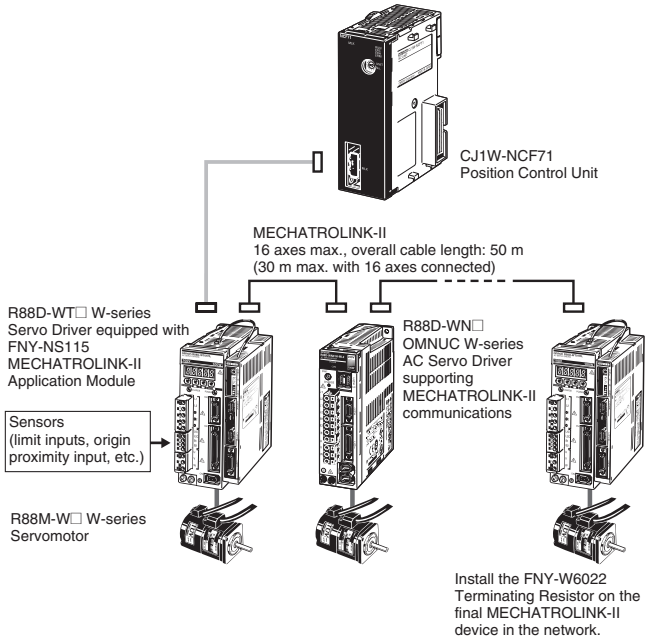


CJ1W-NCF71 NEW

Function

Introducing a Position Control Unit equipped with a MECHATROLINK-II interface that can control up to 16 axes for combining with MECHATROLINK-II-compatible Servo Drivers.

System Configuration



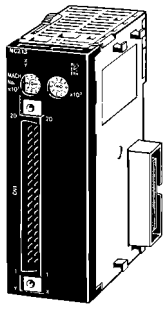
Specifications

Item	CJ1W-NCF7
Unit number	0 to F
Control method	Control commands executed using MECHATROLINK-II synchronous communications
Controlled axes	16 axes max.
Compatible devices	OMRON W-series Servo Drivers equipped with MECHATROLINK-II Application Module
Operating modes	Direct operation
Control mode	Position control, speed control, or torque control
Data format	Binary format (hexadecimal)
Startup time	4 ms (4 axes connected. For details on conditions, refer to the operation manual.)
Position data	−2,147,483,648 to 2,147,483,647 (command units)
Speed data	Position control: 0 to 2,147,483,647 (command units/s) Speed control: −199.999 to 199.999% (0.001% units) (Percentage (%) of the maximum speed of the Servomotor.)
Torque commands	−199.999 to 199.999% (0.001% units) (Percentage (%) of the rated torque for the Servomotor.)
Acceleration/deceleration for position control	1 to 65,535 (10,000 command units/s^2)
Acceleration/deceleration curves for position control	Linear acceleration/deceleration, exponential acceleration/deceleration, S-curve acceleration/deceleration (moving average)
Windows-based Support Software	WS02-MNTC1 Support Software for CJ1W-NCF71 (available soon)
Ambient operating temperature	0 to 55 °C

Position Control Units
CJ1W-NC

High-speed, High-precision Positioning with 1, 2, or 4 Axes

- Simple positioning systems can be created by directly specifying operation from the CPU Unit when required.
- Positioning data is saved in internal flash memory, eliminating the need to maintain a backup battery.
- Use Windows-based Support Software (CX-Position) to easily create positioning data and store data and parameters in files.
- S-curve acceleration/deceleration, forced starting, and other features also supported.
- Position, speed, and acceleration can be changed during direct operation.
- Speed and acceleration can be changed during JOG operation.
- Parameters and data can be backed up at once to the Memory Card in the CPU Unit using the CPU Unit's simple backup operation.

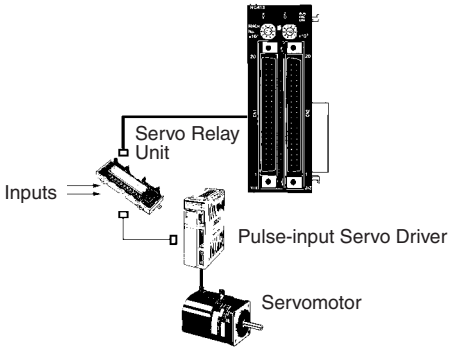


CJ1W-NC113/213/413/133/233/433

Function

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

System Configuration



Specifications

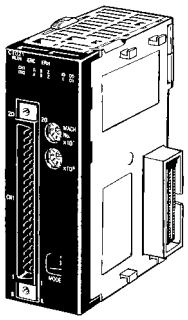
Item	CJ1W-NC113 CJ1W-NC133	CJ1W-NC213 CJ1W-NC233	CJ1W-NC413 CJ1W-NC433
Unit name	Position Control Unit		
Classification	Special I/O Unit		
Unit numbers	0 to 95		0 to 94
Control method	Open-loop control by pulse train output		
Control output interface	CJ1W-NC□13: Open-collector output CJ1W-NC□33: Line-driver output		
Controlled axes	1	2	4
Operating modes	Direct operation, memory operation, or JOG operation		
Data format	Binary (hexadecimal)		
Affect on scan time for end refresh	0.29 to 0.41 ms max./unit		
Affect on scan time for IOWR/IORD	0.6 to 0.7 ms max./instructions		
Startup time	2 ms max. (Refer to operation manual for conditions.)		
Position data	–1,073,741,823 to +1,073,741,823 pulses		
No. of positions	100 per axis (transferable from CPU Unit)		
Speed data	1 to 500 kpps (in 1-pps units)		
No. of speeds	100 per axis (transferable from CPU Unit)		
Acceleration/ deceleration times	0 t 250 s (time to max. speed)		
Acceleration/ deceleration curves	Trapezoidal or S-curve		
Saving data in CPU	Flash memory		
Windows-based Support Software	CX-Position (WS02-NCTC1-E)		
Ambient operating temperature	0 to 55 °C		0 to 50 °C (See note.)
External power supply	24 VDC ±10%, 5 VDC ±5% (line driver only)		24 VDC ±5%, 5 VDC ±5% (line driver only)

Note: Use a CJ1W-SP001 Space Unit when the ambient operating temperature is 0 to 55°C.
For details on usage methods, refer to the *CJ1W Series Position Control Units Operation Manual* (Cat. No. W397).

High-speed Counter Unit
CJ1W-CT021

High-speed, flexible control with a wide array of features

- Input frequencies to 500 kHz.
- 32-bit counting range.
- Digital variable noise filter provided.
- 5-/12-/24-V line driver inputs
- Supports simple, ring, and linear counting modes.
- Supports two external control inputs, and a total of 16 functions can be set: open gate, close gate, preset, reset, capture, stop/capture/reset combinations, reset enable, and more.
- One Unit supports two external outputs and 30 internal outputs with counter value zone comparisons, target comparisons, delays, holds, programmable outputs, and hystereses settings.
- Pulse rate measurement function and data logging.
- Counter outputs and external control inputs can be used to trigger interrupt tasks in the CPU Unit.

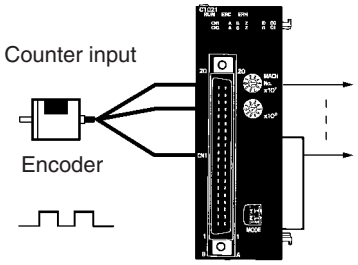


CJ1W-CT021

Function

The High-speed Counter Unit counts pulse signal inputs that are too fast to be detected by normal Input Units. The Unit can be programmed to produce outputs according to counter values for specified conditions, and many other functions are supported.

System Configuration



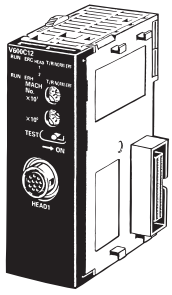
Specifications

Unit name	High-speed Counter Unit			
Classification	Special I/O Unit			
Unit numbers	0 to 92			
Countable inputs	2 channels			
Counter modes	Simple counter	Linear or ring counter		
Input types	Differential phase inputs (x1)	Differential phase inputs (x1, x2, x4)	Up/Down pulse inputs	Pulse and direction inputs
Countable frequencies	50 kHz	10, 50, or 500 kHz		
Counter values	8000 0000 to 7FFF FFFF (–2,147,483,648 to 2,147,483,647)	Liner counter: 8000 0000 to 7FFF FFFF (–2,147,483,648 to 2,147,483,647) Ring counter: 0000 0000 to FFFF FFFF (0 to 4,294,967,295)		
Counter inputs				
Input signals	Phases A, B, and Z			
Input voltage (selected via connector)	24 VDC	5 VDC (for ch1 only)	12 VDC (for ch2 only)	Line driver
External inputs	Number of inputs: 2			
Input voltage	24 VDC			
External outputs	Number of outputs: 2 (switchable between NPN and PNP)			
External power supply	10.2 to 26.4 VDC			
Max. switching capacity	46 mA at 10.2 V to 100 mA at 26.4 V			
Response time	0.1 ms max.			
Leakage current	0.1 mA max.			
Residual voltage	1.5 V max.			
Control methods	Simple counter: Forced ON/OFF, Linear counter: Forced ON/OFF, zone comparison, and target comparison			

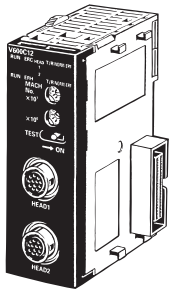
ID Sensor Units
CJ1W-V600C11/V600C12

Build a Flexible System Combining Distributed and Central Control

- Models available to connect to either one R/W Head or two R/W Heads.
- High-speed data communications with the CPU Unit (160 bytes/scan) greatly reduce processing time from communications with Data Carriers to results.
- Efficient programming with control bits and data located in different interface areas.
- Common operating methods for both Single-head and Double-head Units to effectively apply programming resources through modularization.
- Status confirmation function without CPU Unit program for faster system setup.
- Power supply error flags and processing results monitor data (communications TAT and error codes) for easier maintenance.



CJ1W-V600C11
(Single-head Unit)

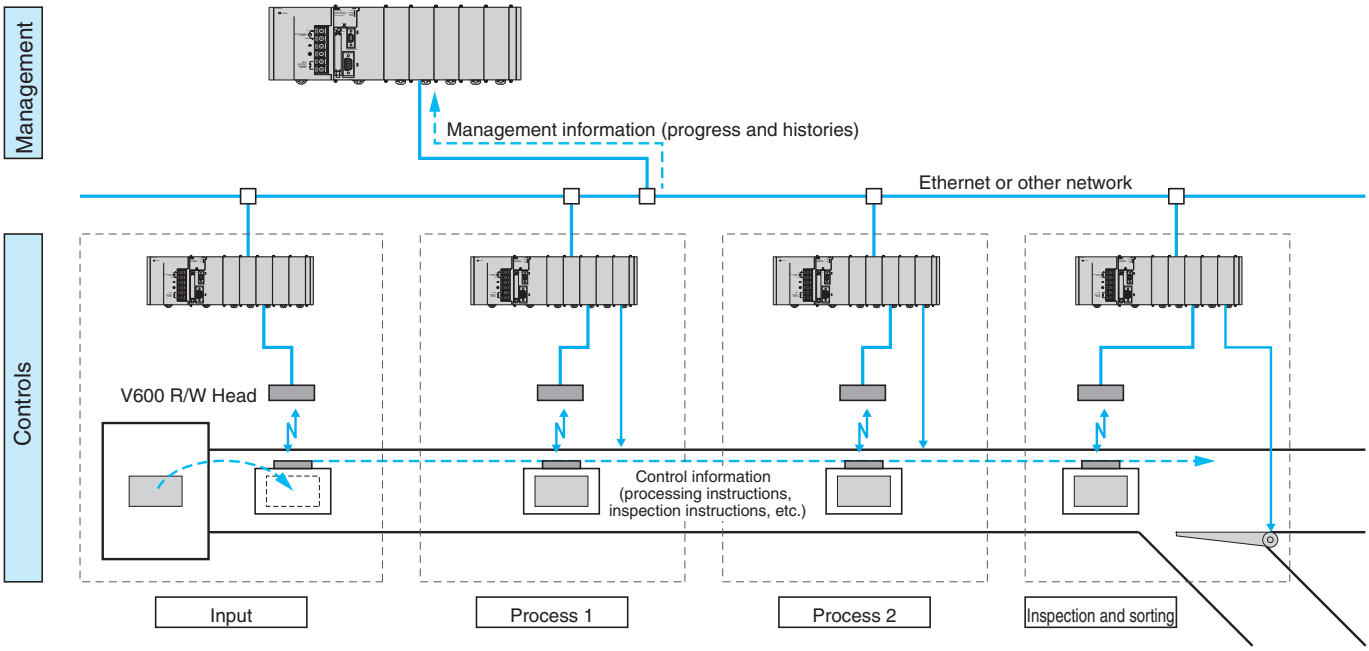


CJ1W-V600C12
(Double-head Unit)

Function

An ID Sensor Unit interfaces a V600-series ID System (an electromagnetic-coupling RDIF system) and is used together with Read/Write Heads (R/W Heads) and Data Carriers.

System Configuration



■ Combine Products and Information

Data Carriers attached to the products being manufactured are used to handle the flow of control and management information on the production line. They can also be used to automatically collect and manage quality information.

■ Autonomous Control

The information required for production is provided from the product itself, enabling the creation of an autonomous control system that does not need to rely on a host.

■ Modularization of Control Processes

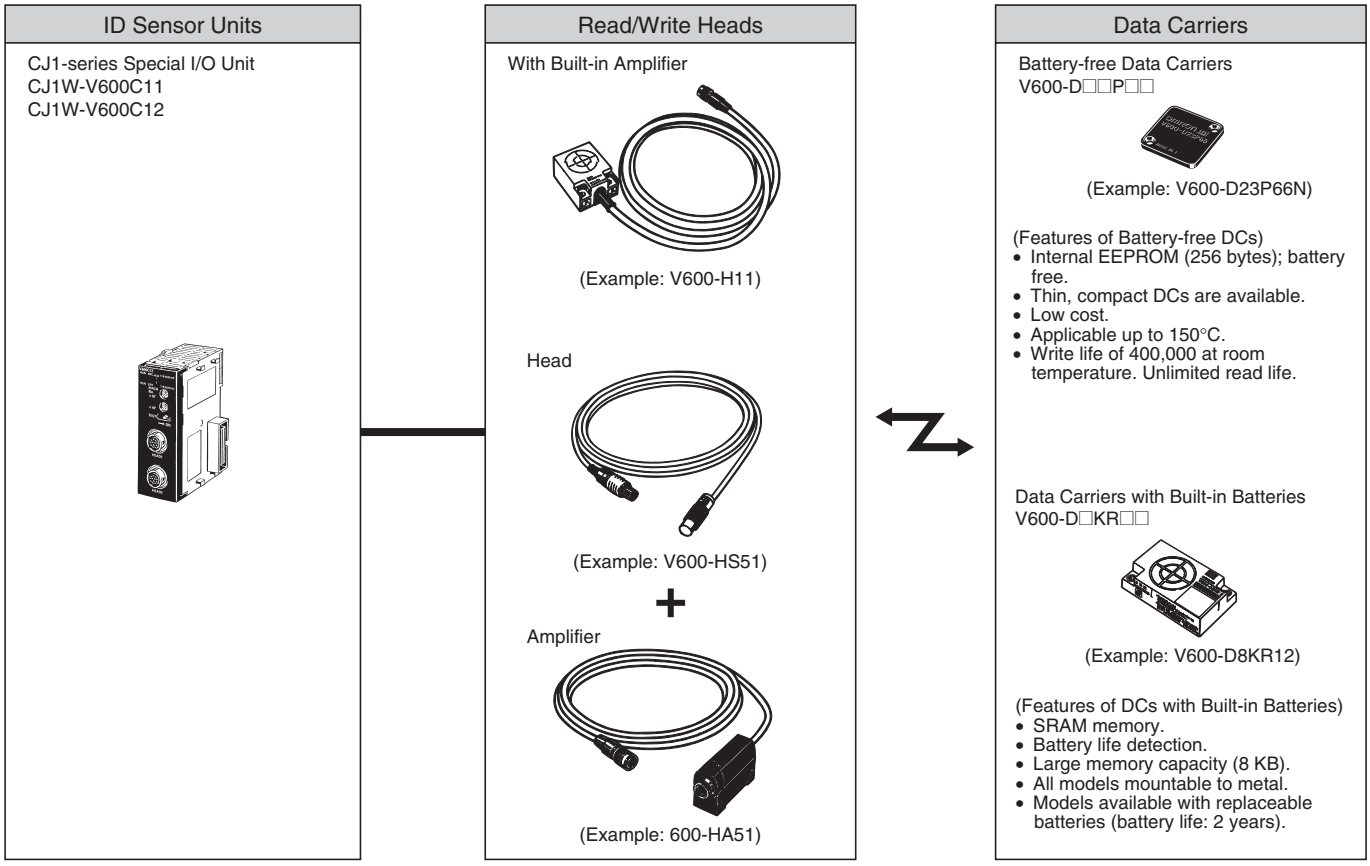
The required information is available when it is required, enabling simple separation of control processes into autonomous modules.

Specifications

<table>
<tr><th>Item</th><th>CJ1W-V600C11</th><th>CJ1W-V600C12</th></tr>
<tr><td>Data transfer speed</td><td colspan="2">160 bytes/scan (between CPU Unit and ID Sensor Unit)</td></tr>
<tr><td>Applicable RFID system</td><td colspan="2">V600 Series</td></tr>
<tr><td>Number of connectable R/W Heads</td><td>1</td><td>2</td></tr>
<tr><td>Commands (The number of bytes that can be specified is given in brackets.)</td><td colspan="2">Read/Write [1 to 2,048]
Data Fill (Clear) [1 to 2,048 or through end address]
Copy (for Double-head Units only) [1 to 2,048]
Calculation Write [1 to 4]
Bit Set/Bit Clear [1 to 4]
Masked Bit Write [2]
Memory Check [2]
No. of Writes Control [2]</td></tr>
<tr><td>Communications processing time (See note.)</td><td colspan="2"><table><tr><th>Command</th><th>Data Carriers with built-in batteries</th><th>Battery-free Data Carriers in time priority mode</th></tr><tr><td>Read</td><td>1.8 × N + 48.4 ms</td><td>1.8 × N + 79.0 ms</td></tr><tr><td>Write with verify</td><td>4.2 × N + 86.5 ms</td><td>7.1 × N + 180.4 ms</td></tr><tr><td>Write without verify</td><td>2.2 × N + 72.8 ms</td><td>4.3 × N + 132 ms</td></tr></table>N = The number of bytes being read or written.</td></tr>
<tr><td>Maintenance features</td><td colspan="2">Communications test, processing results monitor data (communications TAT and error codes)</td></tr>
<tr><td>Error detection</td><td colspan="2">CPU errors, communications errors with Data Carriers, R/W Head power supply check</td></tr>
</table>

Note: Add the data transfer time to the communications processing time for the command processing time.

System Configuration



Note: Refer to the *Auto-Identification Components Group Catalog* (Cat. No. Q132) for details on the V600 Series.

Serial Communications

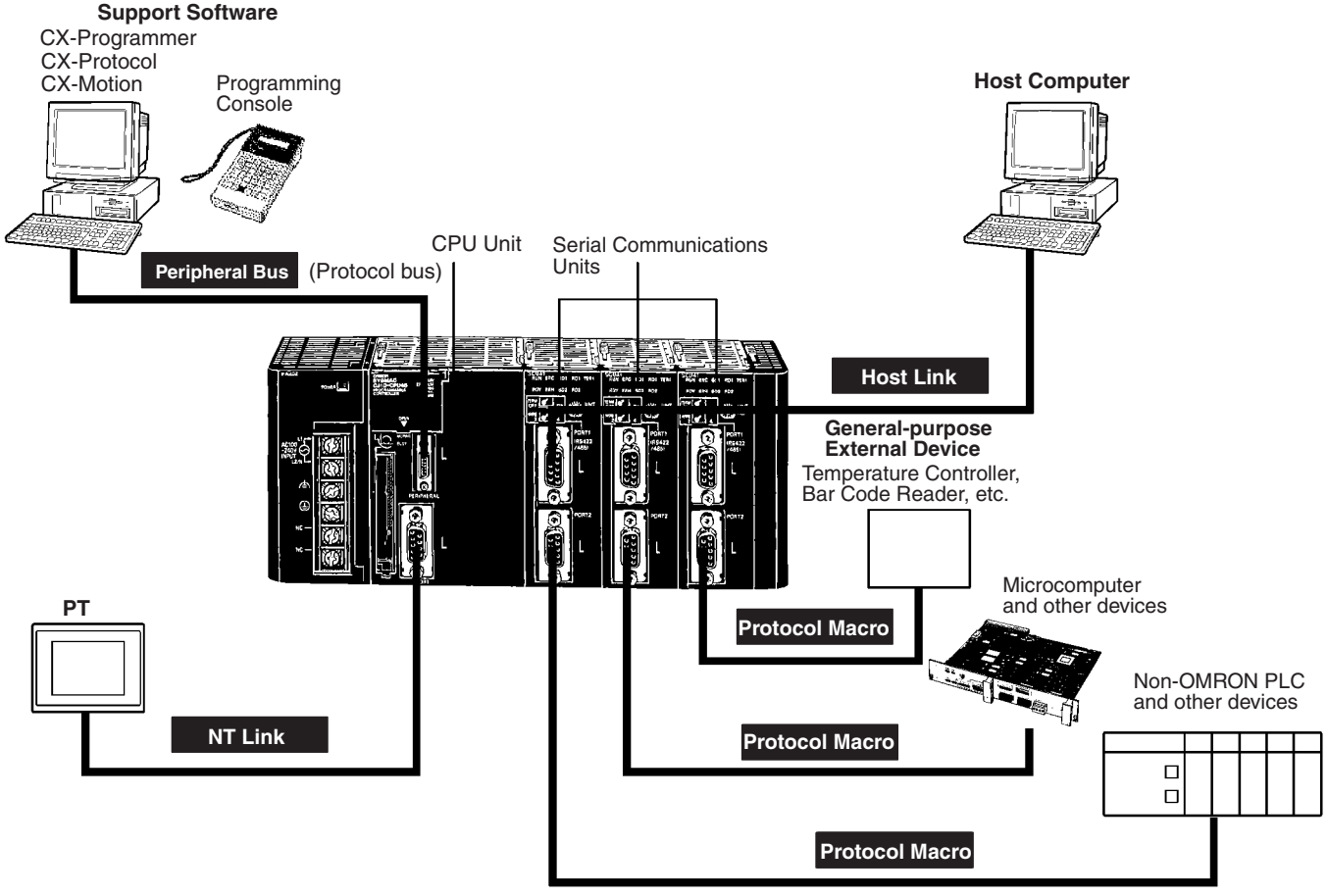
Serial Communications Connections

Unit	Model	Ports	Serial communications mode							
			Protocol macros	Host Link	NT Links	No-protocol	Serial PLC Link	Peripheral bus	Programming Console bus	Serial Gateway (See note 1.) *NEW*
			General-purpose external devices	Host computers	OMRON PTs	General-purpose external devices	CJ1M	Programming Devices	Programming Console	CompoWay/F-compatible models
CPU Units	All models	Port 1: Peripheral	No	Yes	Yes	No	No	Yes	Yes	No
		Port 2: RS-232C				Yes	Yes (CJ1M only)		No	Yes
Serial Communications Units	CJ1W-SCU41-V1	Port 1: RS-422/485	Yes	Yes	Yes	Yes (See note 1.)	No	No	No	Yes (See note 2.)
		Port 2: RS-232C								
	CJ1W-SCU21-V1	Port 1: RS-232C	Yes	Yes	Yes	Yes (See note 1.)	No	No	No	Yes (See note 2.)
		Port 2: RS-232C								

Note: 1. CPU Unit Ver. 3.0 and Serial Communications Unit Ver. 1.2 or later only.

2. Gateway to Host Link FINS is also possible.

Example Serial Communications Configuration



Protocol Macros

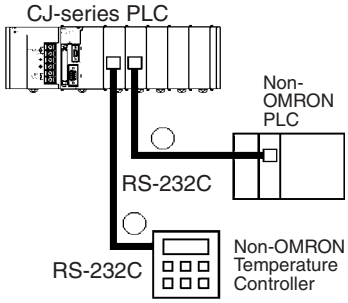
Easily Create Protocols for Data Exchange with External Devices Using One Instruction

■ Function

Data transfer protocol for serial communications vary with the manufacture and with devices. Differences in protocols can make communications between devices by different manufactories very difficult, even when electrical standards are the same.

OMRON's protocol macros solve this problem by enabling easy creation of protocol macros designed to match the protocol of a connected device. Protocol macros will let you communicate with essentially any device with an RS-232C, RS-422, or RS-485 port without having to write a special communications program.

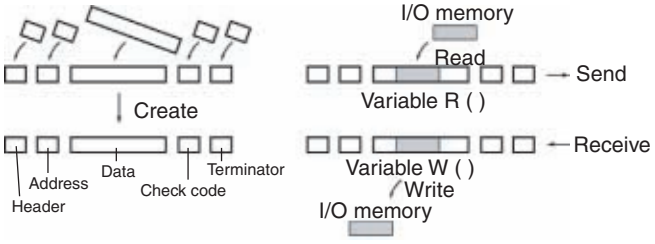
PLCs with Protocol Macros



The Two Main Functions of Protocol Macros

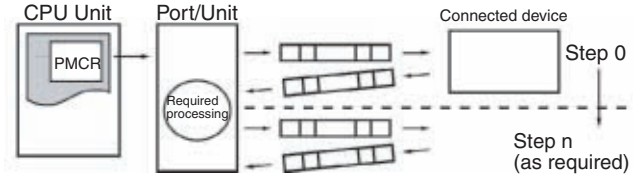
1. Creating Communications Frames

The communications frames can be easily created according to the specifications required by the connected device. Data from I/O memory in the CPU Unit can be easily included as part of a communications frame to read from or write to I/O memory.



2. Creating Frame Send/Receive Procedures

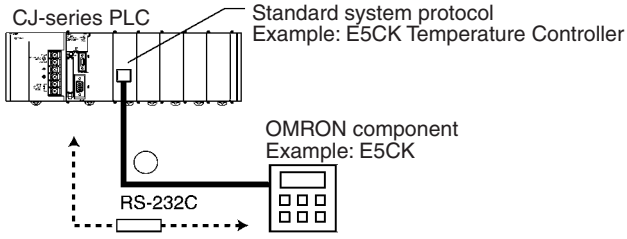
The required processing, including sending and receiving communications frames, can be performed one step at a time according to the results of the previous step, and then CX-Protocol an be used to trace send and receive data.



■ Types of Protocol

Standard System Protocols

Data transfers with OMRON components can be easily performed using standard system protocols. There is no need to develop you own protocols in this case.

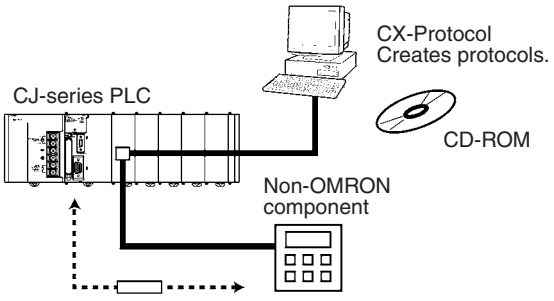


Component		Model
CompoWay/F-compatible components		OMRON CompoWay/F slave components
Digital Controllers and Temperature Controllers	Small Digital Controller with Communications (53 x 53 mm)	E5CK
	Temperature Controllers with Digital Indications (Thermac J with communications) (96 x 96 mm or 48 x 96 mm)	E5□J-A2H0
	Digital Controllers with Communications (96 x 96 mm)	ES100□
	High-density Temperature Controller with communications (8 control points)	E5ZE
Intelligent Signal Processors		K3T□
Bar Code Readers	Laser Scanner type	V500
	CCD type	V520
Laser Micrometer		3Z4L
Visual Inspection Systems	High speed, high precision, low cost	F200
	High-precision inspection/positioning	F300
	Character inspection software/positioning software	F350
ID Controllers	Electromagnetic coupling (for short distances)	V600
	Microwave (for short distances)	V620
Hayes Modem AT Command		---
C-series PLCs (See note.)		PLC with Host Link (C mode) protocol
CS/CJ-series PLCs (See note.) CVM1/CV-series PLCs (See note.)		PLC with Host Link (FINS) protocol
Mitsubishi PLCs (Sequencer CPU Modules) (See note.)		PLC with Computer Link (A-compatible, 1C frame, model 1) slave functions.

Note: Serial Communications Unit Ver. 1.2 or later only.

User-created Protocols

Data transfers with non-OMRON components can be easily created just by defining parameters using the CX-Protocol Windows tool.

