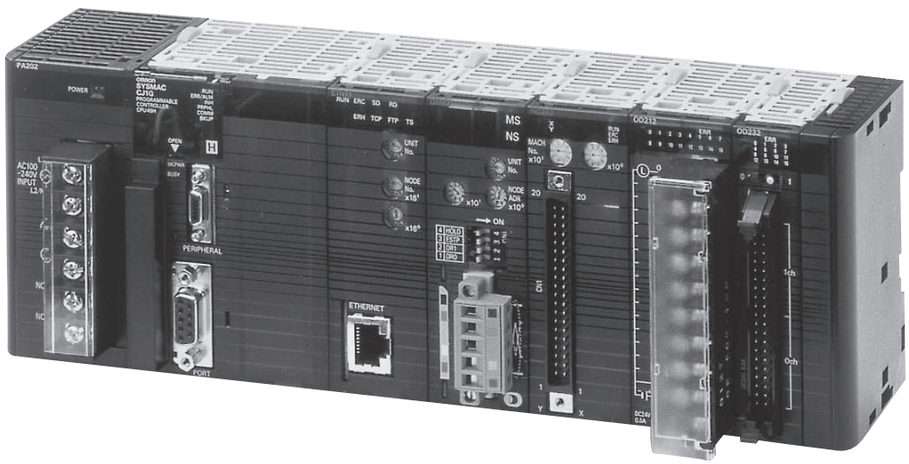
OMRON

Modular PLC series

Modular PLC series

CJ1



Sliceable Solutions

The family of CJ1 CPUs range from very small CPUs for simple sequence control to powerful and fast models that offer total machine control which can handle up to 2560 I/O points.
This enables yout to modularize or 'slice' your machine into logical sections without changing PLC series.

You don't even need to consider where to slice the machine: any I/O units can be mounted on any CPU, enabling you to distribute all the function you need to, wherever you need them. This reduces the number of different modules you have to keep in stock. And no matter how complex your machine becomes, there's always a CPU and a combination of I/Os to match your needs. It's the ultimate in machine sliceability and scalability!

New features in this edition

• **All CPUs (Ver.3.0)**	Function Block programming in IEC 61131-3 Structured Text, and pre-tested Omron Function Block Libraries to reduce machine development time.
• **CJ1H-CPU67H**	The ultimate high-capacity CPU in the CJ1 range
• **CJ1M-CPU1□-ETN**	CPUs with integrated Ethernet port
• **CJ1W-PD022**	Low-end DC power supply unit
• **CJ1W-□□□□ (SL)**	Digital and analog I/O units with screwless terminal blocks.
• **CJ1W-(P)TS**	Temperature input units, from simple non-isolated to fast high-resolution models.
• **CJ1W-SCU□1-V1**	Gateway function for easy linking of various communication networks.
• **CJ1W-CORT21**	CAN communication unit, fully configurable to support any protocol.

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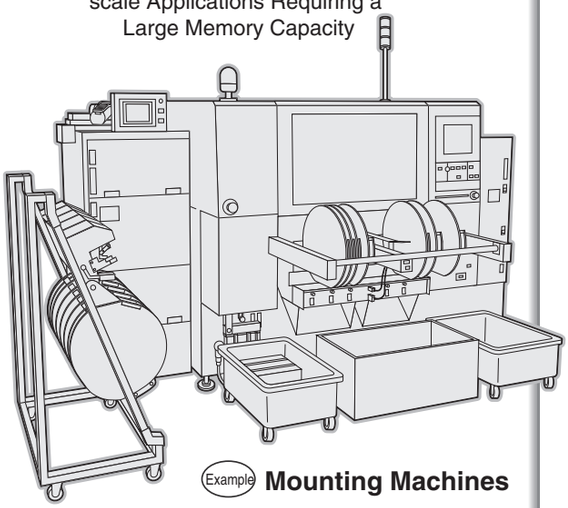
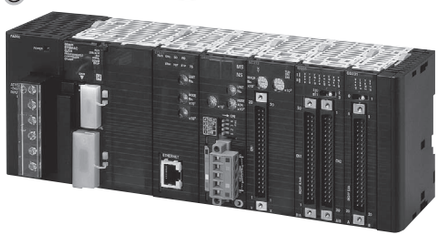
Compact, fast and flexible. The CJ1-series offers the ultimate in scaleability and seamless communication. A wide variation of models to handle essentially any type of machine control. Build the perfect CJ1-series PLC for your application.

CJ1H

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



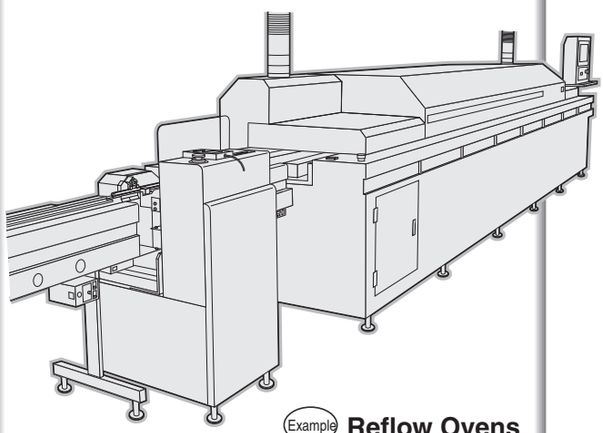
Example **Mounting Machines**



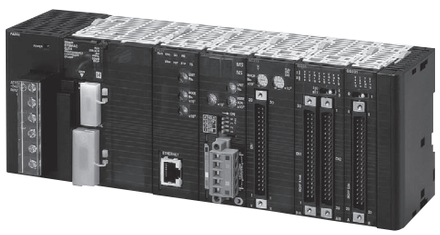
SYSMAC CJ1H-CPU□□H		
Small		YES 62 mm wide
Backplane-free structure		YES
Speed		LD instruction: 20 ns
Seamless		YES
Program capacity	*NEW*	250 to 60 Ksteps
Memory capacity	*NEW*	448 to 128 Kwords
I/O capacity		2,560 points
Memory Cards		YES Compact flash memory
Task programming		YES
Function Block	*NEW*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

CJ1G

For Applications Requiring a Large Memory Capacity for Data Management



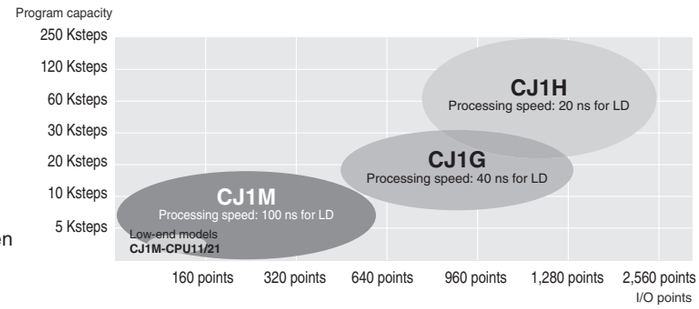
Example **Reflow Ovens**



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

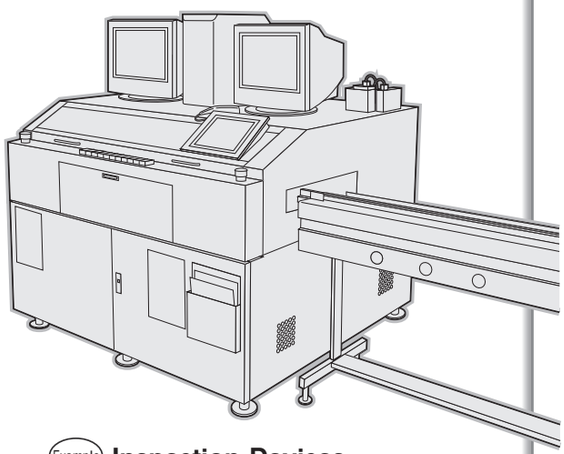
The CJ1H, CJ1G, and CJ1M are compatible for memory allocations, programming instructions, and I/O Units. Compatibility simplifies reusing designs from large-scale applications to small-scale applications.
Select from the range of CJ-series CPU Units including a lineup of low-end models with 160 I/O points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