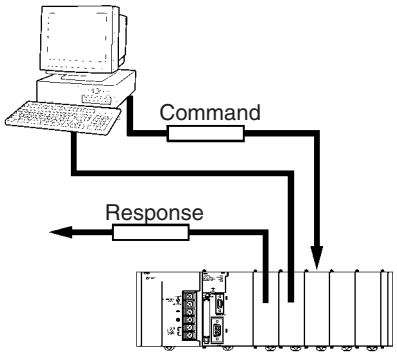


Other Protocols

Host Links

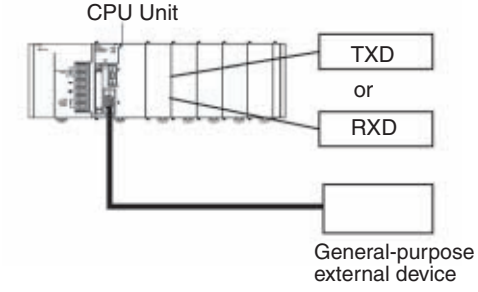
Host Link (C-mode) commands or FINS commands placed within host link headers and terminators can be sent to a host computer to read/write I/O memory, read/control the operating mode, and perform other operations for the PLC.

Unsolicited messages can also be sent from the PLC to the host computer by sending FINS commands from the ladder program using the SEND(090), RECV(098), and CMND(490) instructions.



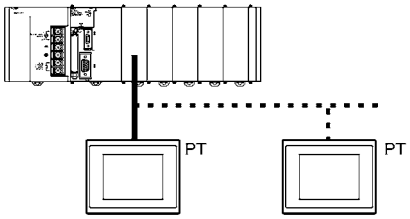
Custom Protocols

I/O instructions for communications ports (TXD/TXDU, RXD/RXDU) can be used for simple data transfers (custom protocols), such as to input data from bar code readers or output data to a printer. Start/end codes can be specified, and RS, CS, and other control signals can be handled.



1:N NT Links with High-speed Links

The PLC can be connected to a Programmable Terminal (PT) via RS-232C or RS422A/485 ports, and I/O memory in the PLC can be allocated to various PT functions, including status control areas, status notifications areas, touch switches, lamps, memory tables, and other objects.



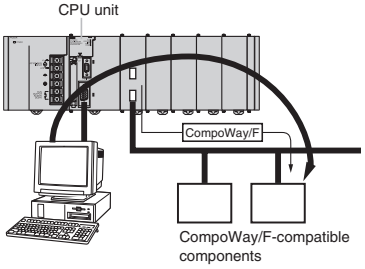
Note: Either one or up to eight PTs can be connected to a PLC in 1:N NT Links.

High-speed NT Links that are three times faster are possible with the NS Series and version 2 of the NT631 and NT31 Series. This speed is particularly important when connecting to more than one PT.

Serial Gateway Function *NEW*

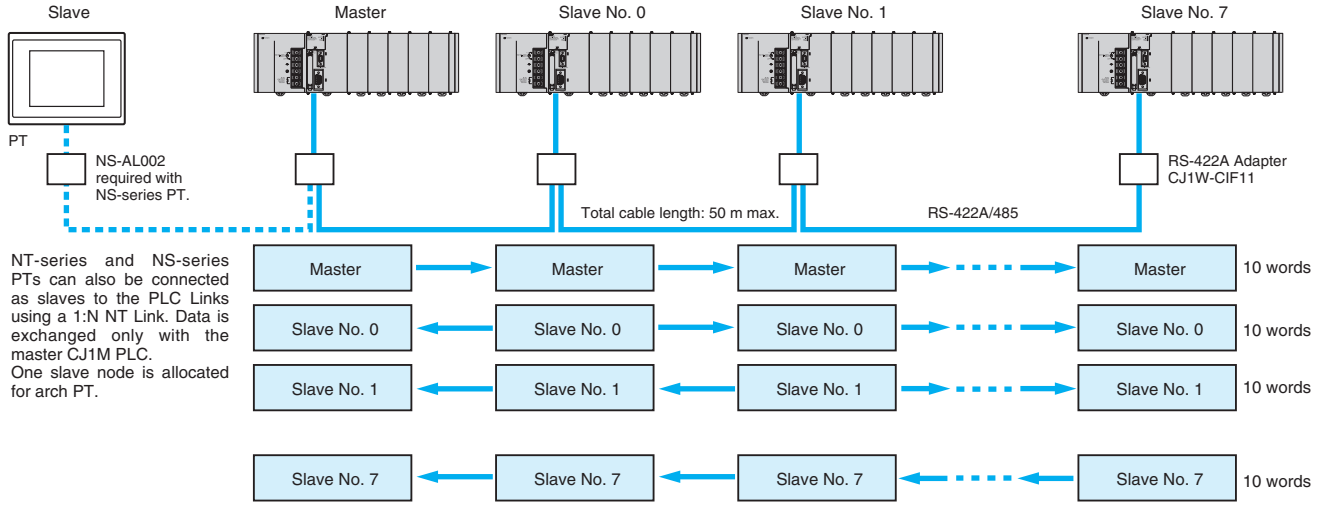
(CPU Unit Ver. 3.0 or later, Serial Communications Unit Ver. 1.2 or later only)

When a FINS command containing a CompoWay/F command is received via network or serial communications, the command is automatically converted to a protocol suitable for the message and forwarded using serial communications. This enables access to CompoWay/F-compatible components from a personal computer, PT, or PLC via a network.



Serial PLC Links (CJ1M CPU Unit's Built-in RS-232C Port)

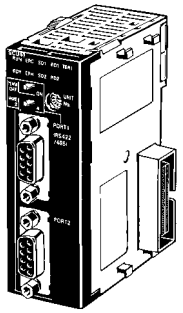
Allows many applications to be easily achieved, such as exclusive control between PCB loaders and unloaders and temperature information and time management between conveyor ovens. Up to 9 CJ1M CPU Units can be connected, with up to 10 words of data between them managed by the built-in RS-232C port. The RS-232C can be converted to RS-422A simply by using a CJ1W-CIF11 RS-422A Conversion Adapter.



Serial Communications Unit
CJ1W-SCU

Support Protocol Macros, Host Link Communications, 1:N NT Links, Serial Gateway, and No-protocol Mode

- Mount up to 16 Units (including all other CPU Bus Units) on CPU or Expansion Racks. Ideal for systems that required many serial ports.



CJ1W-SCU41-V1 *NEW*
CJ1W-SCU21-V1 *NEW*

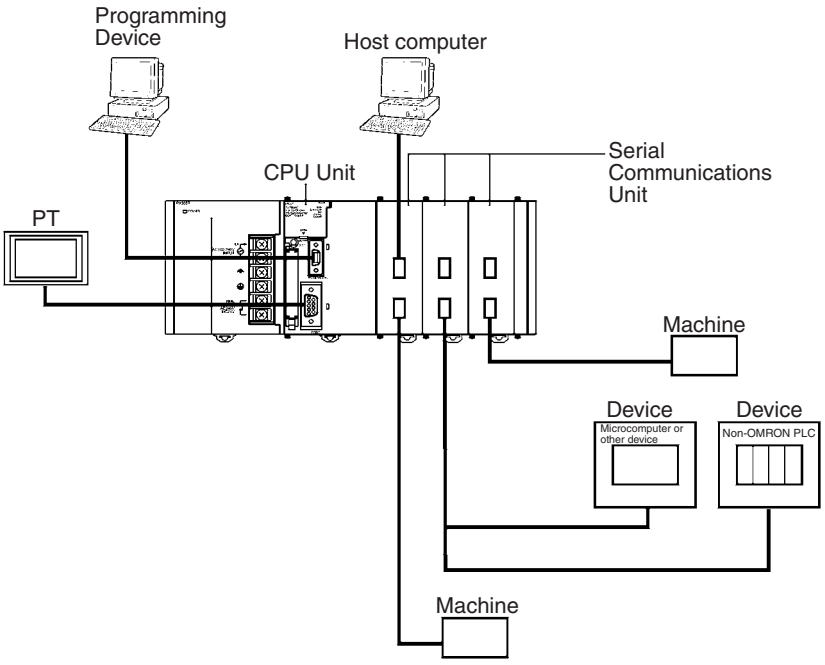
Function

Either an Inner Board or CPU Bus Unit can be used to increase the number of serial ports (RS-232C or RS-422A/485) two at a time. Specify Protocol Macros, Host Link Communications, 1:N NT Links, Serial Gateway (see note), or no-protocol communications (see note) separately for each port. With the CJ Series, you can easily provide the right number of serial ports for your system.

Note: Supported by Serial Communications Units with unit version 1.2 or later.

System Configuration

An RS-232C port can be converted to RS-422A/RS-485 using a CJ1W-CIF11 RS-422A Adapter.



Specifications

■ Serial Communications Units

Unit	Classification	Serial communications modes	Serial	Unit numbers	Model
Serial Communications Unit	CPU Bus Unit	Set separately for each port: Protocol Macro, Host Link, 1:N NT Links, Serial Gateway, or no-protocol communications	RS-232C x 1 RS-422A/485 x 1	0 to F	CJ1W-SCU41-V1
			RS-232C x 2		CJ1W-SCU21-V1

■ CX-Protocol

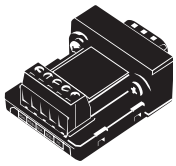
Product	Specifications	Model
CX-Protocol	Windows-based Protocol Creation Software for Windows 95, 98, Me, NT4.0, 2000, or XP	WS02-PSTC1-E

Note: Version 1.2 or higher is required for the CJ1G or CJ1H and version 1.3 or higher is required for the CJ1M.

RS-422A Adapter
CJ1W-CIF11

Converts RS-232C to RS-422A/RS-485

- Use to convert RS-232C to RS-422A/RS-485.
- Simply connect this Adapter to the built-in RS-232C port or an RS-232C connector on a Serial Communications Unit (D-sub, 9-pin) to convert to RS-422A/RS-485).



CJ1W-CIF11

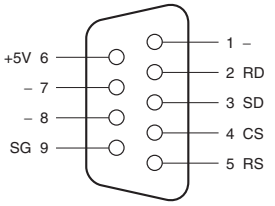
Specifications

Item	Specifications	
Dimensions	18.2 × 34.0 × 38.8 mm (W × H × D)	
Weight	20 g max.	
Rated power supply voltage	+5 V	Supplied from pin 6 on the RS-232C connector.
Current consumption	40 mA max.	
Isolation	No isolation	
Transmission distance	50 m	

Interface

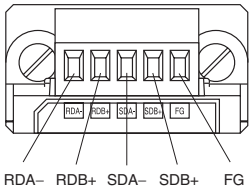
■ RS-232C Connector

RS-232C Port Connector Pin Arrangement



Pin	Signal
1	NC
2	RD
3	SD
4	CS
5	RS
6	+5V
7, 8	NC
9	SG
Hood	FG

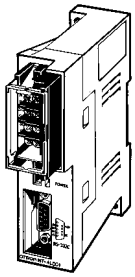
■ RS-422A/485 Terminal Block



Signal
RDA–
RDB+
SDA–
SDB
FG

RS-232C/RS-422A Adapter Unit
NT-AL001

- Long-distance transmissions are possible through an RS-422A interface. By converting from RS-232C to RS-422A and then back to RS-232C, a transmission distance of up to 500 m can be achieved.
- No power supply is required. If the 5-V terminal (150 mA max.) is connected from the RS-232C device, a separate power supply is not required to drive the Adapter Unit.
- Duct wiring can be used. The removable terminal block enables wiring not possible with D-sub connectors. (The RS-232C interface is 9-pin D-sub.)



NT-AL001

Function

The NT-AL001 is used to connect a PT or other device with an RS-232C terminal to a device with an RS-422A terminal.

Communications Specifications

■ General Specifications

Item	Specification
Rated power supply voltage	+5 V ±10% (Use pin 6 on the RS-232C connector.)
Rated current consumption	150 mA max.
Rush current	0.8 A max.
Weight	200 g max.

■ RS-232C Interface

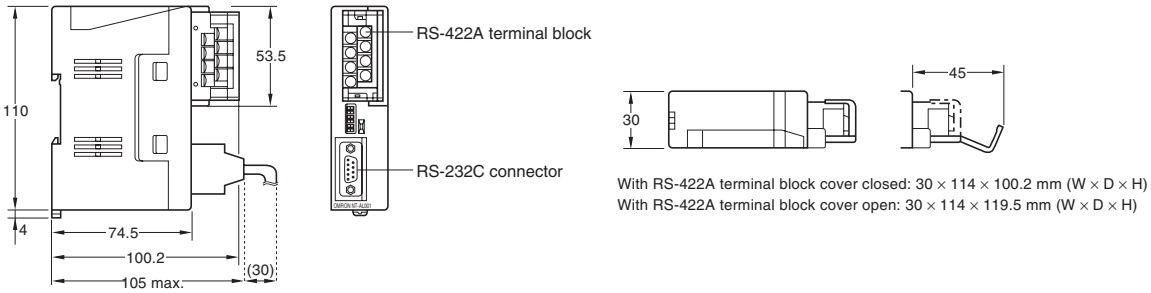
Item	Specification
Baud rate	64 Kbps max.
Transmission distance	2 m max.
Connector	9-pin, D-sub connector (female)

■ RS-422A Interface

Item	Specification
Baud rate	64 Kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminal block	8 terminals, M3.0; detachable

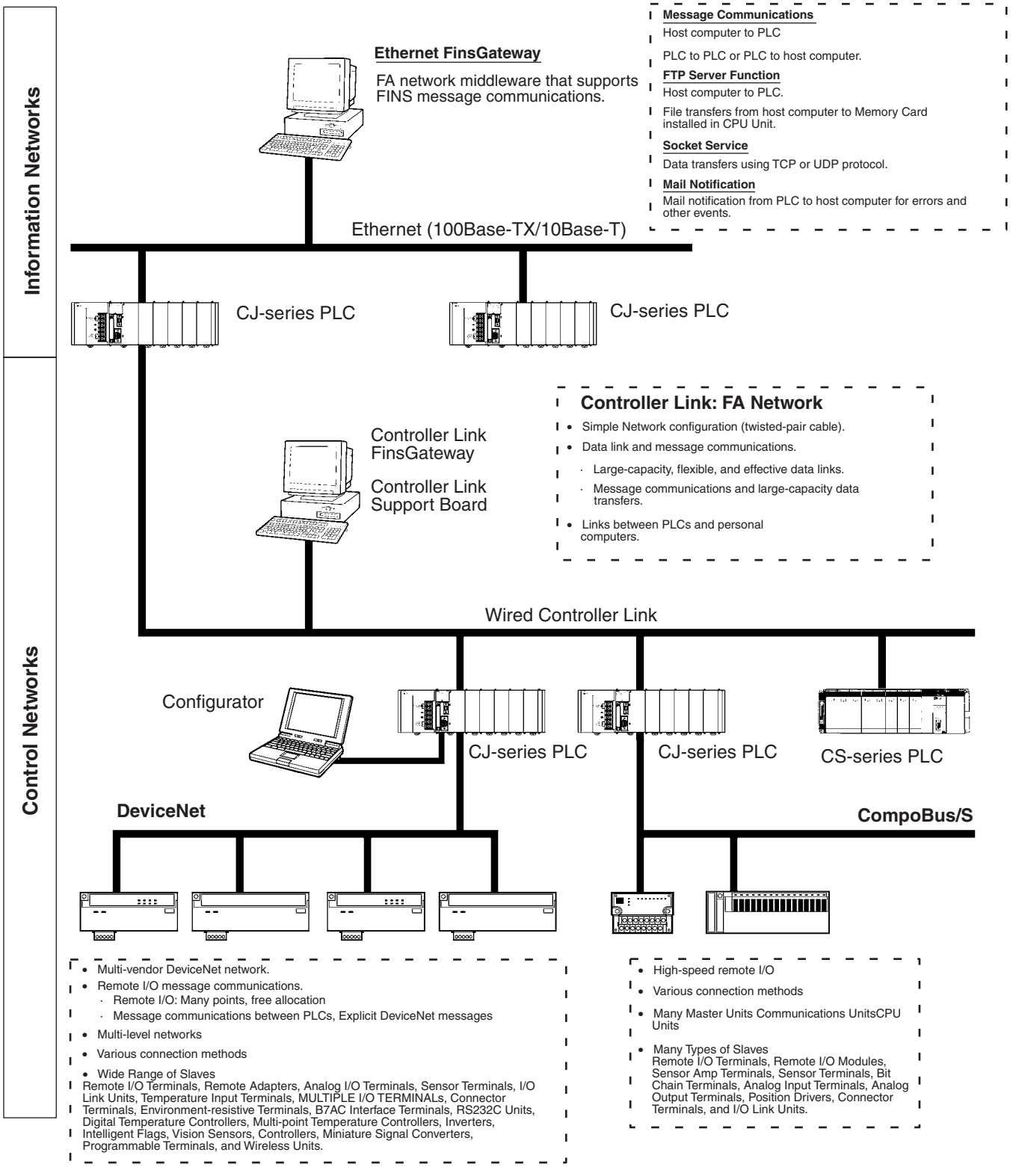
Dimensions

Note: Units are in mm unless specified otherwise.



With RS-422A terminal block cover closed: 30 × 114 × 100.2 mm (W × D × H)
With RS-422A terminal block cover open: 30 × 114 × 119.5 mm (W × D × H)

Communications Networks

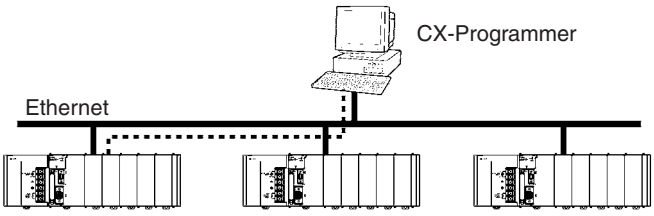


■ Ethernet: Information Network

Use an Ethernet Network to organically link production management with the production site using various communications services.

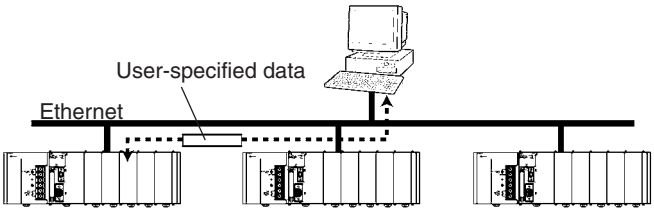
Remote Programming and Monitoring

CX-Programmer running on a computer connected to the Ethernet Network can be used to program and monitoring all the PLCs connected to the Ethernet Network.



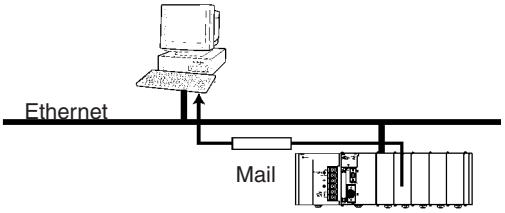
Socket Service

Transfer data using either UDP or TCP protocol.



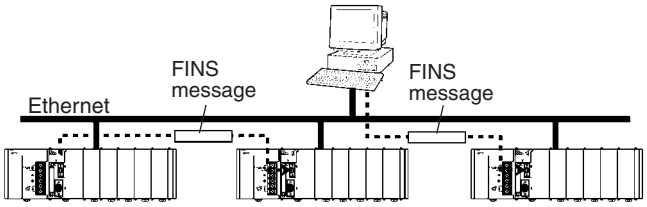
Mail Service

Send electronic mail from the PLC to a host computer when a flag turns ON, when an error occurs, or at scheduled times.



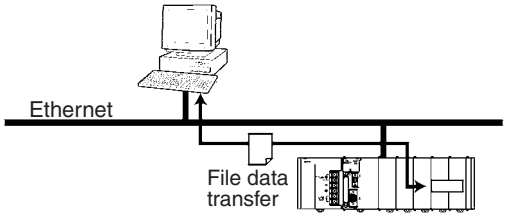
FINS Message Service

Send FINS message between PLCs or between PLCs and host computers. The Ethernet FinsGateway can be used to handle messages from applications without having to program FINS commands directly.



FTP Service

Use the FTP to transfer files between Memory Cards in the CPU Unit and computer memory.



■ Controller Link: Control Network

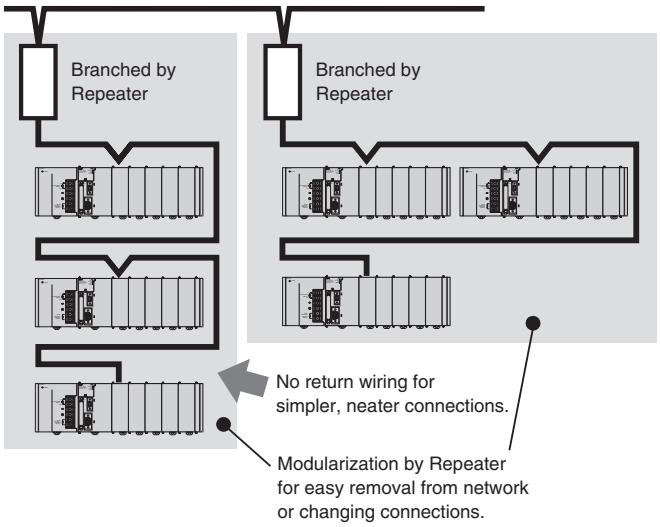
Controller Link can easily connect PLCs at the factory site in a fully functional FA network.

Easy Network Construction with Twisted-pair Cables

Repeater Units Enable T-branch Wiring, Extension, Expansion, or Optical Sections in Networks

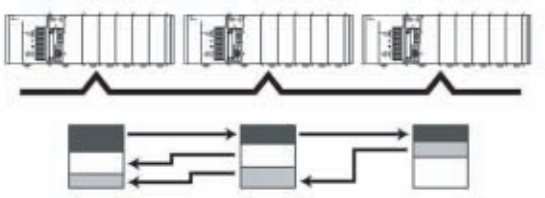
More Flexibility in Wiring for Layout, Construction, and Expansion Using T-branches

Repeater Units can be used for branching, making complicated wiring paths unnecessary. This method reduces wiring labor, and modularization of equipment into Repeater Units.



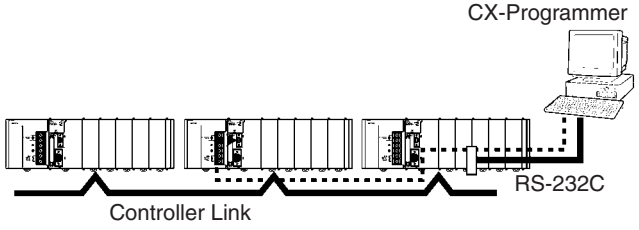
Data Links

Efficient, large-capacity data links can be flexibly created between PLCs and between PLCs and host computers. The Controller Link FinsGateway can be used to handle data links from applications without having to program FINS commands directly.



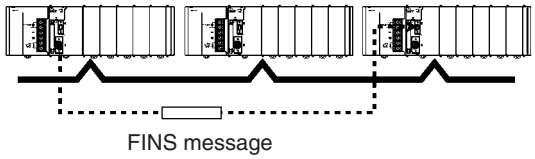
Remote Programming and Monitoring

CX-Programmer connected via RS-232C can be used to program and monitor PLCs on the Controller Link Network.



FINS Message Communications

Large volumes of data can be transferred between PLCs and host computers whenever necessary. The Controller LInk FinsGateway can be used to handle messages from applications without having to program FINS commands directly.

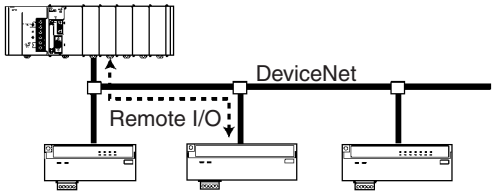


■ DeviceNet: Component Network

Create a multi-vendor network for multibit communications for lower-level PLCs that need to handle both control signals and data.

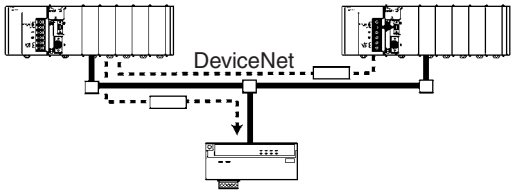
Remote I/O Communications

Large-capacity remote I/O can be freely allocated according to application needs.



Message Communications

Send FINS messages between OMRON PLCs and Explicit message between OMRON PLCs and devices from other makers.



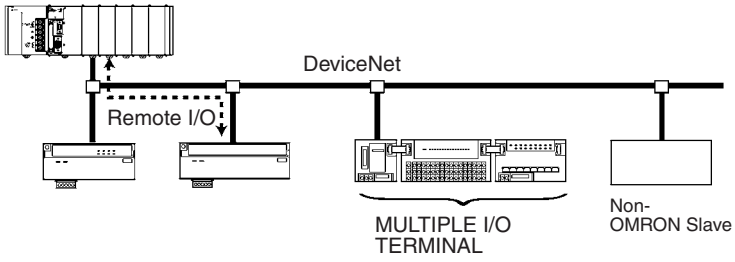
Select from a Wide Range of Slaves (Connection Possible to Data-intensive Devices)

Connect contact I/O, analog I/O, temperature inputs, sensor (photoelectric or proximity) inputs, and small PLCs (e.g., CQM1).

Use MULTIPLE I/O TERMINALs as DeviceNet Slaves

I/O can be expanded through one-step connections. Special I/O and explicit messages are also supported.

Connect to DeviceNet Products from Other Manufacturers

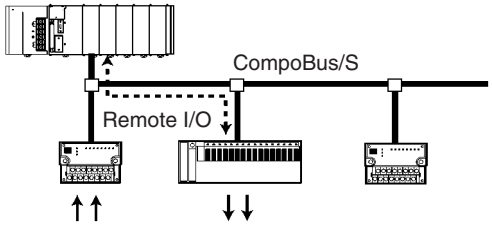


■ CompoBus/S: High-speed ON/OFF Bus

Construct a high-speed remote I/O system under the PLC to reduce wiring for sensors and actuators inside machines.

High-speed Remote Communications at 1 ms or Less

In the High-speed Communication Mode, you can link up to 32 slaves (up to 128 input and 128 output points) with a high-speed communications cycle of 1 ms or less (0.5 ms with up to 16 slaves, 64 input and 64 output points).



High-speed and Long-distance Communications Modes

A switch enables switching between the previous High-speed and a new Long-distance Communications Mode.

- High-speed Mode: 100-m communications distance at 750 Kbits/s (with 2-conductor VCTF cable)
- Long-distance Mode: 500-m communications distance at 93.75 kbits/s (with 2-conductor VCTF cable)

Reduced Wiring with Special Cables

Connect with special Flat Cables or VCTF Cables.

A Slave for Essential Any Application

Contact I/O, Contact I/O Modules, Photoelectric/Proximity Sensor Input Slaves are provided along with Analog Input and Analog Output Slaves.

No-restriction Branching in Long-distance Communications Mode

With special Flat Cables or 4-conductor VCTF Cables, you can branch and wire in any required structure for up to a total distance of 200 m.

Overview of Network Communications

Level	Network	Functions	Communications	Unit/Board
Information networks	Ethernet	Host computer to PLC	FINS messages	Ethernet Unit
		PLC to PLC		
		Host computer to CPU Unit memory card	FTP server	
		UNIX computer or other socket service to PLC	Socket services	
	Controller Link	Computers connected directly to network and PLC	FINS messages	Controller Link Support Board and Unit
			Data links (offsets and automatic setting)	
Control networks	Controller Link	PLC to PLC	FINS messages	Controller Link Unit
			Data links (offsets and automatic setting)	
	DeviceNet		FINS messages on open network	DeviceNet Unit and Configurator
	DeviceNet	PLC to components (slaves)	HIgh-capacity remote I/O on open network (fixed or user allocations)	DeviceNet Unit and Configurator
	CompoBus/S		High-speed remote I/O (fixed allocation) on OMRON network.	CompoBus/S Master Unit

Communications Specifications

Network	Ethernet	Controller Link	DeviceNet	CompoBus/S
Messages	Yes	Yes	Yes	---
Data links	---	Yes	---	---
Remote I/O	---	---	Yes	Yes
Maximum speed	10 Mbps	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	500 Kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	750 Kbps (See note 3.) Comm cycle: Approx. 1 ms (128 inputs and 128 outputs)
Total distance	2.5 km	Twisted-pair cable: 1 km (See note 1.) Optical cable: 20 km	500 m (See note 2.)	Trunk line: 500 m (See note 4.) Communications cycle: 6 ms max.
Maximum nodes	100	32/62	63	32
Communications media	Twisted-pair cable	Special twisted-pair cable or optical cable	DeviceNet cable	2-conductor VCTF cable 4-conductor VCTF cable Special flat cable (See note 5.)
Network data link capacity	---	32,000 or 62,000 words	---	---
Remote I/O capacity	---	---	32,000 pts (with Configurator) 16,000 pts (without Configurator)	256 pts
Supporting PLCs	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE, CQM1H	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE, CQM1H (with I/O Link), CPM2C (with I/O Link)	CJ Series, CS Series, C200HX/HG/HE, CQM1H, CPM2C-S1□0C(-DRT), SMR1, CPM1A (with I/O Link), CPM2C (with I/O Link)

Note: 1. For the baud rate of 500 kbps.