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



CJ1M

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

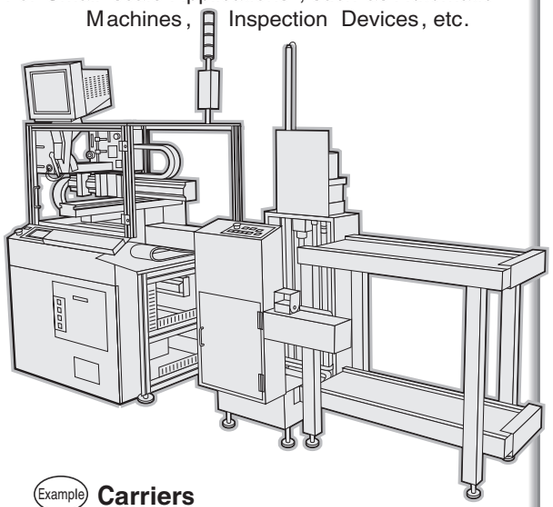


Example **Inspection Devices**

SYSMAC CJ1M-CPU11/12/13	
Small	YES 31 mm wide
Backplane-free structure	YES
Speed	LD instruction: 100ns
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.



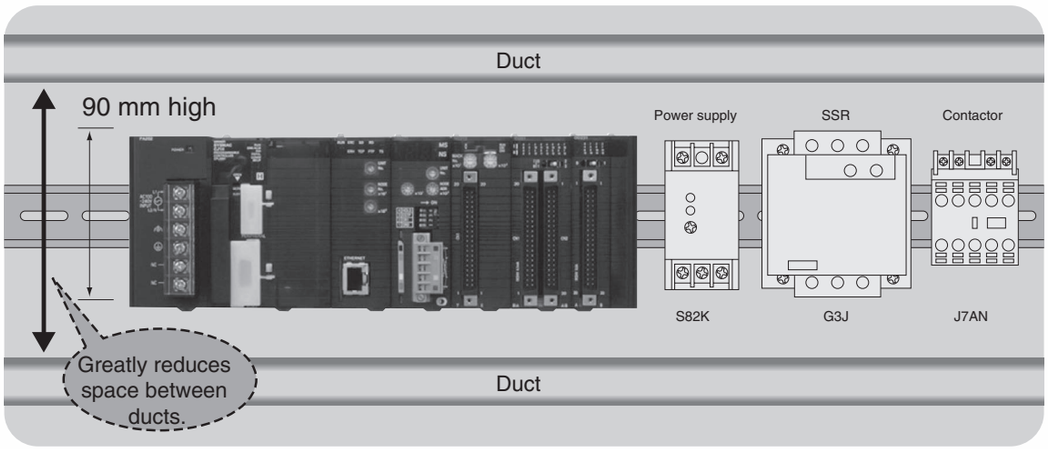
Example **Carriers**

SYSMAC CJ1M-CPU21/22/23 Pulse I/O	
Small	YES 49 mm wide
Backplane-free structure	YES
Speed	LD instruction: 100ns
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

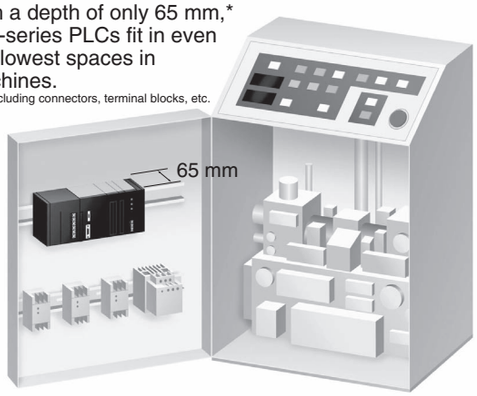
Downsize machines and control cabinets – fits anywhere.

Super Compact: Only 90 mm High and 65 mm Deep, with I/O Units from 20 mm in width.

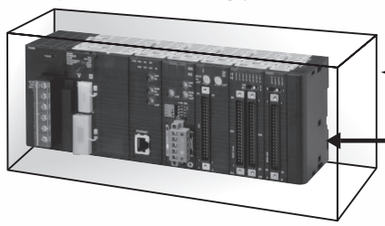
With a height of only 90 mm, CJ1-series PLCs fit between narrow ducts along with other components.



With a depth of only 65 mm,* CJ1-series PLCs fit in even shallowest spaces in machines.
*Not including connectors, terminal blocks, etc.



More power in a strongly reduced volume.



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

Volume compared to CQM1H
Approx. 50%

Unit Downsizing

● CPU Units

CJ1M-CPU11/12/13

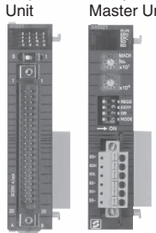
At only 31 mm wide, the CPU Units provide an RS-232C port in addition to a peripheral port. A CF memory card interface is also built in.

31 mm

● I/O Units Only 20 mm Wide

32-point Unit

CompoBus/S Master Unit



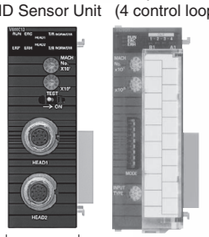
Minimum width with 20 mm space-saving I/O Units

20 mm

● I/O Units Only 31 mm Wide

Double-head ID Sensor Unit

Temperature Control Unit (4 control loops)



High-density Units for greater downsizing and integrated control functions

31 mm

Fast

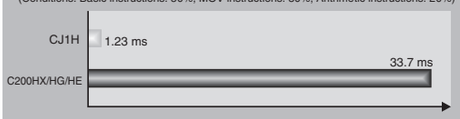
Reduce cycle Time and Increase Productivity with Higher Machine Speed.

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

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

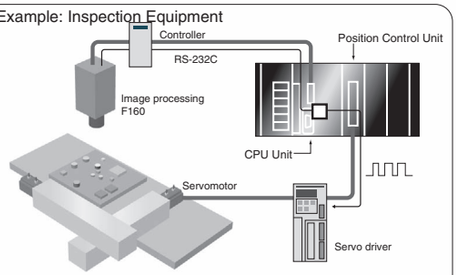
Cycle Time for 30-Kstep Program

(Conditions: Basic instructions: 50%; MOV instructions: 30%; Arithmetic instructions: 20%)

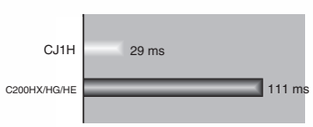


Application Examples

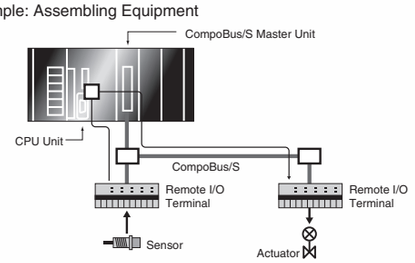
Example: Inspection Equipment



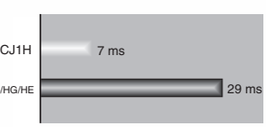
Time required to input image data, perform operations in the CPU Unit, and output pulses from the Position Control Unit (Conditions: 30-Kstep program; ratio of basic instructions to special instructions: 1:1)



Example: Assembling Equipment

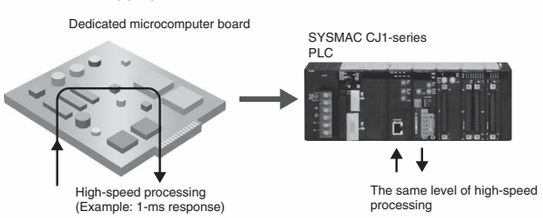


Time required to receive sensor input at the CompoBus/S Remote I/O Terminal, perform operations in the CPU Unit, and turn ON a solenoid valve via the CompoBus/S Remote I/O Terminal (Conditions: 10-Kstep program; ratio of basic instructions to special instructions: 1:1)



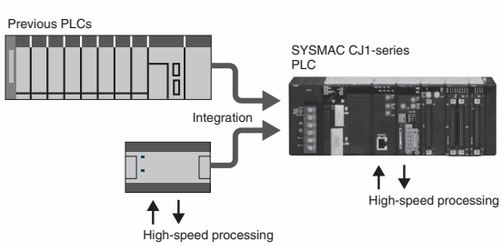
Replace High-speed Microcomputer Boards with PLCs.

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 scalability, and easier debugging and maintenance.