2. For the baud rate of 125 kbps.

3. For the high-speed communications mode (trunk length: 100 m) (30 m max. when using 4-conductor VCTF cable or special flat cable)

4. For the long-distance communications mode (Total wiring length is 200 m when using the 4-conductor VCTF cable or special flat cable.)

5. Different cables cannot be used together.

Ethernet Unit (100Base-TX)
CJ1W-ETN21

Immediate Remote Access to PLCs Via Ethernet

Improved FINS Message Communications

- Conforms to TCP/IP.
- Increased number of nodes. (Previously 126 nodes max. increased to 254 nodes max.)
- Communications are still possible even if IP address of host computer changes.
- Multiple FINS applications can be connected online in the personal computer.
- FINS message communications response is up to four times faster than previous models.

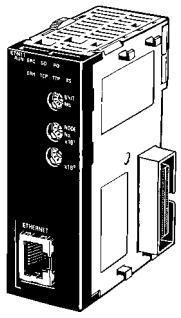
Improved Mail

- Mail can be sent containing commands to the PLC (e.g., mail can be used to read I/O memory in the CPU Unit and send commands to backup memory).
- Files can sent as mail attachments (a data file can be automatically generated and sent as an attachment when specified conditions are met).
- More advanced mail send conditions (e.g., sending mail when values in the CPU Unit's I/O memory change to specified values)

Specify Host Name for Server (DNS Client Function)

Automatically Adjusted Built-in Clock (SNTP Client Function)

FTP Server Function, and Socket Services Are Also Supported (Same as Previous 10-Mbps Ethernet Unit)

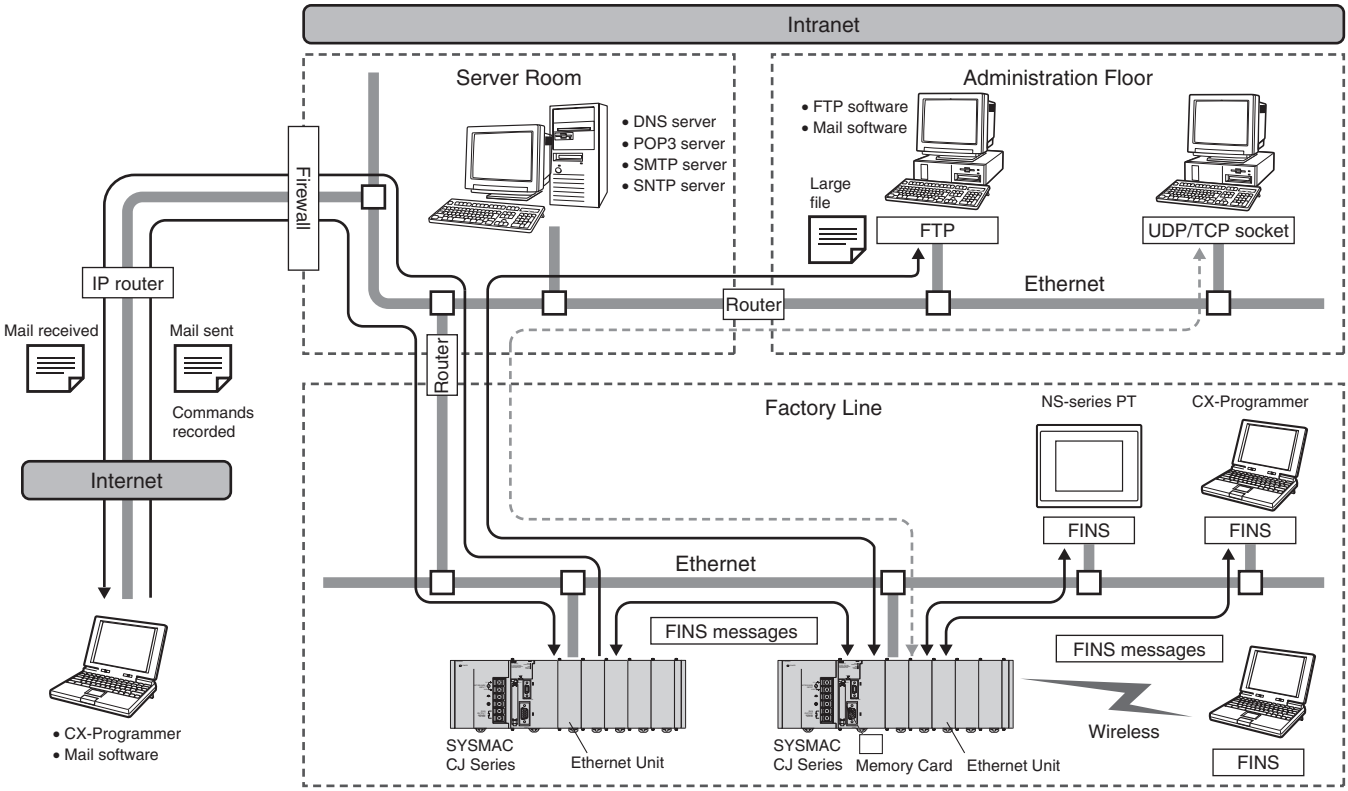


CJ1W-ETN21
100Base-T Ethernet Unit

Function

The same functionality and application interfaces as previous CJ1W-ETN11 Ethernet Units are provided, while using 100Base-TX as the transmission media. Robust FINS communications enable Ethernet connections using the Intranet. Mail functions have been improved to enable PLC remote access via the Internet.

System Configuration

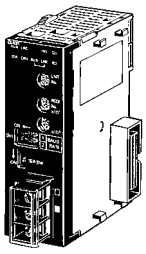


Specifications

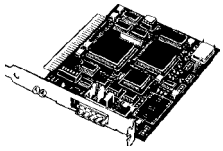
Unit name	Type	Communications service	Connector	Model number
Ethernet Unit (100Base-TX)	CJ1 CPU Bus Unit	FINS communications service (TCP/IP, UDP/IP), FTP server functions, socket services, mail transmission service, mail receive, automatically adjusted PLC built-in clock (remote command receive), server/host name specification.	100Base-TX (10Base-T)	CJ1W-ETN21

Controller Link Units/Support Boards, and Repeater Units
CJ1W-CLK21-V1, 3G8F7-CLK21-EV1, CS1W-RPT0□

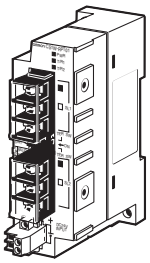
Simpler Controller Link Wiring, Startup, and Construction Provides Larger-capacity Data Links, Greater Flexibility in Area Control, and Supports Multiple Sub-networks



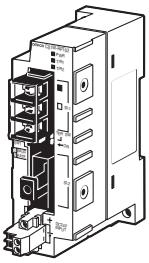
CJ1W-CLK21-V1
Wired Controller Link Unit



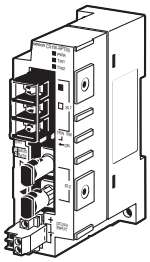
3G8F7-CLK21-EV1
Wired Controller Link Support Board for PCI Bus



CS1W-RPT01
Repeater Unit for Twisted-pair Cable



CS1W-RPT02
Repeater Unit for Optical Ring (H-PCF Cable)



CS1W-RPT03
Repeater Unit for Optical Ring (GI Quartz Cable)

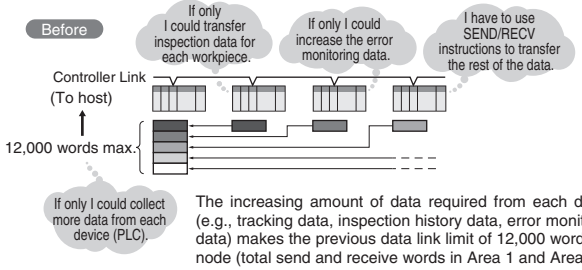
Function

The data link capacity is 20,000 words per node. Allocate both Data Link Area 1 and Area 2 in the same area. Connect up to 8 Units under a single CPU Unit. (Unit Ver. 1.2 only)

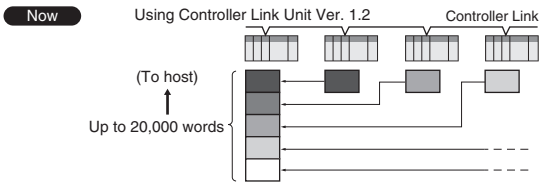
Using Wired Controller Link Units together with Repeater Units allows network configurations for essentially any application, including T-branching, long-distance applications, applications with up to 62 nodes, or applications with optical sections in a wired network. Models are also available that enable changes in configurations and automatic 1:N communications while data links are active.

Huge increase in amount of data that can be collected from devices.

Number of data link send/receive words (total of Area 1 and Area 2) for a single Controller Link Unit increased from 12,000 to 20,000 words.



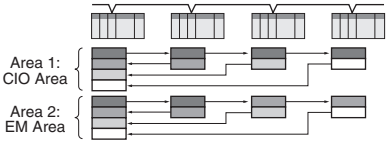
The increasing amount of data required from each device (e.g., tracking data, inspection history data, error monitoring data) makes the previous data link limit of 12,000 words per node (total send and receive words in Area 1 and Area 2 for manually set data links) insufficient for many applications.



New CS/CJ-series Controller Link Units (Wired/Optical Ring) can handle up to 20,000 send/receive data link words (total of Area 1 and Area 2) for a single node. This enables more data to be collected from each device.

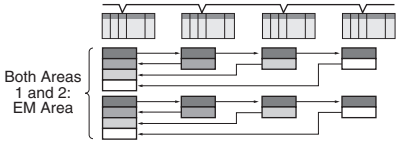
The same Memory Area can be used for the Data Link Areas. For example, Data Link Areas 1 and 2 can be both allocated and managed in EM Bank 0.

Before



Area 1 and Area 2 had to be allocated in separate Memory Areas for user-set data links. Therefore, allocating all data links in the EM Area was not possible.

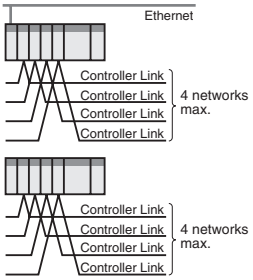
Now



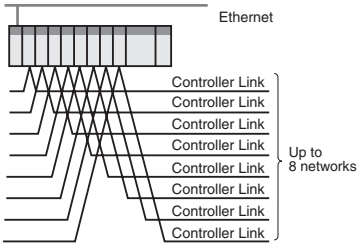
New CS/CJ-series Controller Link Units (Wired/Optical Ring Units) enable both Areas 1 and 2 to be allocated in the same Memory Area when using user-set data links. Provided addresses do not overlap, the same Memory Area can be used, making area control easier.

Control up to 8 Controller Link sub-networks as a group from the host network.

Previous Units supported connection of up to four Controller Link Units to a single CPU Unit. Creating a gateway to the host network to control the Controller Links as a group of sub-networks required dividing the Units between two PLCs with a maximum of four networks for a single PLC.



New CS/CJ-series Controller Link Units (Wired/Optical Ring) enable connection of up to 8 Controller Link Units for each CPU Unit. This enables easy centralized control of a group of Controller Link sub-networks from the one PLC.

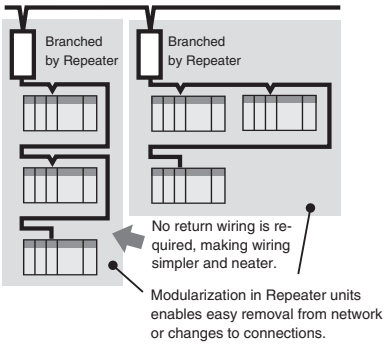


System Configuration

Use Repeater Units for T-branch Wiring, Extension, Expansion, and Optical Sections

T-branching Enables More Flexible Wiring Solutions for Layout, Building, and Expansion of Networks

Repeaters can be used for branching, so long lines are not required. As a result, wiring labor is reduced, and modularization is achieved in Repeater units.



Wired Types Support Long-distance Extension

The total extended length that was previously 500 m at 2 Mbps can be extended to up to 1.5 km by using two Repeater Units.

Connect up to 64 Nodes Using Wired Types

Networks can be constructed with up to 62 nodes when Controller Link Units/Support Boards with -V1 suffix are combined with Repeater Units.

Wiring with Optical Cables Increases Noise Immunity

Using two Repeater Units for optical ring enables wiring with optical cables in parts of the network subject to noise.

Simpler, More Flexible Data Links

Change Data Link Tables While Data Links Are Active

- When data link tables are changed due to additional nodes or other networking changes, data link tables can be transferred without stopping any data link communications.
- Flexible system configurations can be changed by combining node expansion using Repeater Units.

Specifications

Unit/Board	Classification	Compatible PLC	Media	Model	Connections
Controller Link Units	CPU Bus Unit	CJ Series	Wired	CJ1W-CLK21-V1	Can be mounted to previous Controller Link Units/ Support Boards.
Controller Link Support Boards	Personal computer board (for PCI bus)	---		3G8F7-CLK21-EV1	
Controller Link Repeater Units	---	Not mounted to PLC	Twisted-pair cable	CS1W-RPT01	Unit mounted independently using either DIN Track or screws.
			Optical ring (H-PCF cable)	CS1W-RPT02	
			Optical ring (GI cable)	CS1W-RPT03	

Main Specifications Related to Version Upgrade for Unit Ver. 1.2

Item		Unit Ver. 1.2 or later	Pre-Ver. 1.2
Number of data link words		Number of send/receive words per Unit Total of Area 1 and Area 2: 20,000 words max.	Number of send/receive words per Unit Total of Area 1 and Area 2: 12,000 words max.
		Number of send words per Unit Total of Area 1 and Area 2: 1,000 words max.	
Data Link Area allocations	User-set allocations	Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area	
		Both Area 1 and Area 2 can be allocated in the same area (provided there is no address duplication).	Both Area 1 and Area 2 cannot be allocated in the same area.
	Automatically set equal allocations	Area 1: CIO Area (including data link words), Area 2: DM Area and EM Area	
	Automatically set 1:N allocations	Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area	
Maximum number of Controller Link Units connected to a single CPU Unit		8 Units max.	4 Units max.

Note: CX-Programmer Ver. 5.0 or higher is required to set a data link area with a maximum number of send and receive words of 20,000 words per Controller Unit, or to allocate the same area for Area 1 and Area 2.

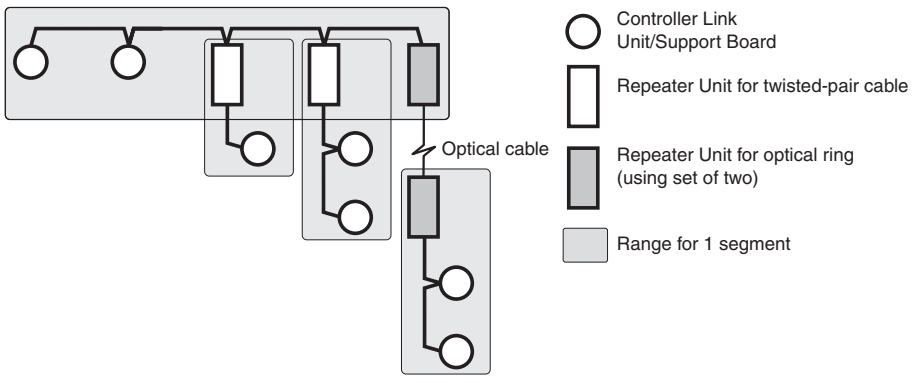
Specifications for Networks Using Repeaters

Item	Segment (See note 1.)	Total network
Transmission path configuration	Multi-drop	Tree (using Repeaters to connect each segment)
Baud rate/maximum transmission distance (See note 2.)	2 Mbps: 500 m 1 Mbps: 800 m 500 kbps: 1 km	2 Mbps: 1.5 km 1 Mbps: 2.4 km 500 kbps: 3.0 km
Maximum number of nodes	Controller Link Unit + Repeater Unit Total number of nodes: 32	Controller Link Unit: 62 nodes (using a Controller Link Unit that supports 62 nodes)
Maximum number of Repeater levels (See note 3.)	---	2 levels

Note: 1. Specifications for each segment are the same as for Wired Controller Link networks.

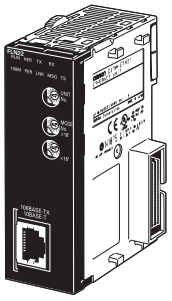
2. Maximum transmission distance: Total wired cable length between the two nodes separated by the longest total wired cable length.

3. Maximum number of Repeater levels: Maximum number of Repeaters in a path linking any two nodes. For optical ring types, one set of two Units comprises one level.



FL-net Unit
CJ1W-FLN22

100Base-TX-compatible CJ-series FL-net Unit Easily Enables High-speed Communications with Multi-vendor Controllers



CJ1W-FLN22 NEW

Functions as Interface with Various Networks

The CJ Series is compatible with upper-layer Ethernet, OMRON's PLC Controller Link communications protocol, and DeviceNet fieldbus systems, enabling interfacing with each of these networks.

Supports Baud Rate of 100 Mbps

A baud rate of 100 Mbps is supported. The baud rate can be automatically selected or a fixed baud rate of 10 Mbps can be set.

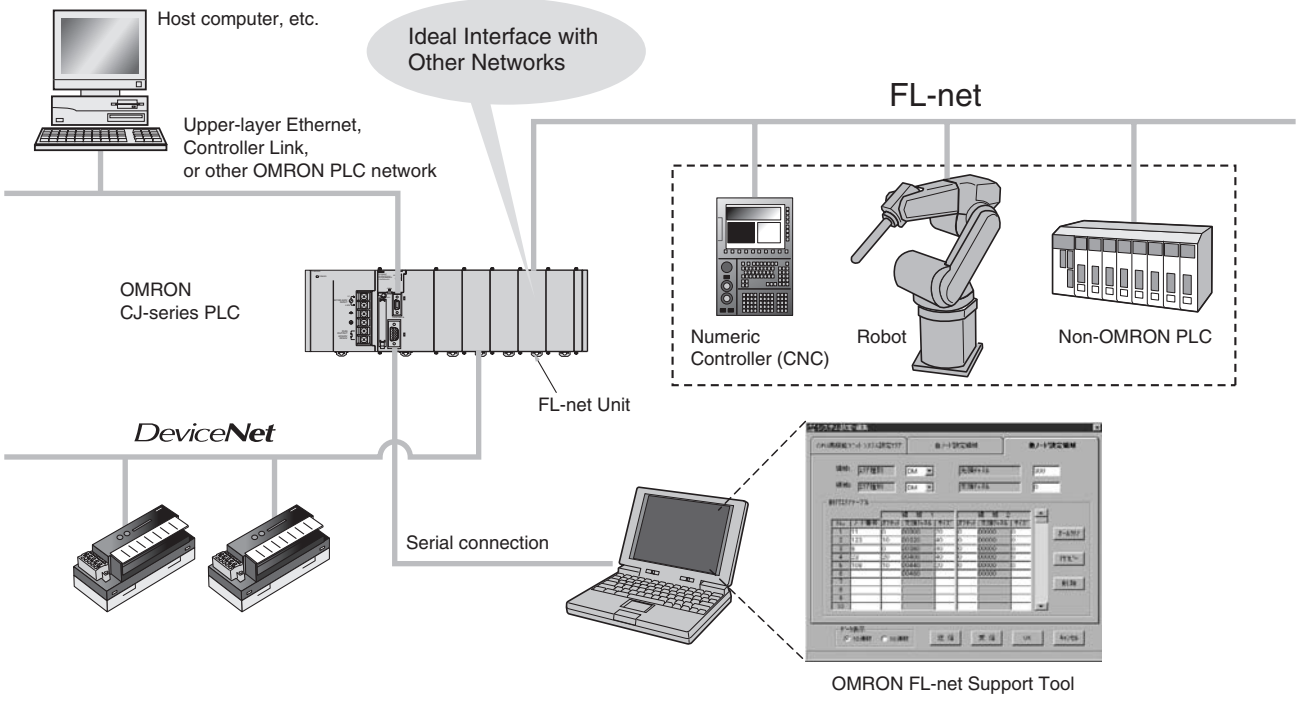
Specify the Order of Data Link Data

The order of link data bytes can be specified for each node according to the needs of the connected device, eliminating the need for upper/lower byte conversion processing in the ladder program.

Supports Simple Backup Function

The setting data (such as the FA Link table) stored in the FL-net Unit can be backed up to the Memory Card in the CPU Unit, making Unit replacement easy.

System Configuration



What is FL-net?

FL-net is an open FA network that was standardized by the Special Committee for Network Promotion organized by the Japan Electrical Manufacturer's Association (JEMA). FL-net is based on Ethernet and enables interconnection of programmable controllers (PLCs) and other FA devices by different manufacturers. FL-net has the following features.

Ethernet-based FA network.

- Defines a new Ethernet-based FA Link protocol.
- Uses Ethernet's standard UDP/IP communications protocol.
- Cables, hubs, and other networking components are readily available.

Supports cyclic and message transmissions.

- Interlocks between devices, production instructions, and production results collection can all be implemented on the same network.

Uses token passing without a master.

- Prevents data collision and ensures transmission within a fixed period of time.
- Nodes can be automatically added to or removed from the network.
- Communications are maintained between all nodes that are capable of communicating even if a power interruption occurs, or a fault occurs in network devices or cables.

Specifications

■ FL-net Unit

Item \ Model / Type		CJ1W-FLN22	
		100Base-TX	10Base-T
Applicable PLCs		CJ-series PLCs	
Unit classification		CPU Bus Unit	
Mounting location		CPU Rack or Expansion Rack	
Number of Units that can be mounted		4 max. (including Expansion Racks)	
Transfer specifications	**Media access method**	CSMA/CD	
	Modulation	Baseband	
	Transmission paths	Star	
	Baud rate	100 Mbps	10 Mbps
	Transmission media	Unshielded twisted-pair (UTP) cable Categories: 5, 5e Shielded twisted-pair (UTP) cable Categories: 100 Ω at 5, 5e	Unshielded twisted-pair (UTP) cable Categories: 3, 4, 5, 5e Shielded twisted-pair (UTP) cable Categories: 100 Ω at 3, 4, 5, 5e,
	Transmission distance	100 m (distance between hub and node)	
	Number of cascade connections	2	4
Communications	**Cyclic transmission**	• Data link capacity: 8 KB max (512 words) + 8,192 words • Maximum size per node: 8 KB max (512 words) + 8,192 words (**Note:** Earlier CJ1W-FLN01/02/12 versions were restricted to a maximum of 7,677 words.) • Maximum number of data links: 128 • The byte order for data transfer between the Common Memory and CPU Unit's Data Link Area can be selected for each node, according to the needs of the data link-compatible device.	
	Message communications	Supported messages (client function): Read word block, write word block, send transparent message frame (send/read), vendor message (FINS message) Supported instructions: SEND(090)/RECV(098)/CMND(490) (executes sends between OMRON PLCs) or CMND(490) (executes sends between OMRON and non-OMRON PLCs)	

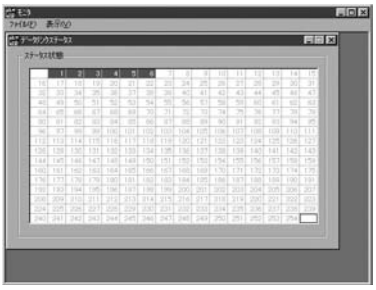
Note: FL-net Support Tool (Ver. 1.60 or higher) is required to make the FL-net settings.
Contact your OMRON sales representative for details on purchasing FL-net Support Tool.

■ FL-net Support Tool

OS	Windows XP, 2000, NT 4.0, Me, 98, or 95
Connection to PLC	Serial connection to CPU Unit's peripheral port or RS-232C port (serial communications mode: Peripheral Bus) Connection cables for IBM PC/AT or compatible: Peripheral port: CS1W-CN226/626 RS-232C port: XW2Z-200S/500S-CV
Function	FL-net Unit initial settings, data link settings, monitor function (Unit status, network status, node status, data link status, participating node status, message sequence status, FA Link network status) With version 1.6 or higher, FL-net Unit settings of other nodes on the FL-net can be made and monitoring of FL-net Units can be performed.

Data Link Status

Displays the data link status of other nodes participating in the FL-net network.



Participating node status

Displays the status of other nodes participating in the FL-net network.

DeviceNet Units
CJ1W-DRM

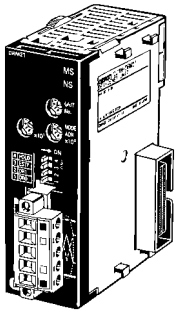
Multivendor, Multibit Network

- Control of up to 32,000 points (2,000 words) per master.
- The following functionality is available without a Configurator:
  1) Remote I/O communications can be allocated in any area using the DM Area settings.
  2) More than DeviceNet Unit can be mounted for each CPU Unit (3 max. for fixed allocations).
  3) More than DeviceNet Unit can be connected in a single network. When using the Configurator (see note), remote I/O can be allocated in an order independent of node address.

Note: The Configurator is allocated 1 node if connected using a special board or card. It is not allocated a node if connected using serial communications.

- DeviceNet Units can be used as both masters and slaves, and master and slave functionality can be used simultaneously.
- DeviceNet Units allow DeviceNet networks to be treated exactly like Controller Link, Ethernet, or other networks for message communications or remote programming and monitoring by a CX-Programmer.

Note: Refer to the *DeviceNet Catalog* (Cat. No. Q102-E1-□) for details on DeviceNet products.



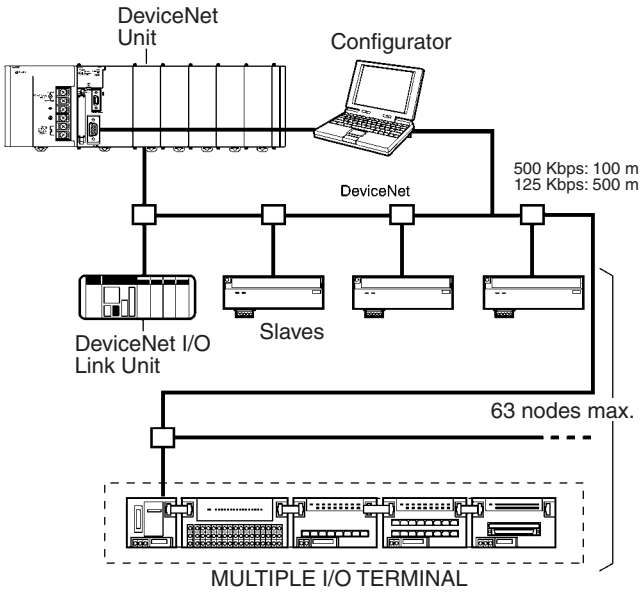
CJ1W-DRM21

Function

This is OMRON's implementation of the DeviceNet open field network, a multibit, multivender network for machine/line control and information. The following types of communications are possible.

1. Remote I/O communications for automatic data transfers between the CPU Unit and Slaves (with no programming in the CPU Unit).
2. Message communications that, using specific instructions (IOWR and CMND), can be programmed in a CPU Unit equipped with DeviceNet Unit to send read/write message to slaves or other CPU Units equipped with DeviceNet Units and control operation.

System Configuration



Specifications

■ DeviceNet Unit

Classification	Types of communications	Specifications	Unit numbers	Model
CPU Bus Unit	Remote I/O communications master (fixed or user-set allocations) Remote I/O communications slave (fixed or user-set allocations) Message communications	Up to 16 Units can be mounted when a Configurator is used.	0 to F (Configurator required to mount 16 Units.)	CJ1W-DRM21

■ DeviceNet Configurator

Name	Model number	Specifications
DeviceNet Configurator	WS02-CFDC1-E	Software only (Windows 95, 98, Me, NT 4.0, 2000, or XP)
	3G8E2-DRM21-EV1	PC card with software (Windows 95, 98, Me, NT 4.0, 2000, or XP)

■ Setting/Monitoring Software

Name	Model number	Specifications
NX-Server	WS02-NXD1-E	DDE edition (Windows 95, 98, NT 4.0, 2000, or XP)

■ Slaves

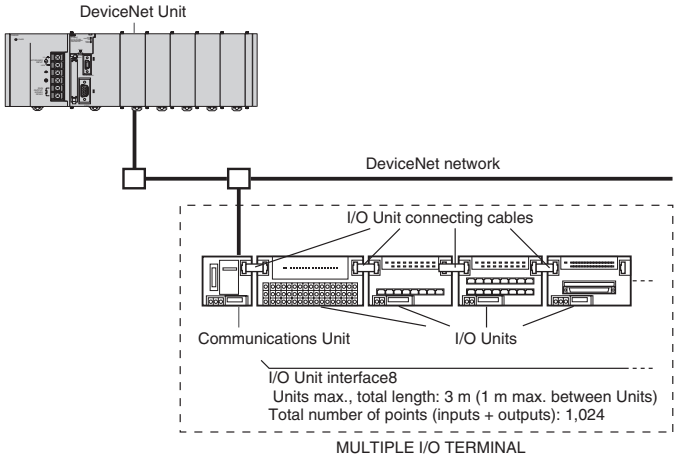
For details on specifications, refer to the *DeviceNet Catalog* (Cat. No. Q102).

MULTIPLE I/O TERMINALs

Multibit Building-block DeviceNet Slaves

- Expand I/O simply by adding I/O Units to the I/O interface.
- Create a low-cost multibit I/O system.
- Connect up to eight Multiple I/O Units to a single Communications Unit.
- Mix Digital and Analog Units.
- Select from a broad range of I/O Units.

System Configuration



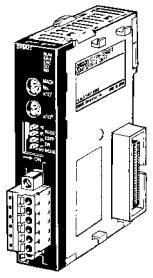
Function

A Communications Unit can be connected to DeviceNet to create an I/O interface for connecting various types of I/O Units. Allocations and address settings are not required for the I/O Units, enabling flexible distributed I/O with ease.

CompoBus/S Units
CJ1W-SRM21

Create a High-speed ON/OFF Bus Ideal for Distributed Control and Reduced Wiring

- Up to 256 I/O points per Master.
- Up to 32 Slaves per Master.
- Communications cycle time: 0.5 ms (fastest speed) (at 750 kbps).
- Communications distance: Up to 500 m (at 93.75 kbps).
- Analog I/O Terminals available.
- Free wiring with any branching method for up to 200 m (in long-distance communications mode).

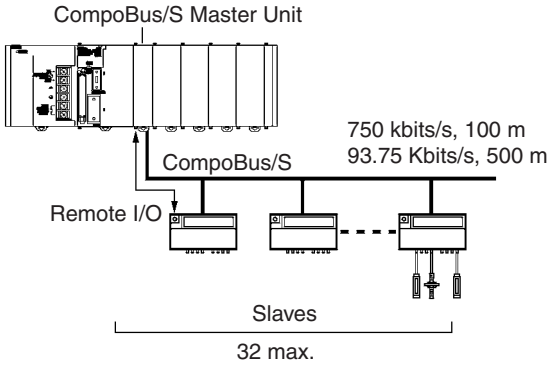


CJ1W-SRM21

Function

The CompoBus/S high-speed bus enables automatic high-speed remote I/O with CPU Unit without special programming in the CPU Unit.

System Configuration



Communications Specifications

<table>
<tr><td colspan="2">Communications method</td><td>Special CompoBus/S protocol</td></tr>
<tr><td colspan="2">Coding</td><td>Manchester</td></tr>
<tr><td colspan="2">Connections</td><td>Multidrop, T-branch (See note 1.)</td></tr>
<tr><td colspan="2">Baud rate</td><td>High-speed mode: 750 kbps
Long-distance mode: 93.75 kbps. (See note 2.)</td></tr>
<tr><td rowspan="4">Communications cycle time</td><td rowspan="2">High-speed mode</td><td>0.5 ms (with 8 input and 8 output Slaves)</td></tr>
<tr><td>0.8 ms (with 16 input and 16 output Slaves)</td></tr>
<tr><td rowspan="2">Long-distance mode</td><td>4.0 ms (with 8 input and 8 output Slaves)</td></tr>
<tr><td>6.0 ms (with 16 input and 16 output Slaves)</td></tr>
<tr><td colspan="2">Media</td><td>2-conductor cable (VCTF 0.75 x 2), 4-conductor cable (VCTF 0.75 x 4), or Special Flat Cable</td></tr>
<tr><td colspan="2">Maximum communications distance</td><td>With 2-conductor VCTF Cable
<table>
<tr><th>Mode</th><th>Main</th><th>Branch</th><th>Total branch</th></tr>
<tr><td>High-speed</td><td>100 m</td><td>3 m</td><td>50 m</td></tr>
<tr><td>Long-distance</td><td>500 m</td><td>6 m</td><td>120 m</td></tr>
</table>
With 2-conductor VCTF or Special Flat Cable
<table>
<tr><th>Mode</th><th>Main</th><th>Branch</th><th>Total branch</th></tr>
<tr><td>High-speed
(See note 3.)</td><td>30 m</td><td>3 m</td><td>30 m</td></tr>
<tr><td>Long-distance
(See note 4.)</td><td colspan="3">Any up to 200 m total</td></tr>
</table></td></tr>
<tr><td colspan="2">Max. No. of nodes</td><td>32</td></tr>
<tr><td colspan="2">Error control checks</td><td>Manchester code, frame length, and parity checks</td></tr>
</table>

Note: 1. Requires external terminating resistance.
2. Set via DIP switch. (Set via DM Area, Default: 750 kbps)
3. For 16 Slaves or fewer: Main: 100 m, Total branch: 50 m.
4. No restrictions on branching method or individual line lengths. Connect terminating resistance to Slave farthest from Master.

Master Specifications

I/O points	256 (128 inputs and 128 outputs) or 128 (64 inputs and 64 outputs) (Switch-selectable)
Allocated words	For 256 I/O: 20 words (8 for inputs, 8 for outputs, 4 for status) For 128 I/O: 10 words (4 for inputs, 4 for outputs, 2 for status)
No. of mountable Master Units	40
Node address	8 addresses per node
No. of connectable Slaves	32
Status information	Communications Error Flags, Participation Flags

Note: Uses Special I/O Unit Area (in CIO Area).

Performance Specifications

■ CompoBus/S Master Unit

Name	Classification	Communications function	Specifications	Unit numbers	Model number
CompoBus/S Master Unit	Special I/O Unit	Remote I/O communications	Mountable Units: 40	0 to 94 (when 2 unit numbers are allocated to each Master) 0 to 95 (when 1 unit number is allocated to each Master)	CJ1W-SRM21

■ CompoBus/S Slave Units

Refer to the *CompoBus/S* catalog (Cat. No. Q103-E1-□) for details on CompoBus/S.

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 September 2004. 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: EC 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

EMS: EN61131-2 and EN61000-6-2 (See note.)

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.

Note: The applicable EMS standard depends on the product.

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.

Basic Configuration Units

Name	Specifications						Model	Standards
CPU Units	**I/O bits**	**Program capacity**	**Data memory capacity**	**LD instruction execution time**	**Built-in I/O**	**No. of function blocks (for Loop Control)**	---	---
	2,560 (3 Expansion Racks)	250k steps	448K words (DM: 32K words, EM: 32K words × 13 banks)	0.02 μs	None	None	CJ1H-CPU67H *NEW*	UC1, CE, N, L
		120k steps	256K words (DM: 32K words, EM: 32K words × 7 banks)				CJ1H-CPU66H	
		60k steps	128K words (DM: 32K words, EM: 32K words × 3 banks)				CJ1H-CPU65H	
	1,280 (3 Expansion Racks)			0.04 μs			CJ1G-CPU45H	
		30k steps	64K words (DM: 32K words, EM: 32K words × 1 bank)				CJ1G-CPU44H	
	960 (2 Expansion Racks)	20k steps					CJ1G-CPU43H	
		10k steps					CJ1G-CPU42H	
	1,280 (Up to 3 Expansion Racks)	60k steps	128K words (DM: 32K words, EM: 32K words × 3 banks)	None		300 blocks	CJ1G-CPU45P *NEW*	UC1, CE
		30k steps	64K words (DM: 32 K words, EM: 32K words × 1 bank)				CJ1G-CPU44P *NEW*	
	960 (Up to 2 Expansion Racks)	20k steps					CJ1G-CPU43P *NEW*	
		10k steps				50 blocks	CJ1G-CPU42P *NEW*	
	640 (1 Expansion Rack)	20k steps	32K words (DM only, no EM)	0.1 μs		None	CJ1M-CPU13	UC1, CE, N, L
	320 (no expansion)	10k steps					CJ1M-CPU12	
	160 (no expansion)	5k steps					CJ1M-CPU11	
	160 (no expansion)	5k steps			10 inputs and 6 outputs		CJ1M-CPU21 (See note 1.)	
	320 (1 Expansion Rack)	10k steps					CJ1M-CPU22 (See note 1.)	
	640 (no expansion)	20k steps					CJ1M-CPU23 (See note 1.)	
Power Supply Units	100 to 240 VAC (with RUN output), Output capacity: 5 A, 5 VDC						CJ1W-PA205R	UC1, CE, N, L
	100 to 240 VAC, Output capacity: 2.8 A, 5 VDC						CJ1W-PA202	
	24 VDC, Output capacity: 5 A, 5 VDC						CJ1W-PD025	
RS-422A Adapter	Converts RS-233C to RS-422A/RS-485						CJ1W-CIF11	
I/O Control Unit	Mount 1 Unit on the CPU Rack when connecting an Expansion Rack.						CJ1W-IC101	UC1, CE, N, L
I/O Interface Unit	1 required on each Expansion Rack.						CJ1W-II101	
I/O Connecting Cable	For connecting Expansion Racks to the CPU Rack or another Expansion Rack.		Cable length: 0.3 m				CS1W-CN313	L, CE
			Cable length: 0.7 m				CS1W-CN713	
			Cable length: 2 m				CS1W-CN223	
			Cable length: 3 m				CS1W-CN323	
			Cable length: 5 m				CS1W-CN523	
			Cable length: 10 m				CS1W-CN133	
			Cable length: 12 m				CS1W-CN133-B2	
Memory Cards (See note 2.)	Flash memory, 30 MB						HMC-EF372 (See note 2.)	L, CE
	Flash memory, 64 MB						HMC-EF672 (See note 2.)	
	Memory Card Adapter (for computer PCMCIA slot)						HMC-AP001	CE

Note: 1. The connector for built-in I/O is not included. Purchase one of the connectors in the following table separately.

2. The HMC-EF172, HMC-EF372, and HMC-EF672 Memory Cards cannot be used with the following products.
The following CPU Units with lot numbers of 020108 or earlier (manufactured 8 January 2002 or earlier): CS1G-CPU□□H, CS1H-CPU□□H, CJ1G-CPU□□H, and CJ1H-CPU□□H
NS7-series PTs with lot numbers of 0852 or earlier (manufactured 8 May 2002 or earlier)

■ Connectors and Connector Cables for Built-in I/O in CJ1M-CPU21/22/23 CPU Units

Name	Specifications		Model
Applicable Connector	MIL Flat Cable Connectors (Pressure-fitted Connectors)		XG4M-4030-T
Connector-Terminal Block Conversion	Slim type (M3 screw terminals,40-pin)		XW2D-40G6
	Special Connecting Cables	Cable length: 1 m	XW2Z-100K
		Cable length: 1.5 m	XW2Z-150K
		Cable length: 2 m	XW2Z-200K
		Cable length: 3 m	XW2Z-300K
		Cable length: 5 m	XW2Z-500K
Servo Relay Units (See note.)	Servo Relay Unit for 1 axis		XW2B-20J6-8A
	Servo Relay Unit for 2 axes		XW2B-40J6-9A
	SMARTSTEP Cable for CJ1M CPU Unit, cable length: 1 m		XW2Z-100J-A26
	W-series Servo Cable for CJ1M CPU Unit, cable length: 1 m		XW2Z-100J-A27

Note: Refer to the catalogs or user manuals for details on the Servo Driver cables.

Programming Devices

Name	Specifications		Model	Standards
Programming Consoles	An English Keyboard Sheet (CS1W-KS001-E) is required. (Connects to peripheral port on CPU Unit only.)		CQM1H-PRO01-E	U, C, CE
			CQM1-PRO01-E	U, C, N, CE
			C200H-PRO27-E	
Programming Console Key Sheet	For CQM1H-PRO01-E, CQM1-PRO01-E, and C200H-PRO27-E.		CS1W-KS001-E	CE
Programming Console Connecting Cables	Peripheral conversion cable that connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)		CS1W-CN114	
	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)		CS1W-CN224	
	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)		CS1W-CN624	
CX-Programmer	Windows-based Programming Device OS: Windows 95, 98, Me, NT4.0, 2000, or XP	Connected to the peripheral port or RS-232C port on the CPU Unit or connected to the RS-232C port on a Serial Communications Unit.	WS02-CXPC1-E-V5□	---
For 3 licenses			WS02-CXPC1-EL03-V5□	
For 10 licenses			WS02-CXPC1-EL10-V5□	
Programming Device Connecting Cables (for peripheral port)	Connects DOS computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect RS-232C cable to peripheral port)		CS1W-CN118	CE
	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	Used for Peripheral Bus or Host Link.	CS1W-CN226	
	Connects DOS computers, D-Sub 9-pin (Length: 6.0 m)		CS1W-CN626	
Programming Device Connecting Cables (for RS-232C port)	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	Used for Peripheral Bus or Host Link. Anti-static connectors	XW2Z-200S-CV	---
	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-CV	
	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	Used for Host Link only. Peripheral Bus not supported.	XW2Z-200S-V	
	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-V	
USB-Serial Conversion Cable	Includes 0.5-m USB-RS-232C conversion cable, and special PC driver (CD-ROM). Conforms to USB specifications 1.1. Personal computer: USB (plug connector A, male) PLC: RS-232C (D-sub, 9-pin, male) OS for driver: Windows 98, Me, 2000, or XP		CS1W-CIF31	---
CX-Simulator	Windows-based Support Software for Windows 95, 98, Me, NT 4.0, 2000, or XP.		WS02-SIMC1-E	---

Optional Products, Maintenance Products, and DIN Track

Name	Specifications	Model	Standards
Battery Set	For CJ1G and CJ1H CPU Units (Use batteries within two years of manufacture.)	CPM2A-BAT01	L, CE
	For CJ1M CPU Units (Use batteries within two years of manufacture.)	CJ1M-BAT01	CE
End Cover	Mounted to the right-hand side of CJ-series CPU Racks or Expansion Racks. One End Cover is provided as a standard accessory with each CPU Unit and I/O Interface Unit.	CJ1W-TER01	UC1, CE
DIN Track	Length: 0.5 m; Height: 7.3 mm	PFP-50N	---
	Length: 1 m; Height: 7.3 mm	PFP-100N	
	Length: 1 m; Height: 16 mm	PFP-100N2	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.	PFP-M	

Basic I/O Units

Name	Specifications	Model	Standards
DC Input Units	12 to 24 VDC, 10 mA, 8 inputs, terminal block	CJ1W-ID201	UC1, CE, N, L
	24 VDC, 7 mA, 16 inputs, terminal block	CJ1W-ID211	
	24 VDC, 4.1 mA, 32 inputs, Fujitsu-compatible connector	CJ1W-ID231 (See note.)	
	24 VDC, 4.1 mA, 32 inputs, MIL connector	CJ1W-ID232 (See note.)	
	24 VDC, 4.1 mA, 64 inputs, Fujitsu-compatible connector	CJ1W-ID261 (See note.)	
	24 VDC, 4.1 mA, 64 inputs, MIL connector	CJ1W-ID262 (See note)	
AC Input Units	100 to 120 VAC, 7 mA (100 V, 50 Hz), 16 inputs, terminal block	CJ1W-IA111	
	200 to 240 VAC, 10 mA (200 V, 50 Hz), 8 inputs, terminal block	CJ1W-IA201	
Interrupt Input Unit	24 VDC, 7 mA, 16 inputs, terminal block	CJ1W-INT01	
High-speed Input Unit	24 VDC, 7 mA, 16 inputs, terminal block	CJ1W-IDP01	
Relay Bit Output Units	250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	CJ1W-OC201	UC1, CE, N, L
	250 VAC/24 VDC, 2 A, independent contacts, 16 outputs max.	CJ1W-OC211	
Transistor Output Units	12 to 24 VDC, 2 A, 8 outputs, sinking, terminal block	CJ1W-OD201	
	24 VDC, 2 A, 8 outputs, sourcing, load short-circuit protection, alarm, terminal block	CJ1W-OD202	
	12 to 24 VDC, 0.5 A, 8 outputs, sinking, terminal block	CJ1W-OD203	
	24 VDC, 0.5 A, 8 outputs, sourcing, load short-circuit protection, alarm, terminal block	CJ1W-OD204	
	12 to 24 VDC, 0.5 A, 16 outputs, sinking, terminal block	CJ1W-OD211	
	24 VDC, 0.5 A, 16 outputs, sourcing, load short-circuit protection, disconnection detection, alarm, terminal block	CJ1W-OD212	
	12 to 24 VDC, 0.5 A, 32 outputs, sinking, Fujitsu-compatible connector	CJ1W-OD231 (See note 1.)	
	24 VDC, 0.5 A, 32 outputs, sourcing, load short-circuit protection, alarm, MIL connector	CJ1W-OD232 (See note 1.)	
	12 to 24 VDC, 0.5 A, 32 outputs, sinking, MIL connector	CJ1W-OD233 (See note 1.)	
	12 to 24 VDC, 0.3 A, 64 outputs, sinking, Fujitsu-compatible connector	CJ1W-OD261 (See note 1.)	
	24 VDC, 0.3 A, 64 outputs, sourcing, MIL connector	CJ1W-OD262 (See note 1.)	
	12 to 24 VDC, 0.3 A, 64 outputs, sinking, MIL connector	CJ1W-OD263 (See note 1.)	
Triac Output Unit	250 VAC, 0.6 A, 8 outputs, terminal block	CJ1W-OA201	

Name	Specifications		Model	Standards
DC Input/Transistor Output Units	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs	Fujitsu-compatible connector	CJ1W-MD231 (See note 2.)	UC1, CE, N
	16 inputs, 24 V DC, 7 mA 16 outputs, 24 V DC, 0.5 A, sourcing outputs Load short-circuit protection, alarm	MIL connector	CJ1W-MD232 (See note 2.)	
	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs	MIL connector	CJ1W-MD233 (See note 2.)	
	32 inputs, 24 V DC, 4.1 mA 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs	Fujitsu-compatible connector	CJ1W-MD261 (See note 1.)	
	32 inputs, 24 V DC, 4.1 mA 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs	MIL connector	CJ1W-MD263 (See note 1.)	
TTL I/O Unit	32 inputs, 5 V DC, 35 mA 32 outputs, 5 V DC, 35 mA/pt. 1.12 A/Unit	MIL connector	CJ1W-MD563 (See note 1.)	
B7A Interface Units	64 inputs		CJ1W-B7A14	UC1, CE
	64 outputs		CJ1W-B7A04	
	32 inputs/32 outputs		CJ1W-B7A22	

Note: 1. Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.

2. Connectors are not provided with these connector models. Either purchase one of the following 20-pin or 24-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.

The SYSMAC CJ Series is designed to address environmental issues that concern FA, in strong support of reducing resource consumption, saving energy, and utilizing recycling at the point of production.

Connectors for 32-point and 64-point I/O Units

Applicable Units	Name	No. required	Connection	Model	Remarks	Standards
I/O Units with Fujitsu connectors	40-pin Connector (See note 1.)	1 per Unit for CJ1W-ID231/OD231 2 per Unit for CJ1W-ID261/OD261/MD261	Soldered	C500-CE404	Connector: FCN-361J040-AU Connector Cover: FCN-360C040-J2	---
			Crimped	C500-CE405	Housing: FCN-363J040 Contactor: FCN-363J-AU Connector Cover: FCN-360C040-J2	
			Pressure welded	C500-CE403	FCN-367J040-AU/F	
	24-pin Connector (See note 2.)	2 per Unit for CJ1W-MD231	Soldered	C500-CE241	Connector: FCN-361J024-AU Connector Cover: FCN-360C024-J2	---
			Crimped	C500-CE242	Housing: FCN-363J024 Contactor: FCN-363J-AU Connector Cover: FCN-360C024-J2	
			Pressure welded	C500-CE243	FCN-367J024-AU/F	
I/O Units with MIL connectors	40-pin Connector (See note 3.)	1 per Unit for CJ1W-ID232/OD232/OD233 2 per Unit for CJ1W-ID262/OD263/MD263/MD563	Pressure welded	XG4M-4030-T	FRC5-A040-3TOS	
	20-pin Connector (See note 4.)	2 per Unit for CJ1W-MD233		XG4M-2030-T	FRC5-A020-3TOS	

Note: 1. The CJ1W-ID231/OD231 I/O Units with Connectors require a single connector per Unit. The CJ1W-ID261/OD261/MD261 I/O Units with Connectors require two connectors per Unit.

2. The CJ1W-MD231 I/O Unit with Connectors requires two connectors per Unit.

3. The CJ1W-ID232/OD232/OD233 I/O Units with Connectors require a single connector per Unit. The CJ1W-ID262/OD263/MD263/MD563 I/O Units with Connectors require two connectors per Unit.

4. The CJ1W-MD233 I/O Unit with Connectors requires two connectors per Unit.

Special I/O Units

Name	Specifications	Model	Standards
Analog Input Unit	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/8000, Conversion speed: 250 μs/point max. (Settable to 1/4000 and 1 ms/point.)	CJ1W-AD081-V1	UC1, CE, N, L
	4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/8000, Conversion speed: 250 μs/point max. (Settable to 1/4000 and 1 ms/point.)	CJ1W-AD041-V1	
Analog Output Unit	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V) Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000, 250 μs/point)	CJ1W-DA08V	
	8 outputs, 4 to 20 mA Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000 and 250 μs/point)	CJ1W-DA08C	UC1, CE, N
	4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000, Conversion speed: 1 ms/point max.	CJ1W-DA041	UC1, CE, N, L
	2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4000, Conversion speed: 1 ms/point max.	CJ1W-DA021	UC1, CE, N
Analog I/O Unit	4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000, 250 μs/point)	CJ1W-MAD42	UC1, CE, N
Process Input Unit	4 inputs, R, S, K, J, T, L, B, Conversion speed: 250 ms/4 points max.	CJ1W-PTS51	UC1, CE
	4 inputs, Pt100Ω (JIS, IEC), JPt100Ω, Conversion speed: 250 ms/4 points max.	CJ1W-PTS52	
Temperature Control Units	4 loops, thermocouple input, NPN output	CJ1W-TC001	UC1, CE, N, L
	4 loops, thermocouple input, PNP output	CJ1W-TC002	
	2 loops, thermocouple input, NPN output, heater burnout detection function	CJ1W-TC003	
	2 loops, thermocouple input, PNP output, heater burnout detection function	CJ1W-TC004	
	4 loops, platinum resistance thermometer input, NPN output	CJ1W-TC101	
	4 loops, platinum resistance thermometer input, PNP output	CJ1W-TC102	
	2 loops, platinum resistance thermometer input, NPN output, heater burnout detection function	CJ1W-TC103	
	2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function	CJ1W-TC104	
High-speed Counter Unit	2 inputs, max. input frequency: 500 kpps	CJ1W-CT021	UC1, CE, N
CompoBus/S Master Unit	CompoBus/S remote I/O, 256 points max.	CJ1W-SRM21	UC1, CE, N, L
Position Control Units	Pulse train, open collector output, 1 axis	CJ1W-NC113	UC1, CE
	Pulse train, open collector output, 2 axes	CJ1W-NC213	
	Pulse train, open collector output, 4 axes (See note 1.)	CJ1W-NC413	
	Pulse train, line driver output, 1 axis	CJ1W-NC133	
	Pulse train, line driver output, 2 axes	CJ1W-NC233	
	Pulse train, line driver output, 4 axes (See note 1.)	CJ1W-NC433	
Space Unit (See note 2.)	---	CJ1W-SP001	
CX-Position (NC Support Software)	Windows 95, 98, Me, NT 4.0, 2000, or XP, Pentium 100 MHz or better, 32 Mbytes of memory min., 50 Mbytes of hard disk space min.	WS02-NCTC1-EV2	---
Servo Relay Units (See note 3.)	For 1-Axis Position Control Unit (without communications support) (CS1W-NC113/133, CJ1W-CN113/133, C200HW-NC113, C200H-NC112)	XW2Z-20J6-1B	
	For 2- or 4-Axis Position Control Unit (without communications support) (CS1W-NC213/233/413/433, CJ1W-CN213/233/413/433, C200HW-NC213/413, C500-NC213/211, C200H-NC211)	XW2Z-40J6-2B	
	For 2- or 4-Axis Position Control Unit (with communications support) (CS1W-NC213/233/413/433, CJ1W-CN213/233/413/433, C200HW-NC213/413)	XW2Z-40J6-4A	

Ordering Information

Name	Specifications	Model	Standards
Position Control Unit Cables (See note 3.)	Connects CJ1W-NC113 to W Series, Cable length: 0.5 m	XW2Z-050J-A14	---
	Connects CJ1W-NC113 to W Series, Cable length: 1 m	XW2Z-100J-A14	
	Connects CJ1W-NC213/413 to W Series, Cable length: 0.5 m	XW2Z-050J-A15	
	Connects CJ1W-NC213/413 to W Series, Cable length: 1 m	XW2Z-100J-A15	
	Connects CJ1W-NC113 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A16	
	Connects CJ1W-NC113 to SmartStep, Cable length: 1 m	XW2Z-100J-A16	
	Connects CJ1W-NC213/413 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A17	
	Connects CJ1W-NC213/413 to SmartStep, Cable length: 1 m	XW2Z-100J-A17	
	Connects CJ1W-NC133 to W Series, Cable length: 0.5 m	XW2Z-050J-A18	
	Connects CJ1W-NC133 to W Series, Cable length: 1 m	XW2Z-100J-A18	
	Connects CJ1W-NC233/433 to W Series, Cable length: 0.5 m	XW2Z-050J-A19	
	Connects CJ1W-NC233/433 to W Series, Cable length: 1 m	XW2Z-100J-A19	
	Connects CJ1W-NC133 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A20	
	Connects CJ1W-NC133 to SmartStep, Cable length: 1 m	XW2Z-100J-A20	
	Connects CJ1W-NC233/433 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A21	
	Connects CJ1W-NC233/433 to SmartStep, Cable length: 1 m	XW2Z-100J-A21	
ID Sensor Units (See note 4.)	For V600 Series, 1 R/W Head	CJ1W-V600C11	---
	For V600 Series, 2 R/W Heads	CJ1W-V600C12	

Note: 1. The ambient operating temperature for 4-Axis Position Control Units is 0 to 50°C; the allowable voltage fluctuation on the external 24-VDC power supply is 22.8 to 25.2 VDC (24 V ±5%).

2. Use a CJ1W-SP001 Space Unit if the operating temperature is 0 to 55ºC.

3. Two Servo Relay Units and two cables for the Position Control Unit are required for a 4-Axis Position Control Unit.

4. Refer to the *Auto-Identification Components Group Catalog* (Cat. No. Q132) for details on the V600 Series RFID System.

CPU Bus Units

Name	Specifications	Model	Standards
Controller Link Units	Wired (Shielded twisted-pair cable) (See note 1.)	CJ1W-CLK21-V1	UC1, CE, N, L
Controller Link Relay Terminals	Wired Includes 5 Terminals	CJ1W-TB101	---
Controller Link Support Boards	Twisted pair, PCI bus, with Support Software	3G8F7-CLK21-EV1	CE
Controller Link Repeater Units	Twisted-pair cable	CS1W-RPT01	UC1, CE
	Optical ring (H-PCF cable) (See note 2.)	CS1W-RPT02	
	Optical ring (GI cable) (See note 3.)	CS1W-RPT03	
Serial Communications Units	1 RS-232C port and 1 RS-422/485 port	CJ1W-SCU41	UC1, CE, N, L
	2 RS-232C ports	CJ1W-SCU21	
CX-Protocol	Windows-based Protocol Creation Software for Windows 95, 98, Me, NT4.0, 2000, or XP	WS02-PSTC1-E	---
Ethernet Units	10Base-T	CJ1W-ETN11	UC1, CE, N, L
	100Base-TX	CJ1W-ETN21	
FL-net Units	100Base-TX	CJ1W-FLN22 *NEW*	UC1, CE
DeviceNet Units	Functions as master and/or slave; allows control of 32,000 points max. per master.	CJ1W-DRM21	UC1, CE, N, L
Motion Control Units	MECHATROLINK-II Real axes: 30; Virtual axes: 2 Motion control language	CJ1W-MCH71	CE
MC-Miel for MCH	Support Software for CS1W-MCH71	MC-Miel for MCH	---
Position Control Units	MECHATROLINK-II-compatible control of up to 16 axes	CJ1W-NCF71 *NEW*	UC1, CE
MECHATROLINK-II Application Modules	R88D-WT□ OMNUC W-series AC Servo Driver (Yaskawa Electric Corporation) Use the model numbers provided in this catalog when ordering from OMRON. Contact your OMRON sales representative for pricing details.	FNY-NS115	---

Ordering Information

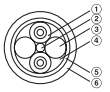
Name	Specifications		Model	Standards
MECHATROLINK-II Cables	Connects MECHATROLINK-II-compatible devices (Yaskawa Electric Corporation) Use the model numbers provided in this catalog when ordering from OMRON. Contact your OMRON sales representative for pricing details.	Cable length: 0.5 m	FNY-W6003-A5	---
		Cable length: 1 m	FNY-W6003-01	
		Cable length: 3 m	FNY-W6003-03	
		Cable length: 5 m	FNY-W6003-05	
		Cable length: 10 m	FNY-W6003-10	
		Cable length: 20 m	FNY-W6003-20	
		Cable length: 30 m	FNY-W6003-30	
MECHATROLINK-II Terminating Resistors	Terminating Resistor for MECHATROLINK-II (Yaskawa Electric Corporation) Use the model numbers provided in this catalog when ordering from OMRON. Contact your OMRON sales representative for pricing details.		FNY-W6022	---
CJ1W-NCF71 Support Software (CX-Motion-NCF)	Windows Support Software for CJ1W-NCF71 OS: Windows 98, Me, NT4.0, 2,000, and XP		WS02-MNTC1	

Note: 1. Use the following shielded, twisted-pair cables:
ESVC0.5 × 2C-13262 (BANDO ELECTRIC WIRE CO., LTD.)
ESNC0.5 × 2C-99-087B (Nihon Electric Wire & Cable Co., Ltd)

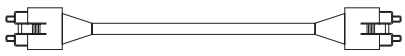
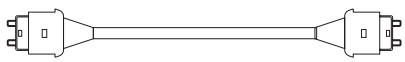
2. Use the H-PCF cables or H-PCF optical fiber cables with connectors listed in the following table for Optical Ring (H-PCF cable) Controller Link Repeater Units.