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

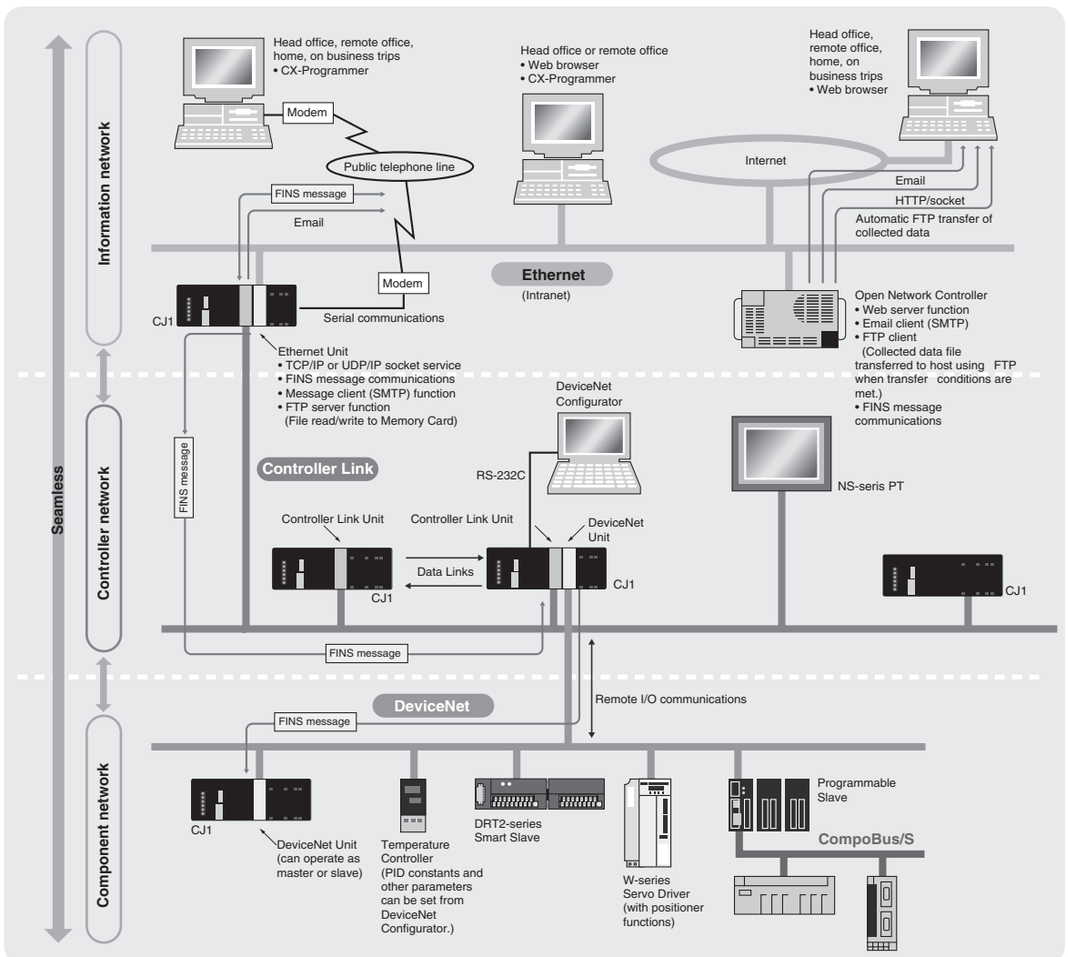
Although previously two PLCs were somtetimes used to enable reading short pulses, the CJ1-series PLCs can now take this role too.



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.

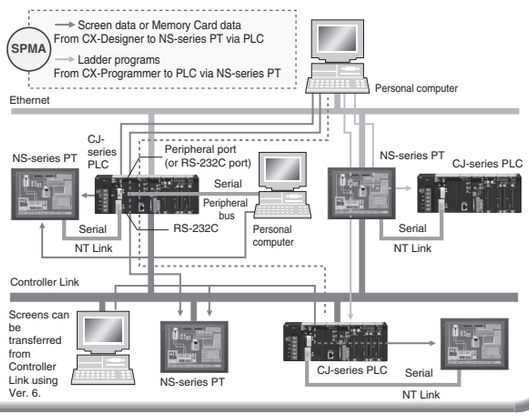


Note: Only Ethernet and Controller Link networks can be used for access across eight levels.

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



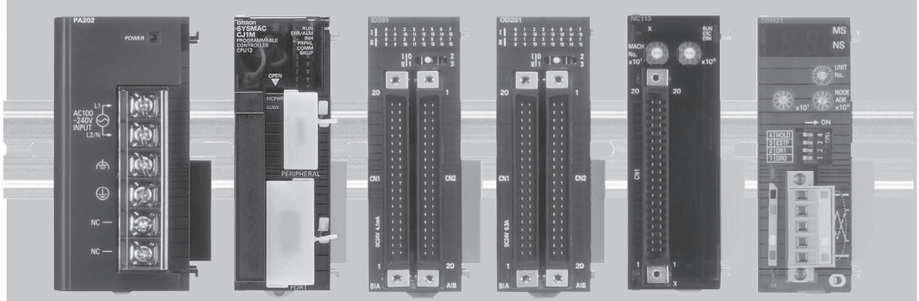
Scalable

Distribute functionality to where you need it.

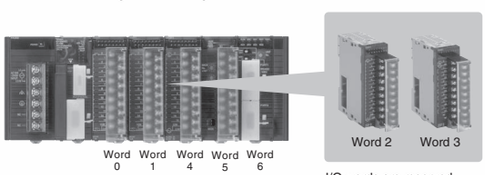
Any unit fits any CPU.

Eliminating the backplane enables more flexible combinations.
Configurable memory allocation allows for easy machine variations. Adding or removing units does not mean you need to change your PLC program.

The high-density interconnecting system forms a high-speed parallel I/O bus.

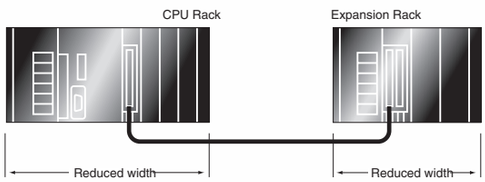


When modifying the system, I/O capacity can be added without changing I/O word allocations using words reserved through CX-Programmer.



I/O words are reserved knowing there is a possibility of Units being added here.

No backplane means you can distribute the I/O units over several blocks to reduce rack width.

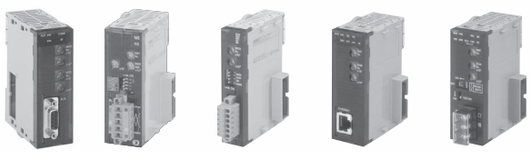


Select the right units for your application

Analog I/O Units | Temperature Control Units | Serial Communications Unit | Position Control Unit | High-speed Counter Unit

Select screw type or screwless terminal blocks

screwless terminals



PROFIBUS-DP Unit | DeviceNet Unit | CompoBus/S Unit | Ethernet Unit | Controller Link Unit

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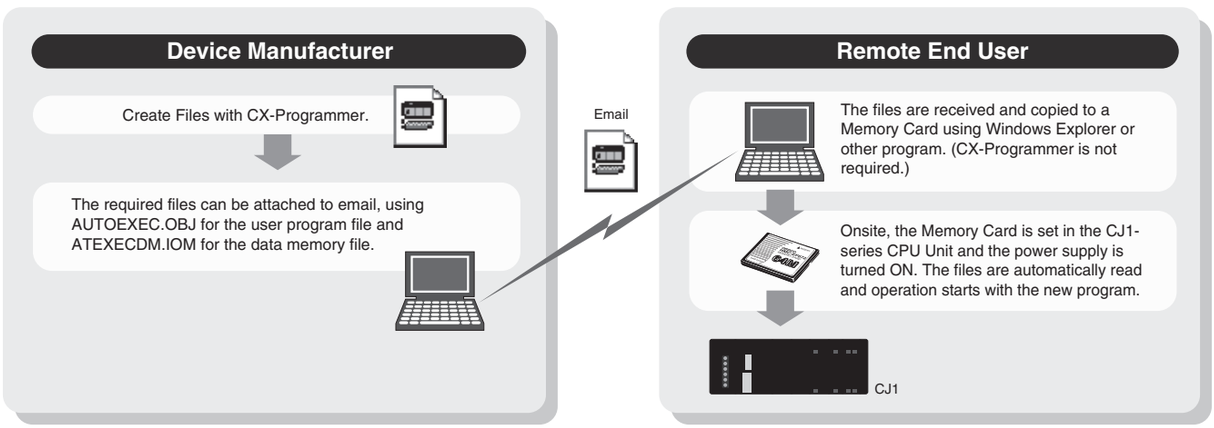
Easier Maintenance with Memory Cards

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.

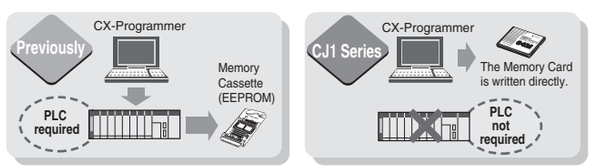


Handle as Windows Files from a Personal Computer.

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.