3. Use the GI optical cables listed on the following page for Optical Ring (GI cable) Controller Link Repeater Units.

■ H-PCF Cables

Name	Applicable Units/Construction		Specifications		Model	Standards
Optical Fiber Cables	Controller Link	 1.Optical-fiber single-core cable 2.Tension member (plastic-covered copper wire) 3. Lacing (plastic lacing 4. Inclusion (plastic yarn or fiber) 5. Holding tape (plastic fiber) 6. Heat-resistant PVC sheath	2-core optical 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 	CS1W-RPT02		Half-lock		S3200-OCCF2571	
			Full-lock		S3200-COCF2071	

■ Applicable Unit

Applicable Units	Appearance	Model	Standards
Controller Link		S3200-CN□□□-20-20	---
		S3200-CN□□□-20-25	
		S3200-CN□□□-25-25	

Cable Length

Cables are available in lengths of 2 m, 5 m, 10 m, 15 m, and 20 m. Contact your sales representative for details on cables 21 m or longer.

Ordering Information

Model Number Legend

(1) Cable length: 2 m, 5 m, 10 m, 15 m, 20 m

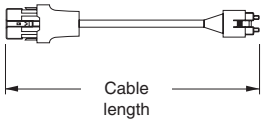
Example: S3200-CN□□□-20-25

(1) (2) (3)

(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



(2) Cable length: 21 m or longer

Example: S3200-CN-20-20

(1) (3) Specify the cable length (unit: 1 m)

(3) Connectors on both ends

Code	Appearance
20	Full lock
25	Half lock

Optical Connector Assembly Tool

Name	Applicable Units	Model	Manufacturer	Standards
Optical Fiber Assembly Tool	Used for assembling crimp-cut connectors and hard plastic-clad, quartz-fiber for SYSMAC C-series SYSBUS, SYSMAC LINK, and Controller Link optical transmission systems.	CAK-0057	Sumitomo Electric Industries, Ltd	---

Note: 1. Contact your nearest OMRON sales representative for details on the CAK-0057.

2. Optical Fiber Cable (H-PCF) Connector Assembly
Performance may be adversely affected if cable connectors are assembled by the user. Cables with connectors or assembly by a professional is recommended.

■ GI Optical Cables

To handle optical cables, always use a qualified technician with the knowledge required to select, assemble, and lay GI optical cables.

Compatible Optical Cables and Connectors

- Optical fiber category: Graded, index, multi-mode, all quartz crystal, fiber (GI AGF cable)
- Optical fiber construction (core/clad diameter): 62.5/125 μm or 50/125 μm
- Optical fiber optical characteristics: Refer to the following table.
- Optical connector: ST connector (IEC-874-10)

50/125 μm AGF Cable

Item	Minimum	Standard	Maximum	Conditions	
Numerical aperture (N.A.)	---	0.21	---	---	
Transmission loss (dB)	---	---	3.0 Lf	0.5 km ≤ Lf	λ = 0.8 μm, T_a = 25°C
			3.0 Lf + 0.2	0.2 km ≤ Lf < 0.5 km	
			3.0 Lf + 0.4	Lf ≤ 0.2 km	
Connection loss (dB)	---	---	1.0	λ = 0.8 μm, one location	
Transmission bandwidth (MHz·km)	500	---	---	λ = 0.85 μm (LD)	

Lf is fiber length in km, T_a is ambient temperature, and λ is the peak wavelength of the test light source.

62.5/125 μm AGF Cable

Item	Minimum	Standard	Maximum	Conditions	
Numerical aperture (N.A.)	---	0.28	---	---	
Transmission loss (dB)	---	---	3.5 Lf	0.5 km ≤ Lf	λ = 0.8 μm, T_a = 25°C
			3.5 Lf + 0.2	0.2 km ≤ Lf < 0.5 km	
			3.5 Lf + 0.4	Lf ≤ 0.2 km	
Connection loss (dB)	---	---	1.0	λ = 0.8 μm, one location	
Transmission bandwidth (MHz·km)	200	---		λ = 0.85 μm (LD)	

Lf is fiber length in km, T_a is ambient temperature, and λ is the peak wavelength of the test light source.

RS-422A Adapters

Name	Specifications	Model	Standards
RS-422A Adapter	Converts RS-233C to RS-422A/RS-485	CJ1W-CIF11	UC1, CE, N
RS-232C–RS-422A Conversion Unit	1 RS-232C port and 1 RS-422A terminal block	NT-AL001	---

DeviceNet Configurator

Name	Specifications	Model	Standards
DeviceNet Configurator	Software only (Windows 95, 98, NT 4.0, 2000, or XP)	WS02-CFDC1-E	---
	PC card with software (Windows 95, 98, Me, NT4.0, 2000, or XP)	3G8E2-DRM21-EV1	

Setting and Monitoring Software

Name	Specifications	Model number	Standards
NX-Server	DDE edition (Windows 95, 98, NT 4.0, 2000, or XP)	WS02-NXD1-E	---

DeviceNet Slaves

Smart Slaves

Name	Model number	Specifications	Standards
Remote I/O Terminals with Transistors	DRT2-ID16	16 input points (NPN with + common)	UC1, CE
	DRT2-ID16-1	16 input points (PNP with – common)	
	DRT2-OD16	16 output points (NPN with – common)	
	DRT2-OD16-1	16 output points (PNP with + common)	
Remote I/O Terminal Expansion Units with Transistors	XWT-ID08	8 input points (NPN with + common)	UC1, CE
	XWT-ID08-1	8 input points (PNP with – common)	
	XWT-OD08	8 output points (NPN with – common)	
	XWT-OD08-1	8 output points (PNP with + common)	
	XWT-ID16	16 input points (NPN with + common)	
	XWT-ID16-1	16 input points (PNP with – common)	
	XWT-OD16	16 output points (NPN with – common)	
	XWT-OD16-1	16 output points (PNP with + common)	
Remote I/O Terminal with Relay Outputs	DRT2-ROS16	16 output points	CE, UR
Remote I/O Terminals with 3-tier Terminal Blocks and Transistors	DRT2-ID16TA	NPN with + common	U1, CE
	DRT2-ID16TA-1	PNP with – common	
	DRT2-OD16TA	NPN with + common	
	DRT2-OD16TA-1	PNP with – common	
	DRT2-MD16TA	NPN with + common	
	DRT2-MD16TA-1	PNP with – common	
Remote I/O Terminals with Transistors and MIL Connectors	DRT2-ID32ML	NPN with + common	U1, CE
	DRT2-ID32ML-1	PNP with – common	
	DRT2-OD32ML	NPN with + common	
	DRT2-OD32ML-1	PNP with – common	
	DRT2-MD32ML	NPN with + common	
	DRT2-MD32ML-1	PNP with – common	
Sensor Connector Terminals	DRT2-ID16S	16 input points (NPN with + common)	U, CE
	DRT2-ID16S-1	16 input points (PNP with – common)	
	DRT2-MD16S *NEW*	8 inputs/8 outputs (NPN inputs with + common/NPN outputs with – common)	
	DRT2-MD16S-1 *NEW*	8 inputs/8 outputs (PNP inputs with – common/NPN outputs with + common)	
Analog Input Terminals	DRT2-AD04	4 input points	U1, CE
Analog Output Terminals	DRT2-DA02	2 output points	
Screwless Clamp Terminals with Transistors	DRT2-ID32SLH *NEW*	32 inputs (NPN with + common) with detection functions	U, CE
	DRT2-ID32SLH-1 *NEW*	32 inputs (PNP with – common) with detection functions	
	DRT2-OD32SLH *NEW*	32 outputs (NPN with + common) with detection functions	
	DRT2-OD32SLH-1 *NEW*	32 outputs (PNP with – common) with detection functions	
	DRT2-MD32SLH *NEW*	16 inputs/16 outputs (NPN inputs with + common, NPN outputs with – common) with detection functions	
	DRT2-MD32SLH-1 *NEW*	16 inputs/16 outputs (PNP inputs with – common, NPN outputs with + common) with detection functions	
	DRT2-ID32SL *NEW*	32 inputs (NPN with + common) without detection functions	
	DRT2-ID32SL-1 *NEW*	32 inputs (PNP with – common) without detection functions	
	DRT2-OD32SL *NEW*	32 outputs (NPN with + common) without detection functions	
	DRT2-OD32SL-1 *NEW*	32 outputs (PNP with – common) without detection functions	
	DRT2-MD32SL *NEW*	16 inputs/16 outputs (NPN inputs with + common, NPN outputs with – common) without detection functions	
	DRT2-MD32SL-1 *NEW*	16 inputs/16 outputs (PNP inputs with – common, NPN outputs with + common) without detection functions	

Ordering Information

Name	Model number	Specifications	Standards
Environment-resistant Terminals with Transistors	DRT2-ID08C	8 input points (NPN with + common)	U, CE
	DRT2-ID08C-1	8 inputs points (PNP with – common)	
	DRT2-OD08C	8 output points (NPN with – common)	
	DRT2-OD08C-1	8 output points (PNP with + common)	
	DRT2-HD16C	16 input points (NPN with + common)	
	DRT2-HD16C-1	16 input points (PNP with – common)	
Modular Temperature Controller	E5ZN-DRT	E5ZN DeviceNet Communications Unit	U, CE
	E5ZN-SCT24S-500	Terminal Unit	
	E5ZN-SDL	Setting Display Unit	
DeviceNet Communications Units (for Inverters)	3G3MV-PDRT2	3G3MV DeviceNet Communications Unit	U, CE
	3G3RV-PDRT2	3G3RV/3G3FV DeviceNet Communications Unit	

General-purpose Slaves

Name	Model	Specifications		Standards
Remote I/O Terminals with Transistors	DRT1-ID08	8 input points (NPN with + common)		U, C, CE
	DRT1-ID08-1	8 input points (PNP with – common)		
	DRT1-OD08	8 output points (NPN with – common)		
	DRT1-OD08-1	8 output points (PNP with +common)		
	DRT1-ID16	16 input points (NPN with + common)		
	DRT1-ID16-1	16 input points (PNP with – common)		
	DRT1-OD16	16 output points (NPN with – common)		
	DRT1-OD16-1	16 output points (PNP with + common)		
	DRT1-MD16	8 input points (NPN with + common) 8 output points (NPN with – common)		---
Remote Adapters	DRT1-ID16X	16 input points (NPN with + common), prewired connector		U, C, CE
	DRT1-ID16X-1	16 input points (PNP with – common), prewired connector		
	DRT1-OD16X	16 output points (NPN with – common), prewired connector		
	DRT1-OD16X-1	16 output points (PNP with + common), prewired connector		
Flat Cable Connectors with MIL Plugs	XG4A-2031	Straight DIP pins		---
	XG4A-2034	L-shaped DIP pins		
Analog Input Terminals	DRT1-AD04	4 input points (4 words) or 2 input points (2 words) (Set via DIP switch.)		U, CE
	DRT1-AD04H	4 input points (4 words)		
Analog Output Terminals	DRT1-DA02	2 output points (2 words)	Current: 0 to 20 mA, 4 to 20 mA	U, CE
			Voltage: 1 to 5 V, 0 to 10 V, – 10 to 10 V	
Temperature Input Terminals	DRT1-TS04T	4 input points (4 words)	Inputs: R, S, K1, K2, J1, J2, T, E, B, N, L1, L2, U, W, PLII	U, CE
	DRT1-TS04P		Inputs: Pt100, JPt100	
Sensor Terminals (for 2-wire Senors)	DRT1-HD16S	8 sensor I/O points (NPN), 2 inputs per Sensor		---
	DRT1-ND16S	8 sensor I/O points		
Cable Connectors	XS8A-0441	0.3 to 0.5 mm^2 (Order in multiples of 10.)		
	XS8A-0442	0.14 to 0.2 mm^2 (Order in multiples of 10.)		
Water-resistant Terminals with Transistors	DRT1-ID04CL	4 input points (NPN with + common)		CE, L
	DRT1-ID04CL-1	4 input points (PNP with – common)		
	DRT1-OD04CL	4 output points (NPN with – common)		
	DRT1-OD04CL-1	4 output points (PNP with + common)		
	DRT1-ID08CL	8 input points (NPN with + common)		
	DRT1-ID08CL-1	8 input points (PNP with – common)		
	DRT1-OD08CL	8 output points (NPN with – common)		
	DRT1-OD08CL-1	8 output points (PNP with + common)		

Ordering Information

Name	Model	Specifications	Standards
Environment-resistant Terminals with Transistors	DRT1-ID08C	8 input points (NPN with + common)	U, C, CE
	DRT1-HD16C	16 input points (NPN with + common)	
	DRT1-HD16C-1	16 input points (PNP with – common)	U, C
	DRT1-OD08C	8 output points (NPN with – common)	U, C, CE
	DRT1-WD16C	16 output points (NPN with – common)	
	DRT1-WD16C-1	16 output points (PNP with + common)	U, C
	DRT1-MD16C	8 input points (NPN with + common) 8 output points (NPN with – common)	U, C, CE
	DRT1-MD16C-1	8 input points (PNP with – common) 8 output points (PNP with + common)	U, C
B7AC Interface Terminal	DRT1-B7AC	10 input points x 3 (3 branches for the B7AC)	U, C, CE

Intelligent PLC-Unit Slaves

Name	Model	Specifications		Standards
Programmable Slaves	CPM2C-S100C-DRT	Controller with SYSMAC CPM2C CPU No. of remote I/O link points: 1,024 max. Provides CompoBus/S Master.	4 transistor outputs (sinking)	U, C, CE
	CPM2C-S110C-DRT		4 transistor outputs (sourcing)	
I/O Link Units	C200HW-DRT21	512 internal inputs/512 internal outputs (with CS/CJ-series or C200HX/HG/HE PLC and Master)		U, C, N, CE
	CQM1-DRT21	16 internal inputs/16 internal outputs (with CQM1/CQM1H and Master)		U, C, CE
	CPM1A-DRT21	32 internal inputs/32 internal outputs (with CPM1A/CPM2A and Master)		

Other Intelligent Slaves

Name	Model	Specifications		Standards
RS-232C Unit	DRT1-232C2	Two RS-232C ports, 16 inputs (signal status)		U, C, CE
DeviceNet Fiber Amplifier Communications Unit	E3X-DRT21	Fiber Amplifier Unit for E3X-DA-N, up to 16 connectable.		---
	E3X-DA6-P	Fiber Amplifier (Order with Wire-reduction Connector.)		
	E3X-CN02	Wire-reduction Connector (Order with Fiber Amplifier.)		
	E39-TM1	Terminal Block Unit		
Intelligent Flag III	V600-HAM42-DRT	DeviceNet-compatible ID system		---
Vision Sensor Controller	F150-C10E-3-DRT	DeviceNet-compatible vision system		CE
Digital Controller	E5EK-AA2-DRT-500	DeviceNet-compatible Digital Controller		---
High-density Temperature Controllers	E5ZE-8AQHD1TCB-V2	Thermocouples	Heating control, voltage output	---
	E5ZE-8ACAD1TCB-V2		Heating control, current output	
	E5ZE-8VQHD1TCB-V2		Heating/cooling control, voltage output	
	E5ZE-8VCAD1TCB-V2		Heating/cooling control, current output	
	E5ZE-8AQHD1TPB-V2	Platinum-resistance thermometers	Heating control, voltage output	
	E5ZE-8ACAD1TPB-V2		Heating control, current output	
	E5ZE-8VQHD1TPB-V2		Heating/cooling control, voltage output	
	E5ZE-8VCAD1TPB-V2		Heating/cooling control, current output	U, CE
AC Servo Drivers	R88A-NCW152-DRT	DeviceNet Option Unit for OMNUC W-series AC Servo Drivers		CE
	R88A-CNU01R	External I/O Connector		---
	R88A-CCW002P4	Cable for Setup Software (IBM PC/AT or compatible, 2 m)		
Programmable Terminal DeviceNet Interface Unit	NT-DRT21	DeviceNet Interface Unit for the NT31/NT631 Series		U, CE
DeviceNet Wireless Units	WD30-ME	DeviceNet Wireless Master Unit	Pencil-type Antenna	---
	WD30-ME01		Magnet Base Antenna	
	WD30-SE	DeviceNet Wireless Slave Unit	Pencil-type Antenna	
	WD30-SE01		Magnet Base Antenna	
	WD30-AT001	Magnet Switching Base Antenna		

DeviceNet MULTIPLE I/O TERMINAL Units

Name		Model	I/O points	Specifications	Standards
Communications Unit		DRT1-COM	---	Total Slave I/O points: 1,024 max.	U, C, CE
Digital I/O Units	Units with Terminal Blocks	GT1-ID16	16 inputs	NPN (+ common)	U, C, CE
		GT1-ID16-1	16 inputs	PNP (– common)	
		GT1-OD16	16 outputs	NPN (– common)	
		GT1-OD16-1	16 outputs	PNP (+ common)	
	Units with MOLEX Connectors	GT1-ID16MX	16 inputs	NPN (+ common)	
		GT1-ID16MX-1	16 inputs	PNP (– common)	
		GT1-OD16MX	16 outputs	NPN (– common)	
		GT1-OD16MX-1	16 outputs	PNP (+ common)	
	Units with Fujitsu Connectors	GT1-ID16ML	16 inputs	NPN (+ common)	
		GT1-ID16ML-1	16 inputs	PNP (– common)	
		GT1-OD16ML	16 outputs	NPN (– common)	
		GT1-OD16ML-1	16 outputs	PNP (+ common)	
	Units with D-Sub 25-pin Connectors	GT1-ID16DS	16 inputs	NPN (+ common)	
		GT1-ID16DS-1	16 inputs	PNP (– common)	
		GT1-OD16DS	16 outputs	NPN (– common)	
		GT1-OD16DS-1	16 outputs	PNP (+ common)	
	Units with High-density Fujitsu Connectors	GT1-ID32ML	32 inputs	NPN (+ common)	
		GT1-ID32ML-1	32 inputs	PNP (– common)	
		GT1-OD32ML	32 outputs	NPN (– common)	
		GT1-OD32ML-1	32 outputs	PNP (+ common)	
Relay Output Units		GT1-ROS16	16 outputs	16 relay outputs, 2 A/SPST-NO	U, C, CE
		GT1-ROP08	8 outputs	8 relay outputs, 5 A/SPST-NO	
		GT1-FOP08	8 outputs	8 SSR outputs, 1.5 A/SPST-NO	---
Analog Input Units		GT1-AD08MX	8 inputs	MOLEX connector	U, C, CE
		GT1-AD04	4 inputs	Terminal block	
Analog Output Units		GT1-DA04MX	4 outputs	MOLEX connector	
		GT1-DA04	4 outputs	Terminal block	
Temperature Input Units		GT1-TS04T	4 inputs	Thermocouple	U, C, CE
		GT1-TS04P	4 inputs	Platinum resistance thermometer	
Counter Unit		GT1-CT01	1 input, 2 outputs	1 input, 2 outputs Counter Unit with encoder input	U, CE
I/O Unit Connecting Cable		GCN1-100	---	1 m	---

Note: For details on specifications, refer to the *DeviceNet Catalog* (Cat. No. Q102).

CompoBus/S Slaves

Name	Model number	Specifications	Standards
I/O Link Units	CPM2C-SRT21	For CPM2C; 8 input points, 8 output points	CE (See note 1.)
	CPM1A-SRT21	For CPM1A/CPM2A; 8 input points, 8 output points	U, C, CE (See note 1.)
Remote I/O Terminals with Transistors	SRT2-ID04	4 input points, NPN (+ common)	U, C, CE (See note 1.)
	SRT2-ID04-1	4 input points, PNP (– common)	
	SRT2-OD04	4 output points, NPN (– common)	
	SRT2-OD04-1	4 output points, PNP (+ common)	
	SRT2-ID08	8 input points, NPN (+ common)	
	SRT2-ID08-1	8 input points, PNP (– common)	
	SRT2-OD08	8 output points, NPN (– common)	
	SRT2-OD08-1	8 output points, PNP (+ common)	
	SRT2-ID16	16 input points, NPN (+ common)	
	SRT2-ID16-1	16 input points, PNP (– common)	
	SRT2-OD16	16 output points, NPN (– common)	
	SRT2-OD16-1	16 output points, PNP (+ common)	
Remote I/O Terminals with Transistors and 3-tier Terminal Block	SRT2-ID16T	16 input points, NPN (+ common)	U, C, CE (See note 1.)
	SRT2-ID16T-1	16 input points, PNP (– common)	
	SRT2-MD16T	16 I/O points, NPN (inputs: + common, outputs: – common)	
	SRT2-MD16T-1	16 I/O points, PNP (inputs: – common, outputs: + common)	
	SRT2-OD16T	16 output points, NPN (– common)	
	SRT2-OD16T-1	16 output points, PNP (+ common)	
Remote Input Terminals with Transistors and Connectors (4/8 points)	SRT2-ID04MX	4 input points, NPN (+ common)	CE (See note 1.)
	SRT2-ID08MX	8 input points, PNP (+ common)	
Remote Output Terminals with Relays	SRT2-ROC08	8 relay output points	U, C, CE (See note 1.)
	SRT2-ROC16	16 relay output points	
	SRT2-ROF08	8 power MOSFET relay output points	
	SRT2-ROF16	16 power MOSFET relay output points	
Remote I/O Terminals with Transistors and Connectors	SRT2-ID32ML	32 input points, NPN (+ common)	CE (See note 1.)
	SRT2-ID32ML-1	32 input points, PNP (– common)	
	SRT2-OD32ML	32 output points, NPN (– common)	
	SRT2-OD32ML-1	32 output points, PNP (+ common)	
	SRT2-MD32ML	32 I/O points, NPN (inputs: + common, outputs: – common)	
	SRT2-MD32ML-1	32 I/O points, PNP (inputs: – common, outputs: + common)	
	SRT2-VID08S	8 input points, NPN (+ common)	U, C, CE (See note 1.)
	SRT2-VID08S-1	8 input points, PNP (– common)	
	SRT2-VOD08S	8 output points, NPN (– common)	
	SRT2-VOD08S-1	8 output points, PNP (+ common)	
	SRT2-VID16ML	16 input points, NPN (+ common)	
	SRT2-VID16ML-1	16 input points, PNP (– common)	
	SRT2-VOD16ML	16 output points, NPN (– common)	
	SRT2-VOD16ML-1	16 output points, PNP (+ common)	
	SRT2-ATT01	Mounting Bracket A	
	SRT2-ATT02	Mounting Bracket B	

Ordering Information

Name	Model number	Specifications	Standards
Waterproof Terminals with Transistors	SRT2-ID04CL	4 input points, NPN (+ common)	CE, L (See note 1.)
	SRT2-ID04CL-1	4 input points, PNP (– common)	
	SRT2-OD04CL	4 output points, NPN (– common)	
	SRT2-OD04CL-1	4 output points, PNP (+ common)	
	SRT2-ID08CL	8 input points, NPN (+ common)	
	SRT2-ID08CL-1	8 input points, PNP (– common)	
	SRT2-OD08CL	8 output points, NPN (– common)	
	SRT2-OD08CL-1	8 output points, PNP (+ common)	
CompoBus/S Fiber Amplifier Sensor Communications Unit	E3X-SRT21	Connects to up to 14 Fiber Amplifier Units	---
Sensor Terminals	SRT2-ID08S	8 Sensor inputs (NPN)	---
	SRT2-ND08S	4 remote-teaching Sensor inputs, 4 outputs (NPN)	
	SRT2-OD08S	8 Sensor outputs (NPN)	
Analog Input Terminal	SRT2-AD04	1 to 4 inputs (set via DIP switch)	U, C. CE (See note 1.)
Analog Output Terminal	SRT2-DA02	1 or 2 outputs (set via DIP switch)	U, C, CE (See note 1.)
Remote I/O Modules	SRT2-ID16P	16 input points, NPN (+ common)	---
	SRT2-OD16P	16 output points, NPN (– common)	
Positioner Drivers (Cannot be used in Long-distance Communications Mode.)	FND-X06H-SRT	200-VAC input, 6 A	U, CE (See note 1.), CU
	FND-X12H-SRT	200-VAC input, 12 A	
	FND-X25H-SRT	200-VAC input, 25 A	
	FND-X50H-SRT	200-VAC input, 50 A	
	FND-X06L-SRT	100-VAC input, 6 A	
	FND-X12L-SRT	100-VAC input, 12 A	

Note: 1. OMRON products that comply with EC Directives also comply with the common emission standard of the EMC Directive as individual products. The user must, however, confirm compliance with the EMC Directive for the overall device or machine containing the OMRON product, which can be affected by the configuration of the control panel, wiring conditions, layout, and other factors.