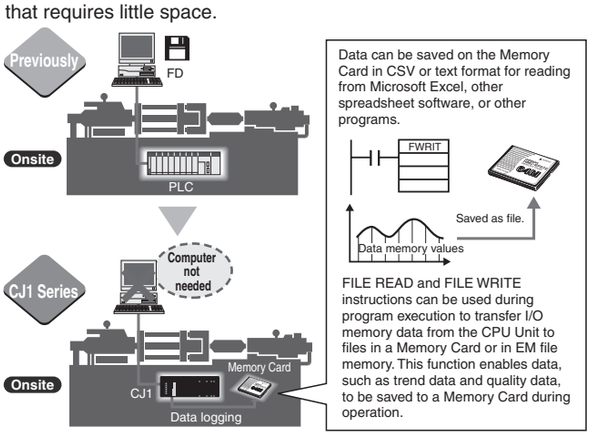
● Advantages in Using Windows Files

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.



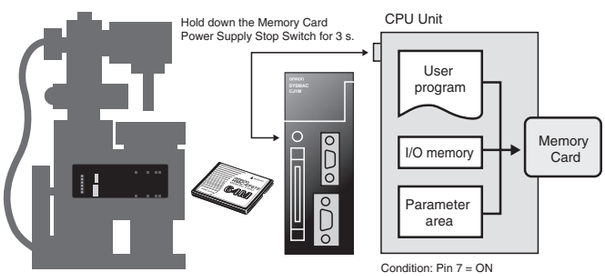
Log production conditions, inspection data, and other valuable information.

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



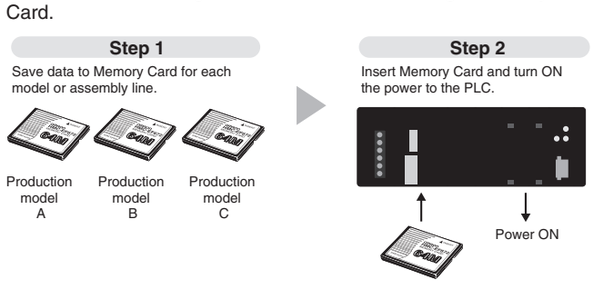
Backup is Simple.

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.

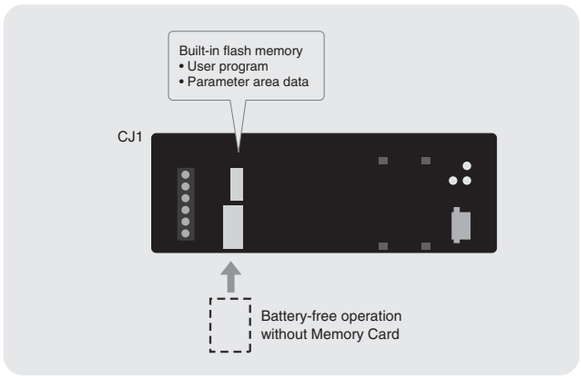
When the power is turned ON, the file in the Memory Card can be automatically transferred to the CPU Unit. As a result, the same operation as that using ROM can be achieved using a Memory Card.



Built-in Flash Memory (Standard Feature)

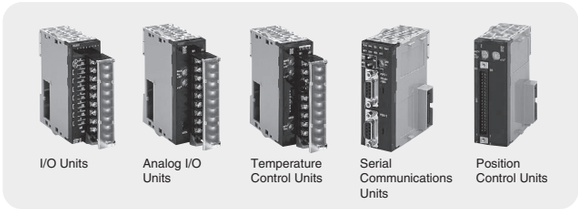
Battery-free Operation Using Flash Memory

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.



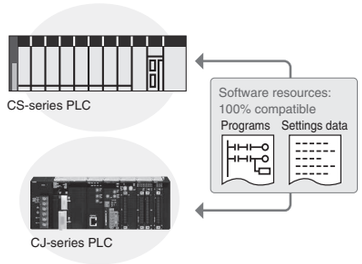
Reduce Maintenance Unit Stocks

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.

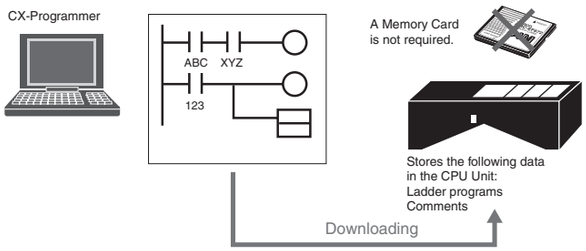


Built-in Comment Memory

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.