2. For details on specifications, refer to the *DeviceNet Catalog* (Cat. No. Q103).

Wiring Devices for I/O Units

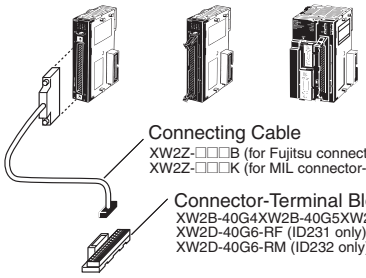
■ XW2Z Connecting Cables and XW2□ Connector-Terminal Block Conversion Units

Connect I/O Units to Terminal Blocks

CJ-series Basic I/O Unit (32 points)
CJ1W-ID231 (Fujitsu connector/Input Unit)
CJ1W-OD231 (Fujitsu connector/Output Unit)
CJ1W-ID232 (MIL connector/Input Unit)
CJ1W-OD232/OD233 (MIL connector/Output Unit)

CJ1M CPU Units
CJ1W-CPU22/CPU23 (MIL connector/built-in I/O)

Unit with Fujitsu Connector | Unit with MIL Connector | Unit with MIL Connector

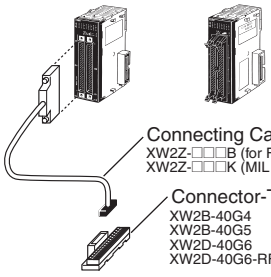


Connecting Cable
XW2Z-□□□B (for Fujitsu connector-type Units)
XW2Z-□□□K (for MIL connector-type Units)

Connector-Terminal Block Conversion Unit
XW2B-40G4XW2B-40G5XW2D-40G6
XW2D-40G6-RF (ID231 only)
XW2D-40G6-RM (ID232 only)

CJ-series Basic I/O Unit (64 points)
CJ1W-ID261 (Fujitsu connector/Input Unit)
CJ1W-OD261 (Fujitsu connector/Output Unit)
CJ1W-MD261 (Fujitsu connector/Output Unit)
CJ1W-ID262 (MIL connector/Input Unit)
CJ1W-OD262 (MIL connector/Output Unit)
CJ1W-OD263 (MIL connector/Output Unit)
CJ1W-MD263 (MIL connector/, I/O Unit)
CJ1W-MD563 (MIL connector, I/O Unit)

Unit with Fujitsu Connector | Unit with MIL Connector

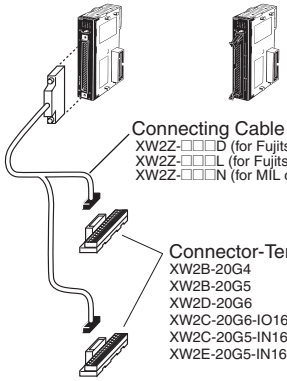


Connecting Cable (2 sets)
XW2Z-□□□B (for Fujitsu connector-type Units)
XW2Z-□□□K (MIL connector)

Connector-Terminal Block Conversion Unit
XW2B-40G4
XW2B-40G5
XW2D-40G6
XW2D-40G6-RF (built-in breeder reactor, CJ1W-ID261 and CJ1W-MD261 inputs only)
XW2D-40G6-RM (built-in breeder reactor, CJ1W-MD263 inputs only)

CJ-series Basic I/O Unit (32 points)
CJ1W-ID231 (Fujitsu connector/Input Unit)
CJ1W-OD231 (Fujitsu connector/Output Unit)
CJ1W-ID232 (MIL connector/Input Unit)
CJ1W-OD232 (MIL connector/Output Unit

Unit with Fujitsu Connector | Unit with MIL Connector

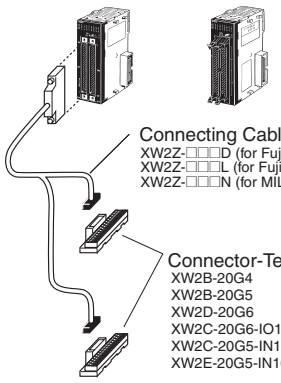


Connecting Cable
XW2Z-□□□D (for Fujitsu connector-type Input Units)
XW2Z-□□□L (for Fujitsu connector-type Output Units)
XW2Z-□□□N (for MIL connector-type Input Units)

Connector-Terminal Block Conversion Unit
XW2B-20G4
XW2B-20G5
XW2D-20G6
XW2C-20G6-IO16
XW2C-20G5-IN16 (inputs only)
XW2E-20G5-IN16 (inputs only)

CJ-series Basic I/O Unit (64 points)
CJ1W-ID261 (Fujitsu connector/Input Unit)
CJ1W-OD261 (Fujitsu connector/Output Unit)
CJ1W-MD261 (Fujitsu connector, I/O Unit)
CJ1W-ID262 (MIL connector/Input Unit)
CJ1W-OD262 (MIL connector/Output Unitz0
CJ1W-OD263 (MIL connector/Output Unit)
CJ1W-MD263 (MIL connector, I/O Unit)
CJ1W-MD563 (MIL connector, I/O Unit)

Unit with Fujitsu Connector | Unit with MIL Connector

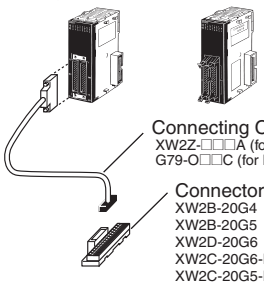


Connecting Cable (2 sets)
XW2Z-□□□D (for Fujitsu connector-type Input Units)
XW2Z-□□□L (for Fujitsu connector-type Output Units)
XW2Z-□□□N (for MIL connector-type Input Units)

Connector-Terminal Block Conversion Unit
XW2B-20G4
XW2B-20G5
XW2D-20G6
XW2C-20G6-IO16
XW2C-20G5-IN16 (inputs only)
XW2E-20G5-IN16 (inputs only)

CJ-series Basic I/O Unit (32 points)
CJ1W-MD231 (Fujitsu connector, I/O Unit)
CJ1W-MD232 (MIL connector, I/O Unit)
CJ1W-MD233 (MIL connector, I/O Unit)

Unit with Fujitsu Connector | Unit with MIL Connector



Connecting Cable
XW2Z-□□□A (for Fujitsu connector)
G79-O□□C (for MIL connector)

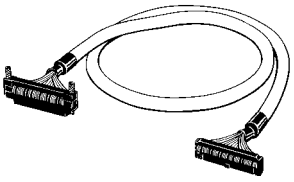
Connector-Terminal Block Conversion Unit
XW2B-20G4
XW2B-20G5
XW2D-20G6
XW2C-20G6-IO16
XW2C-20G5-IN16 (inputs only)
XW2E-20G5-IN16 (inputs only)

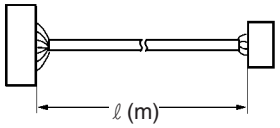
■ XW2Z Connecting Cables

XW2Z-□□□B Connecting Cables for 40-pin Fujitsu-compatible Connectors

Applicable Units	Connecting Cable (See note 1.)		Applicable Connector-Terminal Block Conversion Unit (See note 2.)
	Cable length ℓ (m)	Model number	
Units with Fujitsu-compatible Connectors CJ1W-ID231 CJ1W-ID261 CJ1W-OD231 CJ1W-OD261 CJ1W-MD261	0.5	XW2Z-050B	XW2D-40G6 XW2B-40G5 XW2B-40G4 XW2D-40G6-RF (See note 3.)
	1.0	XW2Z-100B	
	1.5	XW2Z-150B	
	2.0	XW2Z-200B	
	3.0	XW2Z-300B	
	5.0	XW2Z-500B	

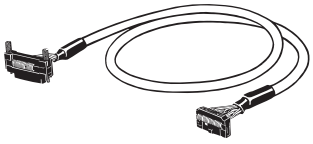
Note: 1. Up to two cables required for each PLC I/O Unit.
2. One Conversion Unit required for each cable.
3. Use with CJ1W-ID231/261 only; bleeder resistance attached to terminal block.

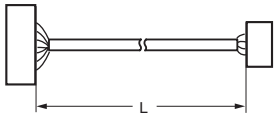




XW2Z-□□□A Connecting Cables for 24-pin Fujitsu-compatible Connectors

Applicable Units	Connecting Cable		Applicable Connector-Terminal Block Conversion Unit
	Cable length ℓ (m)	Model number	
Units with Fujitsu-compatible Connectors CJ1W-MD231	0.5	XW2Z-050A	XW2B-20G4 XW2B-20G5 XW2D-20G6 XW2C-20G6-IO16 XW2C-20G5-IN16 (inputs only) XW2E-20G5-IN16 (inputs only)
	1.0	XW2Z-100A	
	1.5	XW2Z-150A	
	2.0	XW2Z-200A	
	3.0	XW2Z-300A	
	5.0	XW2Z-500A	

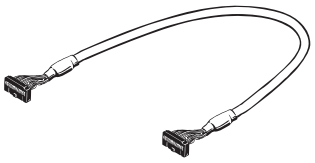


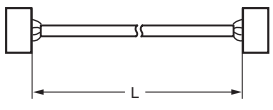


XW2Z-□□□K Connecting Cables for 40-pin MIL Connectors

Applicable Units	Connecting Cable		Applicable Connector-Terminal Block Conversion Unit
	Cable length ℓ (m)	Model number	
Units with MIL Connectors CJ1W-ID232 CJ1W-OD232 CJ1W-ID262 CJ1W-OD233 CJ1W-OD262 CJ1W-OD263 CJ1W-MD263 CJ1W-MD563 CJ1M-CPU2□ (built-in I/O)	1.0	XW2Z-100K	XW2D-40G6 XW2B-40G5 XW2B-40G4 XW2D-40G6-RM (See note.)
	1.5	XW2Z-150K	
	2.0	XW2Z-200K	
	3.0	XW2Z-300K	
	5.0	XW2Z-500K	

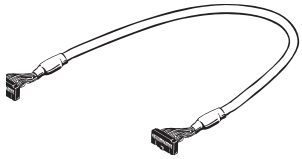
Note: The terminal block has breeder resistance built in. Applicable only to CJ1W-ID232 and CJ1W-MD263 inputs.

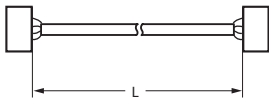




G79-O□□C Connecting Cables for 20-pin MIL Connectors

Applicable Units	Connecting Cable		Applicable Connector-Terminal Block Conversion Unit
	Cable length ℓ (m)	Model number	
Units with MIL Connectors CJ1W-MD232 CJ1W-MD233	0.25	G79-O25C	XW2B-20G4 XW2B-20G5 XW2D-20G6 XW2C-20G6-IO16 XW2C-20G5-IN16 (inputs only) XW2E-20G5-IN16 (inputs only)
	0.5	G79-O50C	

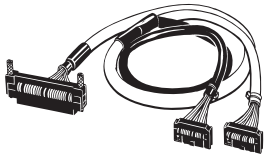


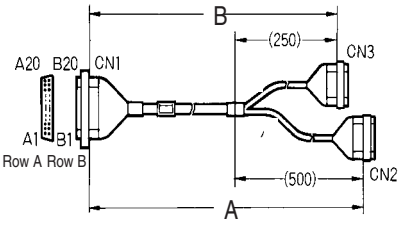


XW2Z-□□□D Connecting Cables for 40-pin Fujitsu-compatible Connectors

Applicable Units		Connecting Cable (See note 1.)			Applicable Connector-Terminal Block Conversion Unit (See note 2.)
		Cable lengths (m)		Model number	
		A	B		
Units with Fujitsu-compatible Connectors CJ1W-ID231 CJ1W-OD231 CJ1W-ID261 CJ1W-OD261 CJ1W-MD261	Inputs	1.0	0.75	XW2Z-100D	XW2B-20G4 XW2B-20G5 XW2D-20G6 XW2C-20G6-IO16 XW2C-20G5-IN16 (See note 3.) XW2E-20G5-IN16 (See note 3.)
		1.5	1.25	XW2Z-150D	
		2.0	1.75	XW2Z-200D	
		3.0	2.75	XW2Z-300D	
		5.0	4.75	XW2Z-500D	
	Outputs	1.0	0.75	XW2Z-100L	
		1.5	1.25	XW2Z-150L	
		2.0	1.75	XW2Z-200L	
		3.0	2.75	XW2Z-300L	
		5.0	4.75	XW2Z-500L	

Note: 1. Up to two cables required for each PLC I/O Unit.
2. One Conversion Unit required for each cable.
3. Connects to CJ1W-ID231, CJ1W-ID261, and CJ1W-MD261 inputs only.



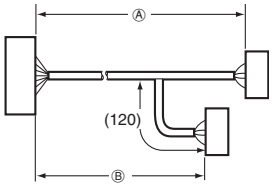


Note: CN2 (black side) corresponds to row A of CN1 and CN3 (yellow) corresponds to row B.

XW2Z-□□□N Connecting Cables for 40-pin MIL Connectors

Applicable Units	Connecting Cable			Applicable Connector-Terminal Block Conversion Unit
	Cable lengths (m)		Model number	
	A	B		
Units with MIL connectors CJ1W-ID232 CJ1W-OD232 CJ1W-ID262 CJ1W-OD233 CJ1W-OD262 CJ1W-OD263 CJ1W-MD263 CJ1W-MD563	1.0	0.75	XW2Z-100N	XW2B-20G4 XW2B-20G5 XW2D-20G6 XW2C-20G6-IO16 XW2C-20G5-IN16 (inputs only) (See note.) XW2E-20G5-IN16 (inputs only) (See note.)
	1.5	1.25	XW2Z-150N	
	2.0	1.75	XW2Z-200N	
	3.0	2.75	XW2Z-300N	
	5.0	4.75	XW2Z-500N	

Note: Connects to CJ1W-ID232, CJ1W-ID262, CJ1W-MD263, and CJ1W-MD563 inputs only.

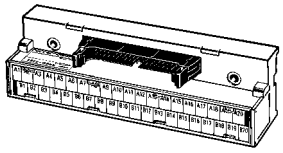


Linear length (bends not included)

■ XW2□ Connector Terminal Block Conversion Units

XW2D Connector-Terminal Block Conversion Units (Slim Type)

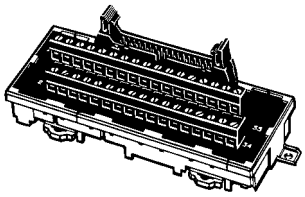
- Mounting area 35% less than 40-point XW2B models enabling down-sizing of control panel and automatic devices.
- Fallout-prevention mechanism used with terminal screws.
- Round crimp terminals and Y-shaped crimp terminals can be used together.
- Models are available that has a built-in breeder resistor (5.6 kΩ) for each terminal (model numbers ending in -RF or -RM) to handle input currents of 8.4 mA (typical).



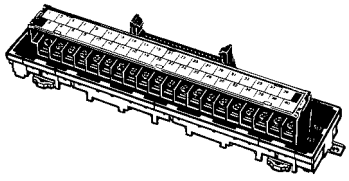
XW2D-□□G6 (M3 Phillips screws)

XW2B Connector-Terminal Block Conversion Units (Through Type)

- Mount to DIN track or with screws.
- MIL flat cable connectors or multi-pin square connectors available.
- Terminal blocks available with M3 or M3.5 screws.



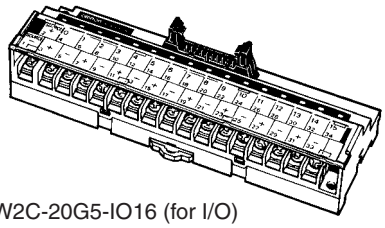
XW2B-□□G4 (regular M3 screws)



XW2B-□□G5 (M3.5 screws)

XW2C Connector-Terminal Block Conversion Units (with Common)

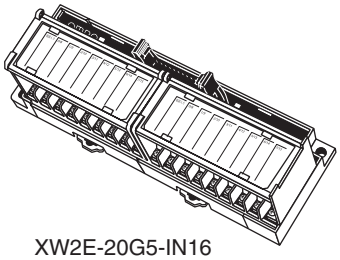
- Equipped with common terminal for I/O device power supply.
- ON/OFF status indicators (XW2C-20G5-IN16).
- Mount to DIN track or via screws.
- Short bars can be set to handle either PLC Input or Output Units (XW2C-20G6-IO16).



XW2C-20G5-IO16 (for I/O)
XW2C-20G6-IN16 (for inputs)

XW2E Connector-Terminal Block Conversion Units (with Common and Three-tier Construction for Inputs)

- Equipped with common terminal on power supply terminal block.
- Three-tier construction for easy wiring.



XW2E-20G5-IN16

■ Models

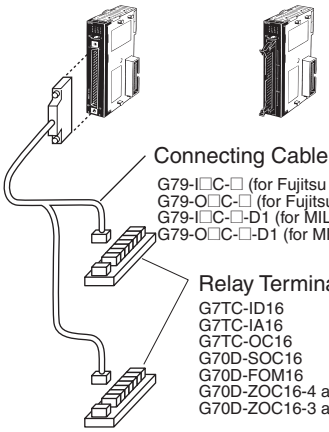
Name		I/O	Model
Connector-Terminal Block Conversion Unit (slim type)	M3	32 points	XW2D-40G6
Connector-Terminal Block Conversion Units (with built-in bleeder resistors)	M3	32 points	XW2D-40G6-RF
			XW2D-40G6-RM
Connector-Terminal Block Conversion Unit (through type)	M3.5	32 points	XW2B-40G5
	M3		XW2B-40G4
Connector-Terminal Block Conversion Unit (slim type)	M3	16 points	XW2D-20G6
Connector-Terminal Block Conversion Unit (through type)	M3.5	16 points	XW2B-20G5
	M3		XW2B-20G4
Connector-Terminal Block Conversion Unit (common type)	M3	16 inputs/16 outputs	XW2C-20G6-IO16
Connector-Terminal Block Conversion Unit (common type)	M3.5	16 inputs	XW2C-20G5-IN16
Connector-Terminal Block Conversion Unit (common type, three tiers for inputs)	M3	16 inputs	XW2E-20G5-IN16

■ G79 I/O Relay Terminal Connecting Cables and G7TC, G70A, and G70D I/O Relay Terminals for Connecting Cables

Connect I/O Units to Relay Terminals

CJ-series Basic I/O Unit (32 points)
CJ1W-ID231 (Fujitsu connector/Input Unit)
CJ1W-OD231 (Fujitsu connector/Output Unit)
CJ1W-ID232 (MIL connector/Input Unit)
CJ1W-OD232 (MIL connector/Output Unit)
CJ1W-OD233 (MIL connector/Output Unit)

Unit with Fujitsu Connector | Unit with MIL Connector

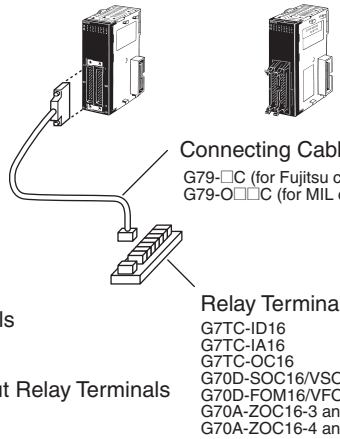


Connecting Cable
G79-I□C-□ (for Fujitsu connector-type Input Units)
G79-O□C-□ (for Fujitsu connector-type Output Units)
G79-I□C-□-D1 (for MIL connector-type Input Units)
G79-O□C-□-D1 (for MIL connector-type Output)

Relay Terminal
G7TC-ID16 } Input Relay Terminals
G7TC-IA16
G7TC-OC16 } Output Relay Terminals
G70D-SOC16
G70D-FOM16
G70D-ZOC16-4 and Relays (See note 1.)
G70D-ZOC16-3 and Relays (See note 2.)

CJ-series Basic I/O Unit (32 points)
CJ1W-MD231 (Fujitsu connector, I/O Unit)
CJ1W-MD232 (MIL connector, I/O Unit)
CJ1W-MD233 (MIL connector, I/O Unit)

Unit with Fujitsu Connector | Unit with MIL Connector



Connecting Cable
G79-□C (for Fujitsu connector)
G79-O□□C (for MIL connector)

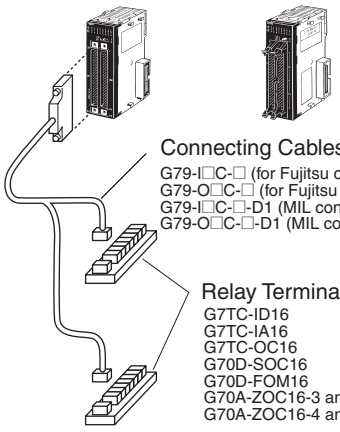
Relay Terminal
G7TC-ID16 } Input Relay Terminals
G7TC-IA16
G7TC-OC16 } Output Relay Terminals
G70D-SOC16/VSOC16
G70D-FOM16/VFOM16
G70A-ZOC16-3 and Relays
G70A-ZOC16-4 and Relays*

Note: 1. Can be used only with CJ1W-OD232.
2. Can be used only with CJ1W-OD231/233.

* Can be used only with CJ1W-MD232.

CJ-series Basic I/O Unit (64 points)
CJ1W-ID261 (Fujitsu connector/Input Unit)
CJ1W-OD261 (Fujitsu connector/Output Unit)
CJ1W-MD261 (Fujitsu connector, I/O Unit)
CJ1W-ID262 (MIL connector/Input Unit)
CJ1W-OD262 (MIL connector/Output Unit)
CJ1W-OD263 (MIL connector/Output Unit)
CJ1W-MD263 (MIL connector, I/O Unit)

Unit with Fujitsu Connector | Unit with MIL Connector



Connecting Cables (2 sets)
G79-I□C-□ (for Fujitsu connector-type Input Units)
G79-O□C-□ (for Fujitsu connector-type Output Units)
G79-I□C-□-D1 (MIL connector/Input Unit)
G79-O□C-□-D1 (MIL connector/Output Unit)

Relay Terminal
G7TC-ID16 } Input Relay Terminals
G7TC-IA16
G7TC-OC16 } Output Relay Terminals
G70D-SOC16
G70D-FOM16
G70A-ZOC16-3 and Relays
G70A-ZOC16-4 and Relays*

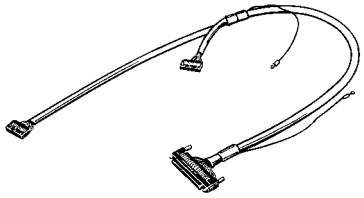
* Can be used only with CJ1W-OD262.

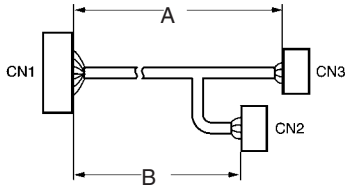
■ G79 I/O Relay Terminal Connecting Cables

G79-I□□□C-□/G79-O□□□C-□ Connecting Cables for 40-pin Fujitsu-compatible Connectors

I/O Unit (32, 64 points)		I/O Relay Terminal Connecting Cable (See note 1.)			Applicable Relay Terminal (See note 2.)
		Cable length (m)		Model	
Model	I/O	A	B		Model number
CJ1W-ID231 CJ1W-ID261 CJ1W-MD261 inputs	32 inputs 64 inputs 32 inputs	1 1.5 2 3 5	0.75 1.25 1.75 2.75 4.75	G79-I100C-75 G79-I150C-125 G79-I200C-175 G79-I300C-275 G79-I500C-475	G7TC-I□16
CJ1W-OD231 CJ1W-OD261 CJ1W-MD261 outputs	32 outputs 64 outputs 32 outputs	1 1.5 2 3 5	0.75 1.25 1.75 2.75 4.75	G79-O100C-75 G79-O150C-125 G79-O200C-175 G79-O300C-275 G79-O500C-475	G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 and Relays

Note: 1. One cable required for each I/O Unit connector.
2. Relay Terminals required for number of I/O.



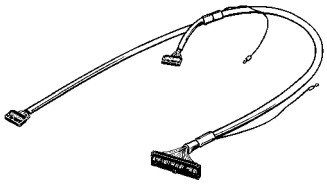


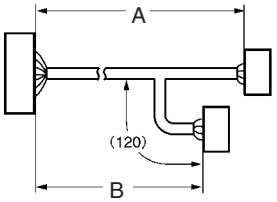
Linear lengths (not including bends)

G79-I□□□-□-D1/G79-O□□□-□-D1 Connecting Cables for 40-pin MIL Connectors

I/O Unit (32/64 points)		I/O Relay Terminal Connecting Cables (See note 1.)			Applicable Relay Terminals (See note 2.)
		Cable lengths (m)		Model numbers	
Model	I/O	A	B		Model numbers
CJ1W-ID232 CJ1W-ID262 CJ1W-MD263 inputs	32 inputs 64 inputs 32 inputs	0.5 0.75	0.25 0.5	G79-O50-25-D1 G79-O75-50-D1	G7TC-I□16
CJ1W-OD232 CJ1W-OD262	32 outputs 64 outputs	0.5 0.75	0.25 0.5	G79-I50-25-D1 G79-I75-50-D1	G70D-SOC16-1 G70A-ZOC16-4 and Relays
CJ1W-OD233 CJ1W-OD263 CJ1W-MD263 outputs	32 outputs 64 outputs 32 outputs	0.5 0.75	0.25 0.5	G79-O50-25-D1 G79-O75-50-D1	G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 and Relays

Note: 1. One connector required for each I/O Unit connector.
2. Relay Terminals required for number of I/O.

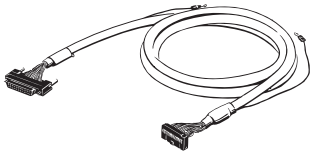


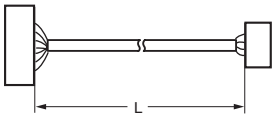


Linear length (not including bends)

G79-□C Connecting Cables for 24-pin Fujitsu-compatible Connectors

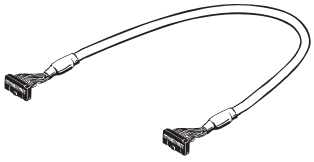
I/O Unit (32 points)		I/O Relay Terminal Connecting Cables)		Applicable Relay Terminals	
Models	I/O				
CJ1W-MD231 inputs	16 inputs	Same for inputs and outputs		Inputs	G7TC-I□16
CJ1W-MD231 outputs	16 outputs	Cable length ℓ (m)	Model	Outputs	G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 and Relays
		1.0	G79-100C		
		1.5	G79-150C		
		2.0	G79-200C		
		3.0	G79-300C		
		5.0	G79-500C		

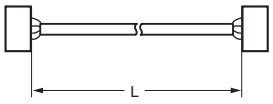




G79-□C Connecting Cables for 20-pin MIL Connectors

I/O Unit (32 points)		I/O Relay Terminal Connecting Cables)		Applicable Relay Terminals (See note 2.)
Models	I/O	Cable length ℓ (m)	Model	
CJ1W-MD232 inputs CJ1W-MD233 inputs	16 inputs	0.25	G79-O25C	G7TC-I□16
		0.5	G79-O50C	
CJ1W-ND232 outputs	16 outputs	0.25	G79-O25C	G7TC-OC16-1
		0.5	G79-O50C	
		0.25	G79-I25C	G70D-SOC16-1 G70A-ZOC16-4 and Relays
		0.5	G79-I50C	
CJ1W-MD233 outputs	16 outputs	0.25	G79-O25C	G7TC-OC16 G70D-□O□16 G70A-ZOC16-3 and Relays
		0.5	G79-O50C	

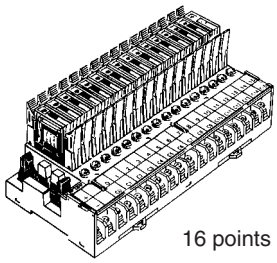




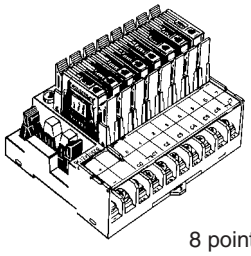
■ G7TC, G70A, and G70D I/O Relay Terminals for Connecting Cables

G7TC:
Input and Output Terminals Ideal for Creating an Interface with the Controller

- Models with 8 outputs, 16 outputs, or 16 inputs.
- PNP model with 16 outputs.
- Compact: 182 x 85 x 68 mm (WxDxH) (8-pt: 102 mm H).
- G7T I/O relays (SPST-NO, 5 A/relay) mounted.
- Models available meeting UL and CSA standards.
- Model with 16 independent points.
- G3TA I/O Solid-state Relays can be mounted.



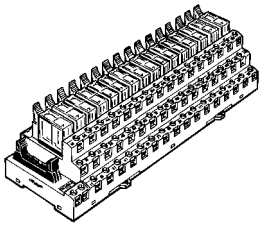
16 points



8 points

G70A-ZOC16:
High-capacity Relay Terminal Sockets That Allow Mounting of G2R Relay (SPDT Type)

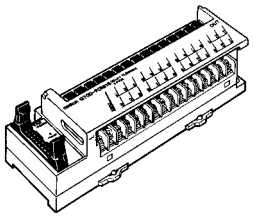
- 16-output relay terminal sockets.
- PNP models available.
- Compact: 234 x 75 x 64 mm (W x D x H).
- Mount G2R Power Relays, G3R Solid-state Relays, G3RZ Power MOS FET Relays, or H3RN Timers as required (Relays/Timers sold separately).
- High-capacity terminal block: 10 A.
- VDE standards met.
- Model with 16 independent points.



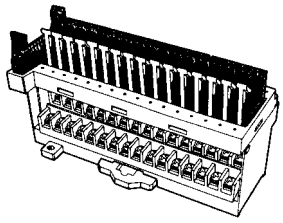
Note: Relays sold separately.

G70D:
Compact, Space-Saving Relay Terminal That Contributes to Downsizing of Control Panels

- 16-output relay terminal.
- Pick from a flat design (156 x 51 x 39 mm (WxDxH)) or vertical design (135 x 46 x 81 mm (WxDxH))
- G6D Power Relays (SPST-NO, 3 A/relay for flat design and 3 A/common for vertical design) or G3DZ Power MOS FET Relays (SPST-NO, 0.3 A/relay) mounted.
- Flat design: 2 outputs/common,
  Vertical design: 16 independent outputs.



Flat Design
G70D-SOC16
(relay outputs)
G70D-FOM16
(MOS FET outputs)



Vertical Design
G70D-VSOC16
(relay outputs)
G70D-VFOM16
(MOS FET outputs)

■ Models

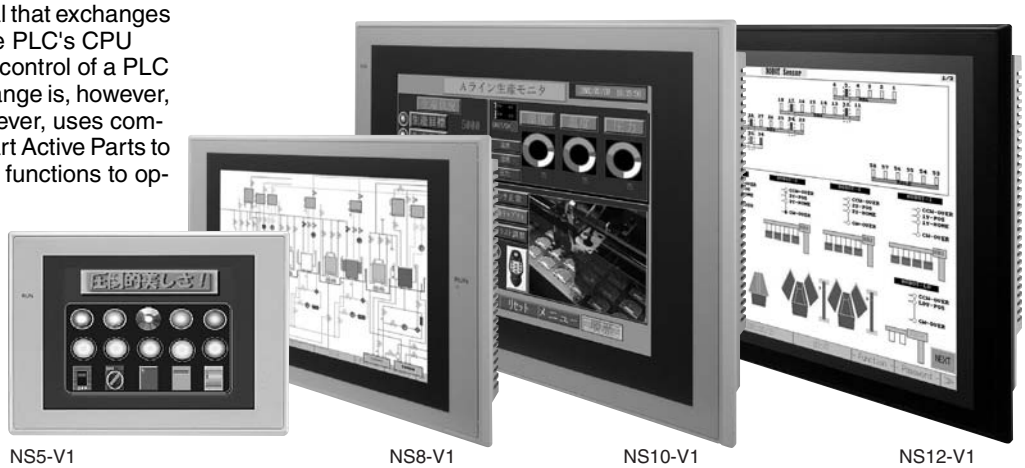
Model	Rated voltage
G7TC-ID16	24 VDC
G7TC-IA16	100/110 VAC
	200/220 VAC
G7TC-OC16	24 VDC
G70A-ZOC16-3	Relays sold separately.
G70A-ZOC16-4	Relays sold separately.
G70D-SOC16	24 VDC
G70D-VSOC16	24 VDC
G70D-FOM16	24 VDC
G70D-VFOM16	24 VDC

Peripheral Devices

Programmable Terminals
NS5-V1/8-V1/10-V1/12-V1

PTs as a Machine Navigator. NS-series PTs Navigate All Areas of Machine Operation, from Daily Operation to Device Error Displays and Error Recovery

The PT is traditionally a terminal that exchanges data in allocated areas with the PLC's CPU Unit. The internal and external control of a PLC with only this type of data exchange is, however, difficult. An NS-series PT, however, uses communications functions and Smart Active Parts to incorporate software computer functions to operate as a Device Navigator.



NS5-V1
5-inch Model

NS8-V1
8-inch Model

NS10-V1
10-inch Model

NS12-V1
12-inch Model

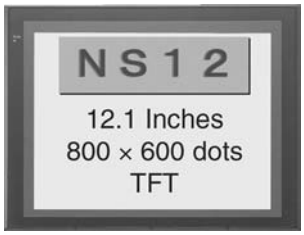
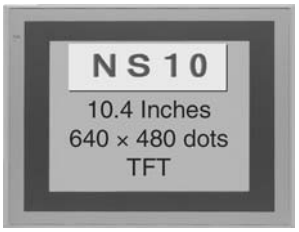
Consider the possibilities in using an NS-series PT with your existing system.

- NS-series PTs support serious networking to enable creating flexible communications systems.
- Simulate PT operations on personal computers without PT hardware.
- Monitor PLC ladder programs from an NS-series PT after system startup.
  (Applies to SYSMAC CS-series and CJ-series PLCs.)
- Use macro programs. A wide range of processing can be written in an easy-to-understand language.
- Use the many functions that greatly increase screen creation efficiency.
- Use Memory Cards with a wide range of data formats:
  CSV, RTF, TXT, BMP, and JPEG.

NS-Designer

The new NS-Designer screen creation software provides an easy, comfortable development environment.

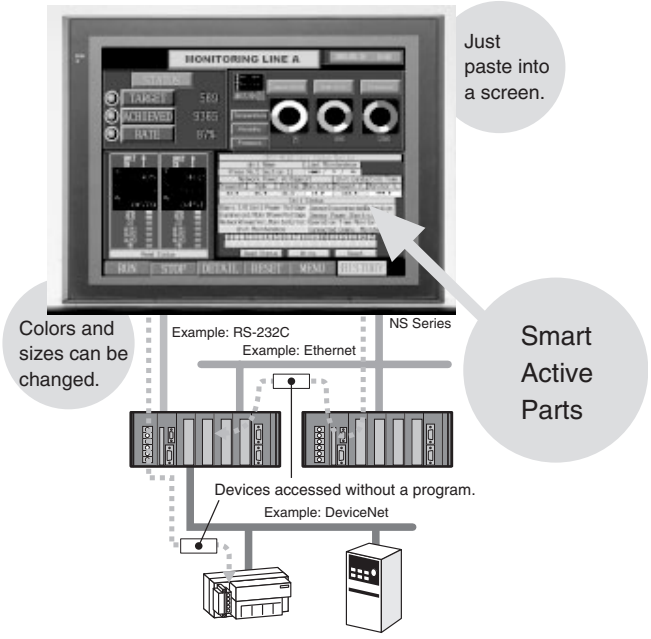
NS-series Lineup

Item	Series	NS12-V1	NS10-V1	NS8-V1	NS5-V1
Appearance					
Dimensions (W × H × D)		315 × 241 × 48.5 mm	315 × 241 × 48.5 mm	232 × 177 × 48.5 mm	195 × 142 × 54 mm
Effective display area		12.1 inch	10.4 inch	8 inch	5.7 inch
Display device		TFT	TFT	TFT	STN
Number of dots		800 × 600 dots	640 × 480 dots	640 × 480 dots	320 × 240 dots
Display colors	Basic colors (objects, background, etc.)	256 colors	256 colors	256 colors	256 colors
	Image data (BMP or JPEG images)	32,768 colors	32,768 colors	32,768 colors	4,096 colors
	Images displayed via video input (See note 2.)	260,000 colors	260,000 colors	260,000 colors	---
Screen data capacity		20 Mbytes	20 Mbytes	20 Mbytes	6 Mbytes
Memory Card		❍	❍	❍	❍
Ladder Monitor function		❍	❍	❍	---
Video input Unit support		❍	❍	❍	---
Controller Link Interface support		❍	❍	---	---

Note: **1.** The screen data capacity of the NS8-V1 depends on the model.
2. Video input is not supported by the NS5-V1.

With an NS-series PT, just paste Smart Active Parts to customize the interface for your machine.

NS-series PTs provide Smart Active Parts that allow direct data access to a variety of devices.



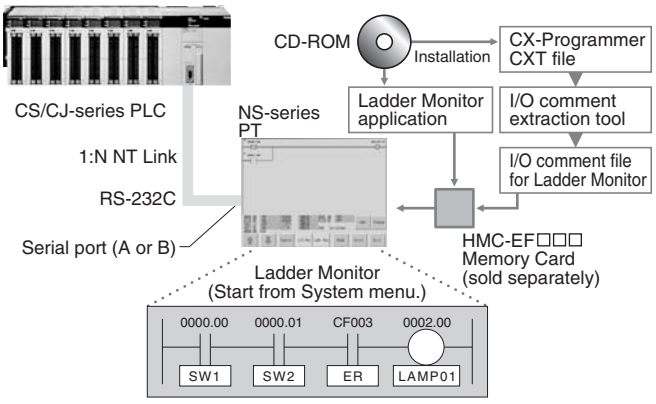
A SYSMAC CS/CJ-series PLC's Ladder Program can be monitored from an NS-series Programmable Terminal after the System is started.

NS-Ladder Monitor

Do You Need to Monitor Execution of the PLC's Ladder Program?

● Ladder Monitor Function

Save the NS-EXT01-V2 Ladder Monitor system program on a Memory Card and install the Memory Card to enable monitoring of a ladder program (I/O bit status monitor, address/instruction search, multiple I/O bit monitor, etc.) being executed in a CS/CJ-series PLC connected by a serial connection. It is also possible to display I/O comments created with the CX-Programmer.



Note: The PLC operation can be monitored only if the PLC is a CS/CJ-series PLC connected to serial port A or serial port B of the Programmable Terminal with 1:N NT Link protocol.

Ordering Information

Model name	Specifications			Model number
		Ethernet	Case color	
NS12-V1 PT	TFT 12 inch 800 × 600 dots	No	Ivory	NS12-TS00-V1
			Black	NS12-TS00B-V1
		Yes	Ivory	NS12-TS01-V1
			Black	NS12-TS01B-V1
NS10-V1 PT	TFT 10 inch 640 × 480 dots	No	Ivory	NS10-TV00-V1
			Black	NS10-TV00B-V1
		Yes	Ivory	NS10-TV01-V1
			Black	NS10-TV01B-V1
NS8-V1 PT	TFT 8 inch 640 × 480 dots	No	Ivory	NS8-TV00-V1
			Black	NS8-TV00B-V1
		Yes	Ivory	NS8-TV01-V1
			Black	NS8-TV01B-V1
NS5-V1 PT	STN 5 inch 320 × 240 dots	No	Ivory	NS5-SQ00-V1
			Black	NS5-SQ00B-V1
		Yes	Ivory	NS5-SQ01-V1
			Black	NS5-SQ01B-V1
NS-Designer Screen-design software	Windows version on CD-ROM			NS-NSDC1-V6
Cable (See note 1.)	Screen transfer cable for IBM PC/AT or compatible			XW2Z-S002
	USB Host Cable, cable length: 5 m			NS-US52 (5 m)
	USB Host Cable, cable length: 2 m			NS-US22 (2 m)
	USB RS-232C Host Cable, cable length: 0.5 m			CS1W-CIF31
PT to PLC Connecting Cable	PT connection: 9 pins PLC connection: 9 pins		Length: 2 m	XW2Z-200T
			Length: 5 m	XW2Z-500T
Accessories	Ladder Monitor Software	One CD-ROM Ladder Monitor application (See note 2.) and I/O Comment File Extraction Tool (See note 3.) A Memory Card (sold separately) is required to use the software in the NS-series PT. An HMC-AP001 Memory Card Adaptor is required in order to copy the data from the CD-ROM in the computer to the Memory Card.		NS-EXT01-V2
				NS-EXT01-V2L03 (3 licenses)

Note: 1. Be sure to use a USB Cable made by OMRON when connecting the PT to a printer.
2. NS-series PT application used to monitor a SYSMAC CS/CJ-series PLC's ladder program from the PT.
3. This tool extracts I/O comment data from the CX-Programmer's CXT file and converts the data to a format that can be used by the Ladder Monitor Software for NS.

■ Accessories

Model name/Specifications			Model
Ladder monitor	**Note: 1.** A Memory Card (sold separately) is required to use the software in the NS-series PT **2.** An HMC-AP001 Memory Card Adapter is required to copy data from the CD-ROM in the computer to the Memory Card.		NS-EXT01-V2L10 (10 licenses)
			NS-EXT01-V2HMC (with 64-Mbyte Memory Card)
Video Input Unit	Inputs: 4 channels Signal type: NTSC/PAL		NS-CA001
	Inputs: 2 video channels and 1 RGB channel (See note 2.) Signal type: NTSC/PAL		NS-CA002
Special Cable for the Console			F150-VKP (2 m)
			F150-VKP (5 m)
Controller Link Interface Unit		For Controller Link Communications	NS-CLK21
RS-422A Adapter	Transmission distance: 500 m total length **Note: 1.** Use this model when connecting PT models without a V1 suffix. **2.** PT models with a suffix of V1 can also be connected.		NS-AL002
	Transmission distance: 50 m total length **Note:** Only PT models with a suffix of V1 are connectable. Use the NS-AL002 to connect models without a V1 suffix.		CJ1W-CIF11
Anti-reflection Sheets (5 surface sheets per pack)		NS12/10	NS12-KBA04
		NS8	NS7-KBA04
		NS5	NT30-KBA04
Protective Covers (5 sheets per pack) (anti-reflection coating)		NS12/10	NS12-KBA05
		NS8	NS7-KBA05
		NS5	NT31C-KBA05
Protective Covers (5 sheets per pack) (transparent)		NS12/10	NS12-KBA05N
		NS8	NS7-KBA05N
		NS5	NT31C-KBA05N
Attachment	(NT625C/631/631C Series to NS12 Series)		NS12-ATT01
	(NT625C/631/631C Series to NS12 Series)		NS12-ATT01B
	(NT620S/620C/600S Series to NS8 Series)		NS8-ATT01
	(NT600M/600G/610G/612G Series to NS8 Series)		NS8-ATT02
Memory Card		15 MB	HMC-EF172
		30 MB	HMC-EF372
		64 MB	HMC-EF672
Memory Card Adapter			HMC-AP001
Battery			CJ1W-BAT01
Bar Code Reader (Refer to the Catalog for details.)			V520-RH21-6

Note: 1. Chemical-resistant Cover NT30-KBA01 is available for the NS5 only.
2. One screen cannot display two video inputs simultaneously.

Mechatronics

■ R7M-A/R7D-A AC SMARTSTEP Servomotors/Servo Drivers

SMARTSTEP Provides an Easy-Setup Operation Environment

Connections

A lineup of control cables ensures easy connections between the Driver and a variety of controllers. A signal cable is all that is required to connect the motor as well. Special reduction gears are available.

Operation

The SMARTSTEP used in combination with OMRON's SYSMAC CJ-series PCs or NS-series PTs enables easy system monitoring and debugging. Furthermore, versatile support products include the Parameter Unit as well as the Monitoring Software.

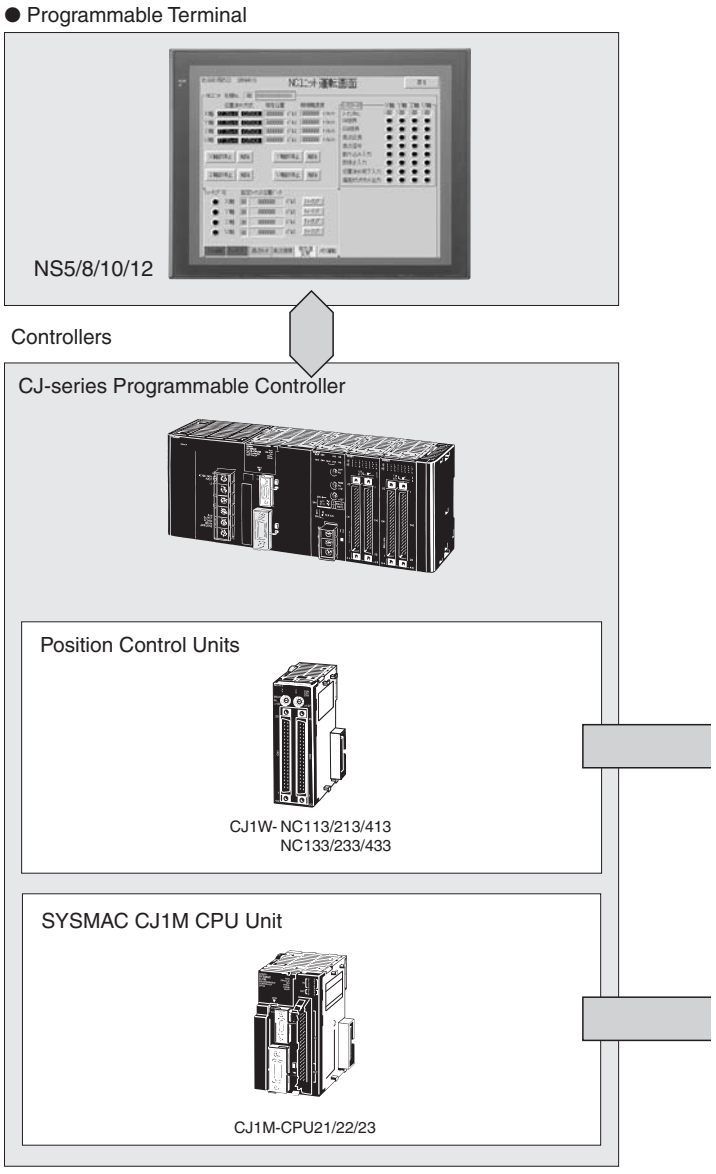
Setup

Easy system setup is possible from front-panel switches. The system does not require time-consuming parameter settings and the Servomotor can be used as easily as a stepping motor.

Servomotor Capacities

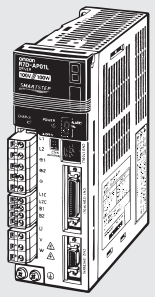
30 W, 50 W, 100 W, 200 W, 400 W, 750 W

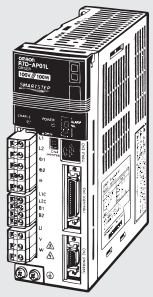
System Configuration



Servo Drivers

R7D-A

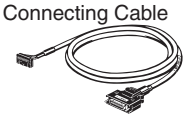




The illustrations shown here are examples only.

Pulse train references

XW2Z-□□□J-B5
Servo Driver
Connecting Cable

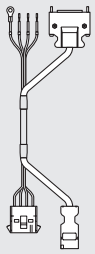


XW2B-□□J6-□B
Servo Relay Unit

XW2Z-□□□J-A□
Position Control Unit
Connecting Cable

Motor Cables

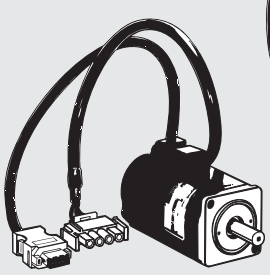
R7A-CEA□□□S
(without brakes)
R7A-CEA□□□B
(with brakes)

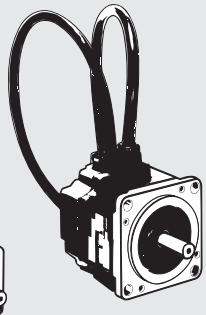


Motor Drive and Encoder Signals
Separate cables are also available for the motor drive and encoder signals.

Servomotors

R7M-A





The illustrations shown here are examples only.

■ R88M-W/R88D-W AC Servomotors/Servo Drivers (OMNUC W Series)

The Performance, Response, Speed, and Control Accuracy Required of Servos Onsite: Greatly Improve Machine Performance and Productivity

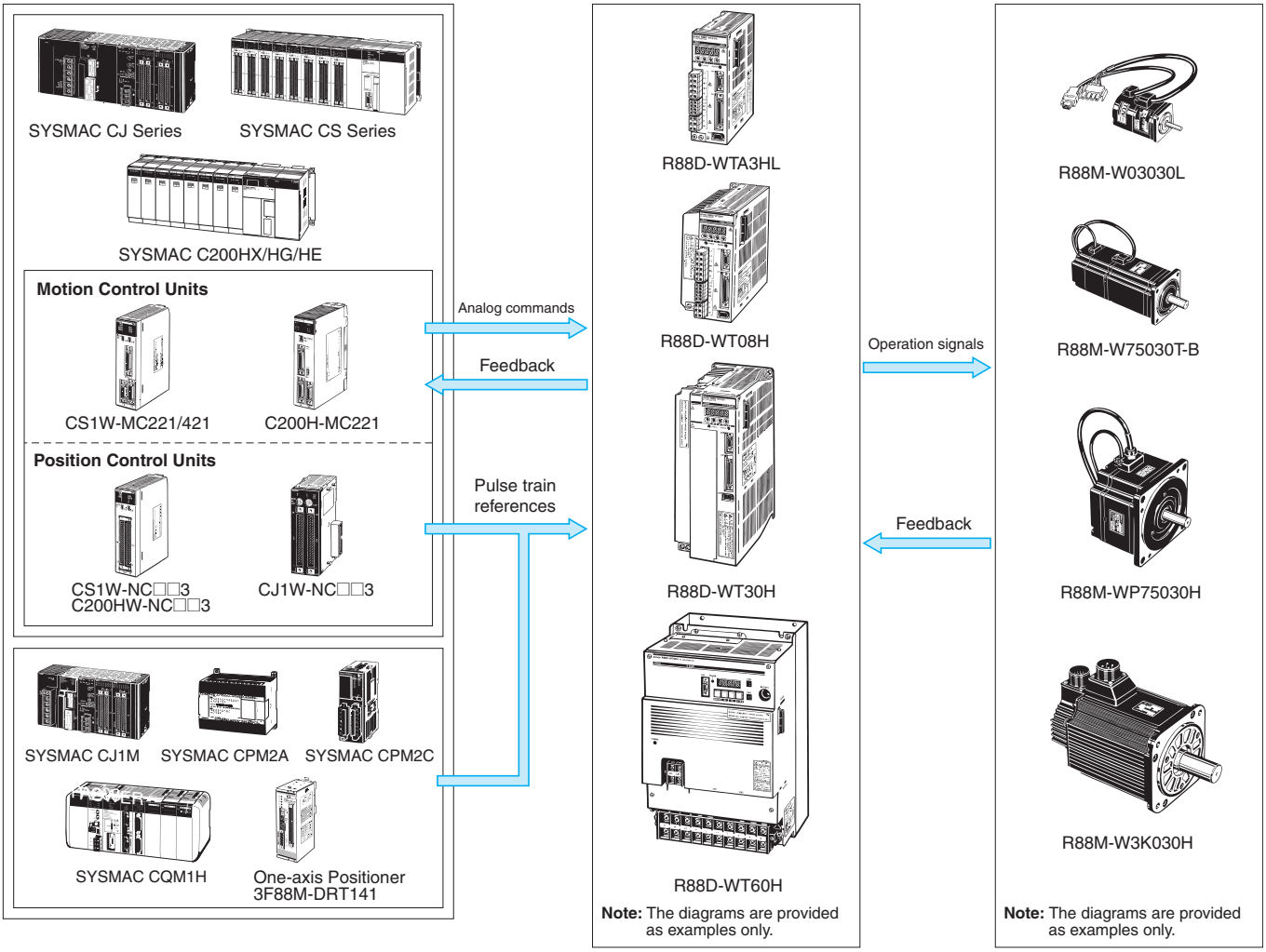
AC Servo Drivers

- Control algorithms greatly reduce positioning time (1/3rd of OMRON U Series).
- Online auto-tuning to automatically measure machine characteristics and easily adjust the servo gain.

AC Servomotors

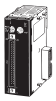
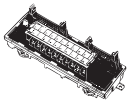
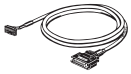
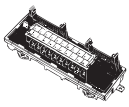
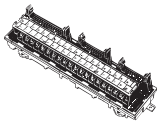
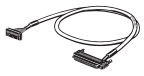
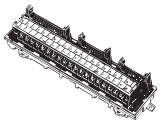
- Comprehensive lineup: Models with brakes, models with gears, 1,000-r/min models (300 W to 5.5 kW), 1,500-r/min models (450 W to 15 kW), and 3,000-r/min models (30 W to 5 kW).
- Greatly reduce motor speed ripple for smoother operation.
- Maximum speeds of 5,000 r/min and high-resolution serial encoder for a fast, accurate drive (not provided on all models).

System Configuration



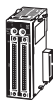
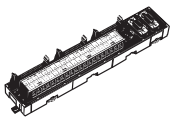
■ XW2B Servo Relay Units

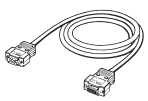
Combinations of Servo Relay Units, Servo Drivers, and Position Control

Position Control Units	Position Control Unit Connecting Cables	Servo Relay Units	Servo Driver Connecting Cables	Servo Drivers
			 (See note 2.)	
CJ1W-NC113	XW2Z-050J-A14 (For W Series, 50 cm) XW2Z-100J-A14 (For W Series, 100 cm)	XW2B-20J6-1B (See note 1.)	SMARTSTEP A-series Connecting Cable	SMARTSTEP A-series Servo Driver
	XW2Z-050J-A16 (For A Series, 50 cm) XW2Z-100J-A16 (For A Series, 100 cm)		XW2Z-100J-B5 (for 100 cm) XW2Z-200J-B5 (for 200 cm)	R7D-AP□□□
CJ1W-NC133	XW2Z-050J-A18 (For W Series, 50 cm) XW2Z-100J-A18 (For A Series, 100 cm)			
	XW2Z-050J-A20 (For A Series, 50 cm) XW2Z-100J-A20 (For A Series, 100 cm)			
			 (See note 2.)	
CJ1M-CPU21/22/23 (for 1 axis)	XW2Z-100J-A27 (For W Series or R88D-WT□, 100 cm)	XW2B-20J6-8A	OMNUC W-series Connecting Cable	OMNUC W-series Servo Driver
	XW2Z-100J-A26 (For A Series or R7D-AP□, 100 cm)		XW2Z-100J-B4 (for 100 cm) XW2Z-200J-B4 (for 200 cm)	R88D-WT□□H□
				
CJ1W-NC213/413 (See note 3.)	XW2Z-050J-A15 (For W Series, 50 cm) XW2Z-100J-A15 (For W Series, 100 cm)	XW2B-40J6-2B (See note 1.)		
	XW2Z-050J-A17 (For A Series, 50 cm) XW2Z-100J-A17 (For A Series, 100 cm)			
CJ1W-NC233/433 (See note 3.)	XW2Z-050J-A19 (For W Series, 50 cm) XW2Z-100J-A19 (For W Series, 100 cm)			
	XW2Z-050J-A21 (For A Series, 50 cm) XW2Z-100J-A21 (For A Series, 100 cm)			
				
CJ1M-CPU21/22/23 (for 2 axes)	XW2Z-100J-A27 (For W Series or R88D-WT□, 100 cm)	XW2B-40J6-9A		
	XW2Z-100J-A26 (For A Series or R7D-AP□, 100 cm)			

SMARTSTEP A Series with Communications Functions

The motor response waveform, alarm information, and other information from the SMARTSTEP A Series can be used for monitoring in a PLC or PT by transferring data through a Serial Communications Unit.

Position Control Units	Position Control Unit Connecting Cables	Servo Relay Units	Servo Driver Connecting Cables	Servo Drivers
			 (See note 2.)	
CJ1W-NC213/413 (See note 3.)	XW2Z-050J-A17 (for 50 cm) XW2Z-100J-A17 (for 100 cm)	XW2B-40J6-4A (See note 4.)	SMARTSTEP A-series Connecting Cable	SMARTSTEP A-series Servo Driver
CJ1W-NC233/433 (See note 3.)	XW2Z-050J-A21 (for 50 cm) XW2Z-100J-A21 (for 100 cm)		XW2Z-100J-B7 (for 100 cm) XW2Z-200J-B7 (for 200 cm)	R7D-AP□□□

Serial Communications Unit	Serial Communications Unit Connecting Cable
	
CJ1W-SCU41/SCU21	XW2Z-100J-C1 (for 100 cm) XW2Z-200J-C1 (for 200 cm)

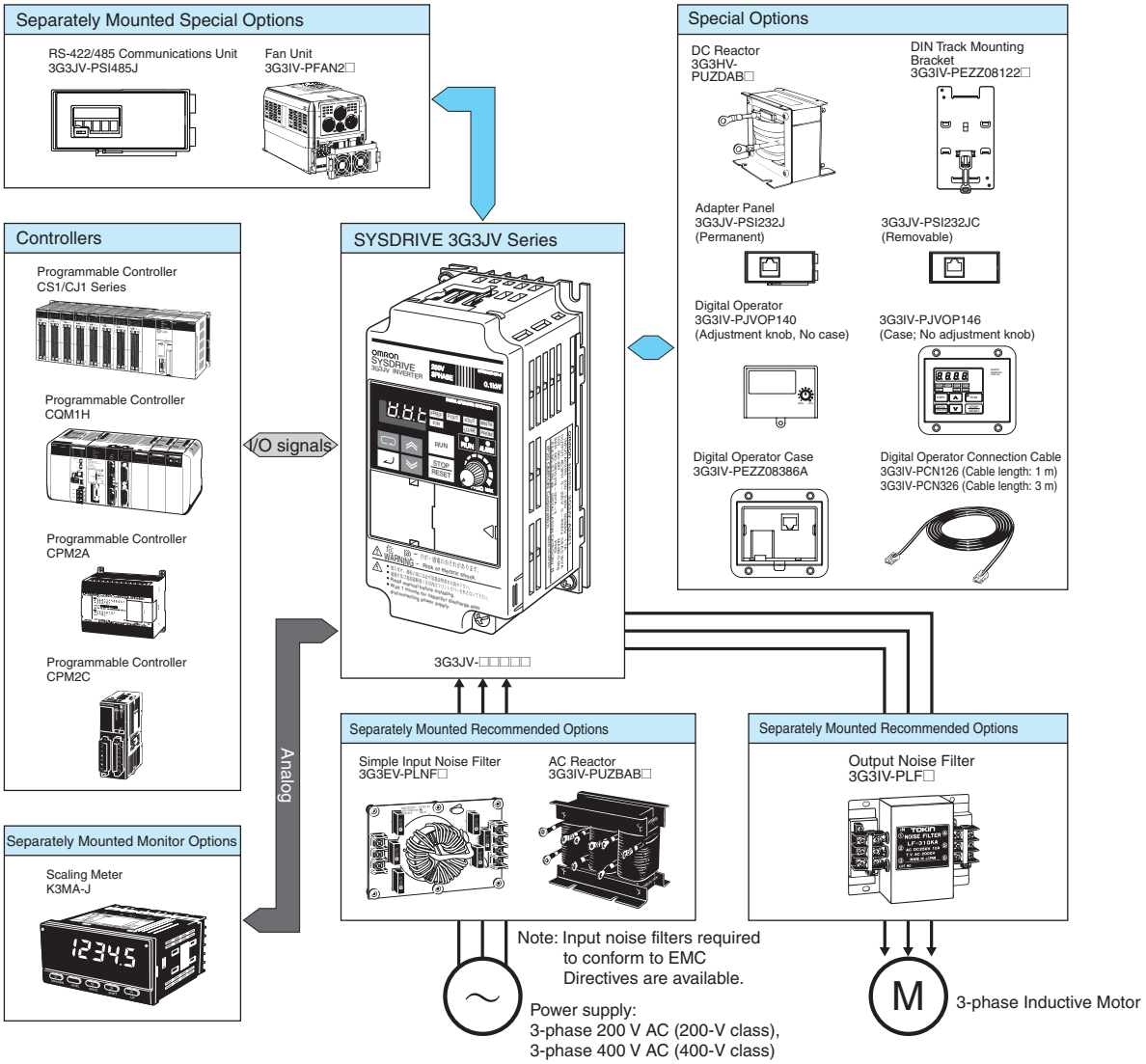
Note:
1. Satisfies the functions of conventional models such as the XW2B-20J6-2, XW2B-40J6-2, and XW2B-20J6-3 and can be connected to the R88D-UEP□□□ or R7D-AP□□□.
2. When used in combination with the XW2B-40J6-□A, two Servo Driver Connecting Cables are required for one Relay Unit.
3. When connecting to a CJ1W-NC413/-NC433, two Servo Driver Connecting Cables and two Servo Relay Units are required.
4. When using a CJ1W-NC413/-NC433, two Servo Relay Units are required. The two Servo Relay Units are connected with an XW2Z-□□□J-C1 Connecting Cable.

■ SYSDRIVE 3G3JV-series Compact Simplified Inverters

Economic Compact Inverter with Versatile Functions for Easy Application, Maintenance, and Speed Control

- The speed adjuster on the front panel ensures easy speed control.
- Offers versatile speed control operations such as multi-step speed control up to a maximum of eight steps, jog operations, and acceleration and deceleration (UP/DOWN) control.
- Numerous easy-to-use functions including slip compensation, overtorque detection, and speed search functions packed into a compact body.
- A cooling fan can be snapped on in a single action, making mounting and removal easy, and simplifying maintenance.
- Compact size for easily building into panels.
- The main circuit terminals are arranged on the top and bottom of the housing, making it possible to mount the Inverter like a contactor. The optional DIN Track Mounting Bracket enables the Inverter to be easily mounted to a DIN Track in one easy action.
- Conforms to CE and UL/cUL standards.

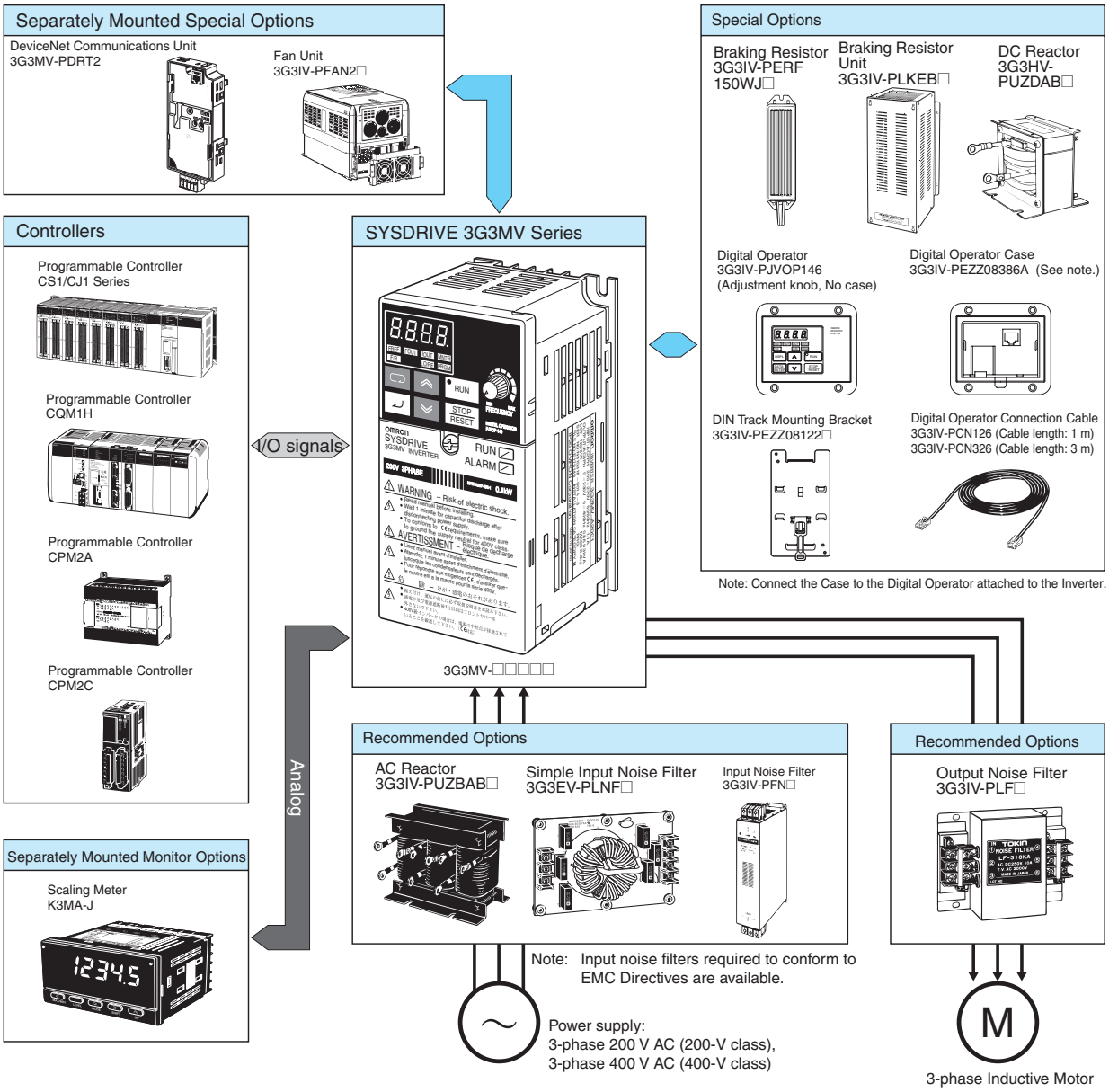
System Configuration



■ SYSDRIVE 3G3MV-series Multi-function Compact Inverters

Powerful with Complete Functions and New Networking Capabilities

- Sensor-free vector control function to deliver high torque at low speeds.
- RS-422/485 communications are provided as a standard feature and an optional DeviceNet Communications Unit is available for complete network compatibility.
- Even easier to use, with frequency control located on the top of the Digital Operator, and parameter constants able to be copied and managed from a standard Digital Operator.
- Standard features include energy-saving control and PID control. The high-speed current limit function further improves tripless operation.
- Incorporates an inrush current preventive circuit for even more robust protection.
- Conforms to CE and UL/cUL standards.



Open Network Controllers

■ ITNC-EI□01 (-DRM/-CST)/-EPX01 (-DRM) Open Network Controller

Information Station for Manufacturing Equipment and Production Lines

- Simply put, the ONC is an information station. It provides onsite information to your information system from manufacturing equipment and production lines by sending data collected from PLCs, DeviceNet, Temperature Controllers, Digital Panel Meters, and other FA components via Ethernet, intranet, and Internet connections. It can be used to add advanced information capabilities to equipment and production facilities without changing the PLC system.

Ordering Information

Hardware

Name	Specifications	Model
Version 2	Expansion slot (See note 1.); Three RS-232C ports and one RS-422A/485 port; No DeviceNet interface	ITNC-EPX01
Version 2 with DeviceNet	Expansion slot (See note 1.); Three RS-232C ports and one RS-422A/485 port; DeviceNet interface	ITNC-EPX01-DRM
Version 1 Standard model	No expansion slot; Two RS-232C ports; No DeviceNet interface	ITNC-EIS01
Version 1 Standard model with DeviceNet	No expansion slot; Two RS-232C ports; DeviceNet interface	ITNC-EIS01-DRM
Version 1 Expandable model	Expansion slot (See note 2.); Two RS-232C ports and one RS-422A/485 port; No DeviceNet interface	ITNC-EIX01
Version 1 Expandable model with DeviceNet	Expansion slot (See note 2.); Two RS-232C ports and one RS-422A/485 port; DeviceNet interface	ITNC-EIX01-DRM
Version 1 Standard model with CS1 Bus Interface	No expansion slot; Two RS-232C ports; CS1 bus interface (See note 3.)	ITNC-EIS01-CST
Version 1 Expandable model with CS1 Bus Interface	Expansion slot (See note 2.); Two RS-232C ports and one RS-422A/485 port; CS1 bus interface (See note 3.)	ITNC-EIX01-CST
CS1 Bus Interface Cable	Cable length: 1 m	ITBC-CN001-CST
	Cable length: 5 m	ITBC-CN005-CST
	Cable length: 12 m	ITBC-CN012-CST
Standard model with Mounting Bracket for vertical mounting	For version 1	ITNC-AP001
Expandable model with Mounting Bracket for vertical mounting	For version 1	ITNC-AP002
DIN Track Mounting Bracket	Common to standard and expandable model	ITNC-DIN01

Note: 1. The expansion slot is a PCI bus slot into which either a Controller Link Support Board, SYSMAC Link Support Board, or CS1 Bus Interface Board (PCI bus type) can be mounted.Only one slot is provided.

2. The expansion slot is an ISA bus slot into which either a Controller Link Support Board, SYSMAC Link Support Board, or SYSMAC Board (ISA bus type) can be mounted. Only one slot is provided.

3. Models with CS1 bus interfaces cannot be connected to DeviceNet.

Software (for Both ONC Version 1 and Version 2)

Name	Licensed product	Specifications	Model
Data Collection/Distribution Service Software Ver. 2.00 (See note 2.)	Available (for 1 user, 5 users, or 10 users)	A Memory Card (15 Mbytes min.) must be purchased separately. (See note 1.)	ITNC-DL1Q-ECD-V2
WebToolKit Software Ver. 1.00			ITNC-WK1Q-ECD
RemoteKit Software Ver. 1.11			ITNC-RK1Q-ECD
DataBase ToolKit Software Ver. 1.00			ITNC-DK1Q-ECD
Third-party PLC Connection Unit Ver. 1.00 (Mitsubishi A-series Computer Link Unit)	None	---	ITNC-MD1Q-EF
NX-Server for DeviceNet ONC Edition Ver. 2.00			ITNC-NS1Q-EF

Note: 1. A Memory Card (sold separately) is required for ONC version 1. A Memory Card is not required for ONC version 2 if the available space in the internal disk is sufficient.

2. A Memory Card is also recommended for ONC version 2.

General Specifications

Item	Ver. 1		Ver. 2
	ITNC-EIS01 ITNC-EIS01-DRM ITNC-EIS01-CST	ITNC-EIX01 ITNC-EIX01-DRM ITNC-EIX01-CST	ITNC-EPX01 ITNC-EPX01-DRM
CPU	486 compatible, CPU: 66 MHz, equivalent to 486SX		486 compatible, CPU: 133 MHz, equivalent to 486DX
FPU	None (software emulation)		Provided
Memory	16 Mbytes		32 Mbytes

Item		Ver. 1		Ver. 2
		ITNC-EIS01 ITNC-EIS01-DRM ITNC-EIS01-CST	ITNC-EIX01 ITNC-EIX01-DRM ITNC-EIX01-CST	ITNC-EPX01 ITNC-EPX01-DRM
Internal disk		Flash disk, 8 Mbytes		Flash disk, 32 Mbytes
Interface	LAN	10Base-T		10Base-T/100Base-TX
	Serial ports	Two RS-232C ports	Two RS-232C ports and one RS-422A/485 port	Three RS-232C ports and one RS-422A/485 port
	DeviceNet	Available (ITNC-EIS01-DRM only)	Available (ITNC-EIX01-DRM only)	Available (ITNC-EPX01-DRM only)
	CS1 bus interface	Available (ITNC-EIS01-CST only)	Available (ITNC-EIX01-CST only)	None
CF card slot		None	One ISA bus slot (half size)	One PCI bus slot (half size)
Memory card		One slot		
Power supply		24 VDC, 15 W max.	24 VDC, 20 W max.	24 VDC, 20 W max.
Backup memory		None		Provided
Setup utility		No Setup/Maintenance Utility (use a Dedicated Memory Card)		Setup/Maintenance Utility installed in internal disk

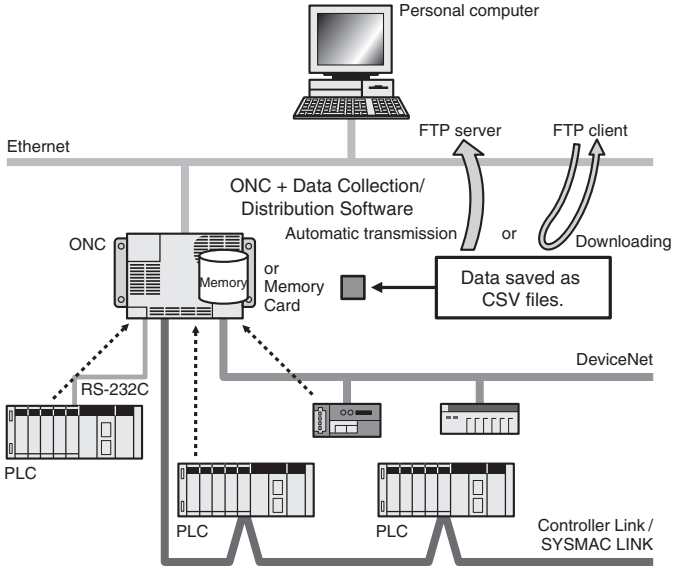
Application as a Data Collection Station

Collect Data and Send It Using FTP

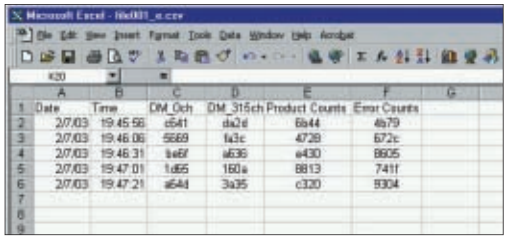
Collect data under the required conditions from PLCs (see note 1) connected via various networks and from DeviceNet slaves (see note 2) and save it in CSV or binary files in the Memory Card in the ONC. Without any changes to the PLC system, the ONC can be used as a collection station for production, error, inspection, and history data.

Note: 1. CIO and DM Area data from the PLC can be collected if it is set for event memory in the ONC or specified for a serial connection.

2. Periodic collection: Collection at a specified time interval, such as 500 ms.
Event collection: Collection when some event occurs, such as a change in I/O status or data contents in the PLC or in DeviceNet devices.
Example: Collecting status information when an error occurs by using the occurrence of an error in processing or inspections on the production line as the event.
Scheduled collection: Collection at specific times, such as each hour.
Example: Collection every hour on the hour, such as 12:00 noon, 1:00 PM, etc. (minimum setting: every minute)



Example: Data collected using the Data Collection/Distribution Software can be displayed in Excel as shown below. A sample CSV file is shown set to collect data when bit 00 in CIO 0000 turns ON. The date can be added each time data is collected, and field names can be attached.

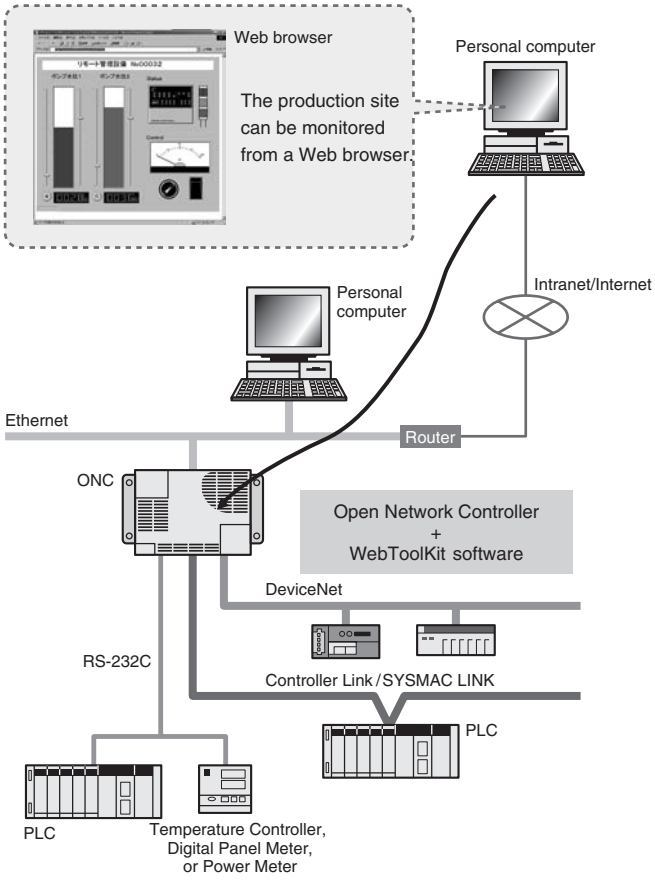


	A	B	C	D	E	F	G
1	Date	Time	DM_0ch	DM_315ch	Product Counts	Error Counts	
2	2/7/03	19:45:56	c541	da2d	6b44	4b79	
3	2/7/03	19:46:06	5569	fa3c	4728	672c	
4	2/7/03	19:46:31	be6f	a636	e430	8805	
5	2/7/03	19:47:01	1d65	160a	8813	741f	
6	2/7/03	19:47:21	a644	3a35	c320	9304	
7							
8							

WebToolKit for ONC Application as a Browser Station

Information from FA components connected to the ONC can be viewed from a Web browser running on a personal computer connected to Ethernet, an intranet, or Internet (see note). This enables using Internet Explorer on your computer for monitoring. The WebToolKit is a development kit for building Web applications using Visual Basic or Java. The Web application is built in the ONC, allowing Web browsers running on personal computers to monitor data. (The computer is used as a graphic terminal.)

Note: Obtain a fixed IP address from the provider to use Internet.

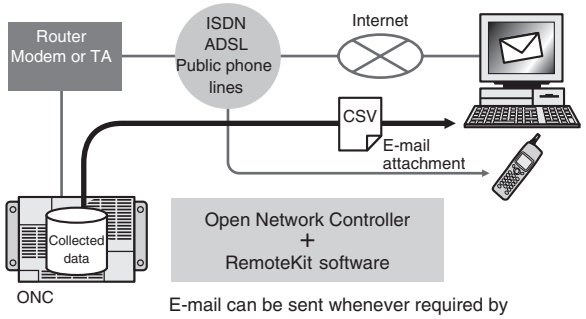


RemoteKit for ONC Application as an E-mail Station

E-mail can be sent from the ONC to personal computers or cell phones under specified conditions (see note). Files created by the Data Collection/Distribution Software can also be attached to e-mail sent to personal computers. This enables e-mail to be used to provide status reports periodically, when errors occur, or at scheduled times. Dialup connections can be automatically processed through a modem or DoPa terminal to your ISP.

Note: 1. E-mail can be sent based on a schedule or according to changes in bits or analog data from components connected to the ONC, such as PLCs or DeviceNet slaves.

2. DoPa is a packet communications service provided by Japan's NTT DoCoMo for use in the DoCoMo network. Charges are applied according to the volume of transmitted data.



E-mail can be sent whenever required by installing a single ONC in the facility (e.g., gas turbine power generation plants).

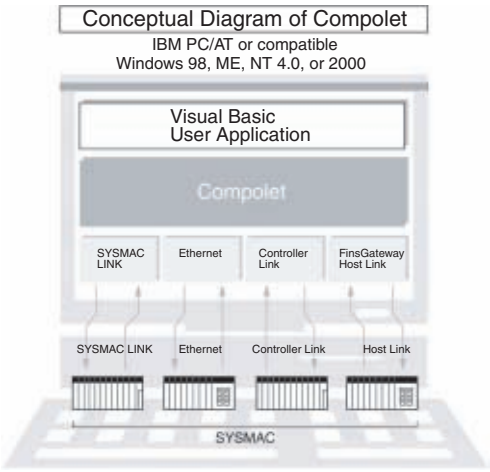
Communications Middleware

■ Compolet – SCPL-SYS-2003 + SFGW-RT-2003 (Windows 2000 or XP)

Development Work for PLC Communications Simpler and Faster with Compolet

You can create a program for communications between a PC and controllers using Compolet components. With SYSMAC Compolet for Windows, you can create a communications program easily by dragging and dropping software objects, enabling reading and writing of production information without requiring special knowledge of communications commands. Simple processing from Visual Basic is all that is needed to read and write PLC data.

Supports FinsGateway



Main Features

Significant Reduction in Development Time

Compolet significantly reduces the time and effort required for difficult, time-consuming communications programming. Using Compolet software for direct operation of Programmable Controllers (e.g., SYSMAC), eliminates the need for knowledge of PLC communications commands (FINS commands).

Use in Microsoft .NET Framework.

SYSMAC Compolet Version 2003 fully supports the recently developed MicrosoftVisual Studio. NET. In addition to Visual Basic. NET, Visual C#.NET can also be used.

Read and write data using a wide range of data representations and formats.

SYSMAC Compolet Version 2003 provides the means for reading and writing various data. Data conversion (BIN/SBIN/BCD) is also supported by adding the MicrosoftVisual Studio. NET data format (e.g., Integer, Single) to the specified read or write operation.

SYSMAC Compolet Version 2 is also included. This enables you to create applications using Microsoft Visual Basic 6.0.

ActiveX Control, the SYSMAC Compolet Version 2 is also included in the package containing SYSMAC Compolet Version 2003. This enables you to continue using applications previously used with SYSMAC Compolet Version 2 without any modification.

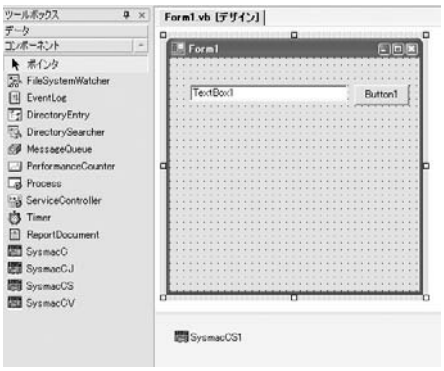
Main Functions

Interface	Function	Description
Property	Communications with SYSMAC PLCs	Specifying the SYSMAC to communicate with, and reading network information
	Reading/writing variables and I/O Area memory data	Reading and writing to memory areas such as DM and CIO words E.g. DM word 100: DM (100)
	Operating state	Reading or changing the operation mode
	Area information	Reading the size of the program area or the number of DM words
	Error information	Reading the value of an error as a message.
	Other SYSMAC information	Reading the format, changing or reading the time
Method	Reading/writing variables and I/O Area memory data	Reading and writing of memory area data such as consecutive DM or I/O words
	I/O table creation	Creating an I/O table for the current configuration
	Forced set/reset/cancel of input bits (contacts)	Forced set/reset/cancel of individual input bits (contacts)
	Execution of FINS services	Sending FINS commands, and acquisition of FINS responses received
Event	Cyclic events	Events occur at fixed intervals.

Using Compolet

1 Drag and drop the **SysmacCS** icon from the **Visual Basic** Toolbox on to the form.

In the same way, place the command button **Button1** and text box **TextBox1** on the form.



2 Double-click the **Button1** Button to display the window for entering code.

Enter the following program to read data from word DM 0 of the SYSMAC CS1 PLC to the event handler.

```
Private Sub Button1_Click(ByVal sender As System.Object, _
                          ByVal e As System.EventArgs) Handles Button1.Click
    With SysmacCS1
        .NetworkAddress = 1
        .NetworkAddress = 2          } ①
        .UnitAddress = 0
        .Active = True ———— ②
        TextBox1.Text = .DM(0) —— ③
    End With
End Sub
```

Reading the values in DM word 0.

① Specify the communications destination (can be set in the Visual Basic Property Window).

② Enable Compolet communications.

③ Read the memory.

Completed

Models

Choose one from the following products according to specification requirements.

Software

For SYSMAC C/CV/CS/CJ

SYSMAC Compolet Version 2003

Model: SCPL-SYS-2003

FinsGateway

FinsGateway Version 2003 Runtime version

(Ethernet, SYSMAC LINK, Controller Link, Serial Communications, SYSMAC Board)

Model: SFGW-RT-2003 (Windows 2000/XP)

Operating Environment/Specifications

SYSMAC Compolet Version2003

Computer	IBM PC/AT or compatible (x86 processor) An environment where the OS can run properly 10MB of free disk space for installation At least 73 MB of free hard disk space for installation with FinsGateway.
CPU (memory)	Intel Celeron 400 MHz min. or better recommended (Memory: 96 MB min.)
OS	Microsoft Windows 2000 or XP
Required development software	Microsoft Visual Basic.NET Microsoft Visual C#.NET
Compatible networks	SYSMAC C, CV, CS or CJ Series

SYSMAC Compolet Version 2 (included with SCPL-SYS-2003)

Computer	IBM PC/AT or compatible (x86 processor) An environment where the OS can run properly At least 70 MB of free hard disk space for installation with FinsGateway.
CPU (memory)	Intel Celeron 400 MHz min. or better recommended (Memory: 32 MB min.)
OS	Microsoft Windows 98, Me, 2000, NT4.0 or XP
Required development software	Microsoft Visual Basic 5.0/6.0
Compatible networks	SYSMAC C, CV, CS, or CJ Series

■ PLC Reporter 32 – AMS-DK32-97 Simple Data Collection Software

Write PLC data to Excel without programming.

OMRON's simple data collection software Reporter 32 enable you to use familiar Excel spreadsheets to download PLC data or enter production data. Each read/write series is easily set on menus in the communications cells, eliminating the need for any special programming. The Reporter 32 provides an environment that allows just about anyone to easily collect and transmit onsite data.

Main Features

Easy Operation

Time-consuming computer programming is completely unnecessary. After installation, PLC data can soon be collected at the computer simply using screen settings. No specialist knowledge is required.

Large Reductions in Construction Costs

Basically, the system can be constructed with just a computer, PLC Reporter, Excel and a Host Link cable. This means that construction time and cost can be greatly reduced.

Automatic Saving/Printing Function

By setting the times at which data is to be saved or printed, or communications started, PLC Reporter will automatically perform all the required tasks. Also, simultaneous time and condition specification is now possible. The maximum number of items that can be set for either specification has been increased to 32. With automatic printing, it is possible to specify different printout sheets for each setting.

Modem Module

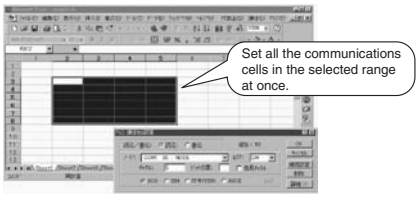
A modem module that has the functionality required for modem connections is available as a standard product. By using PLC Reporter in combination with the modem module, data can be obtained from a remote PLC.

Log Function

An easy-to-use log function that helps in the creation of daily reports is available. There are 3 log modes: Fixed time-intervals; when a specified bit turns ON; and one-shot logging to log data only once a day. The logging function can be selected to suit the application, and specified contents of PLC memory can be written to the Excel cells automatically.

Consecutive Reading and Writing for Cells

Data in consecutive areas in PLC memory can be read/written to consecutive cells in the spreadsheet. It is also possible to set cells in the same column simultaneously, and using the batch-setting function that has been added, communications cells can be specified out of a selected range.



Multi-network Version Available

All types of FA network can be handled with this software package. In addition to Host Link communications, a multi-network version that is compatible with SYSMAC LINK, Controller Link, and Ethernet Networks is available.

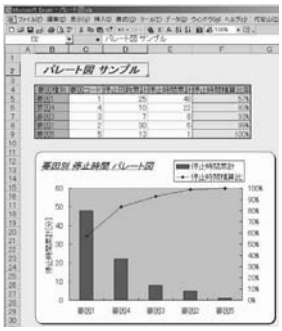
System Configuration Examples

Manage Errors in a History

This application example is for managing errors that occur in equipment in an error history. Communications cell settings combine the event conditions and history settings. The error code from the error event is compiled in the history. Excel functions (e.g., Lookup) can be used to convert error codes to error messages.

Display Equipment Stop Time According to Cause in a Graph

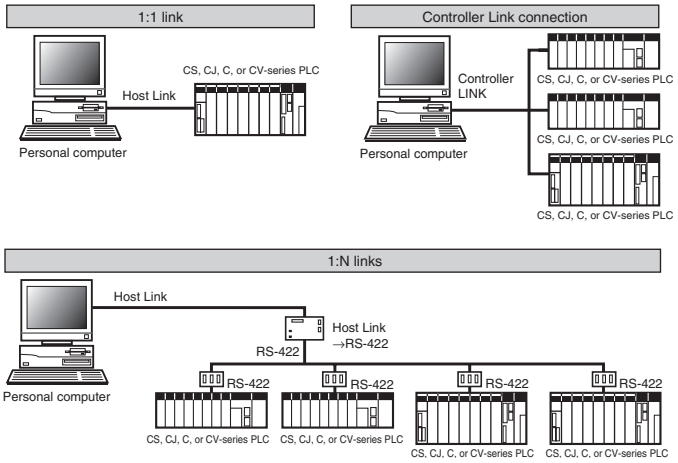
This application example is for displaying the stop times as both a table and histogram according to the cause. The error codes the cause of stop, the number of stops, and the total stop time held in the PLC's DM Area are collected using the Reporter and displayed as a histogram using the Excel graph function.



Models/Specifications

Product name	PLC Reporter 32 Host Link Version	PLC Reporter 32 Multi-network Version
Model	AMS-DK32-97-HLK	AMS-DK32-97-MLT
Compatible networks	Host Link	Host Link, Controller Link, SYSMAC LINK, Ethernet, SYSMAC Board
Connectable PLCs	CS Series, CJ Series, C Series, CV Series, SYSMAC Board	
OS	Microsoft Windows 98, Me, 2000, or XP	
Compatible Excel version	Microsoft Excel 97, 2000, or 2002	
Computer	IBM PC/AT or compatible	
Recommended specifications	CPU: Pentium 300 MHz min. Memory:128 MB min. Free disk space: 20 MB min. CD-ROM drive required for installation	

Connection Example



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