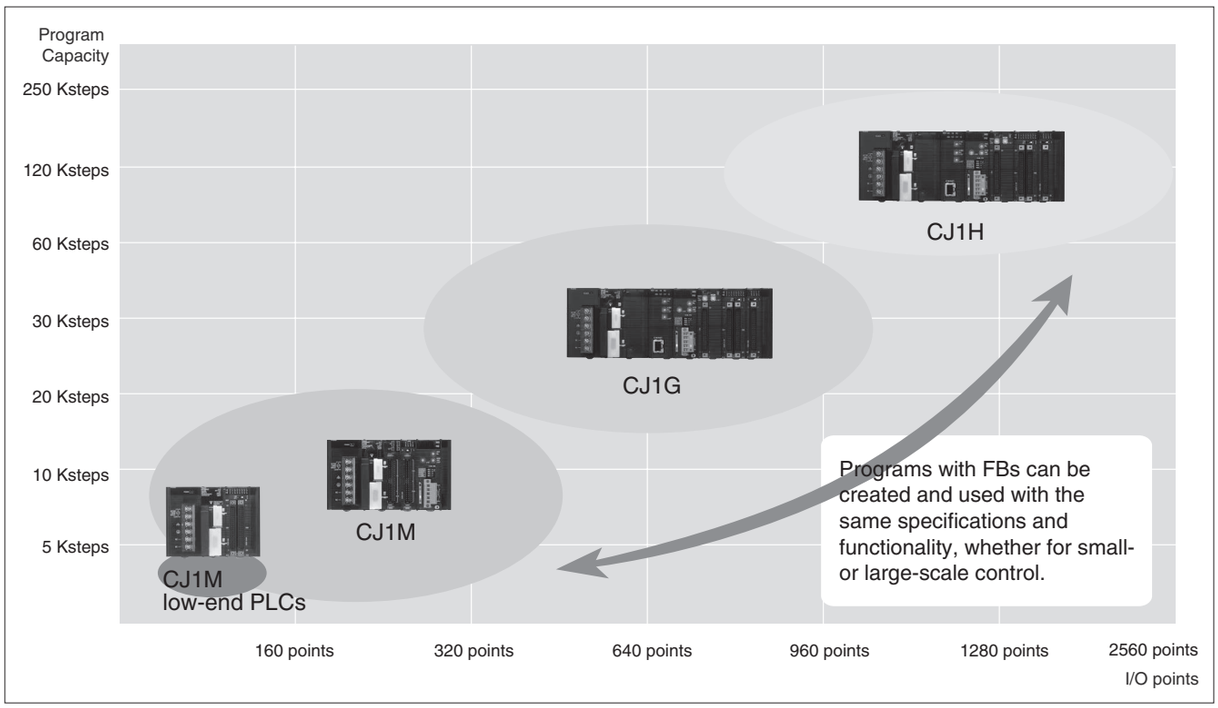
OMRON

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

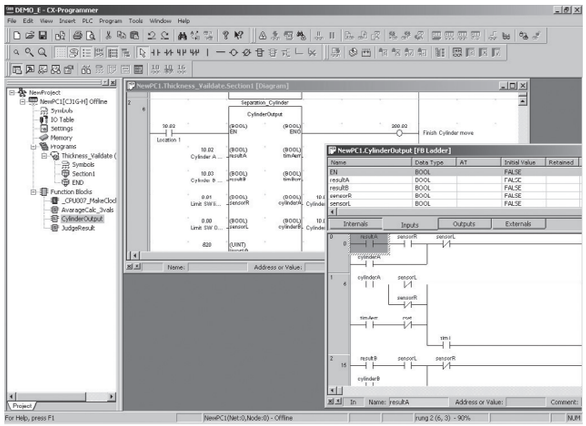
Function Block *NEW*

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

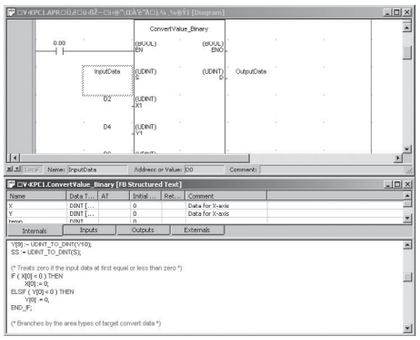
FB (Ladder Programming/Structured Text) Compatibility with all CS/CJ-series Models



Ladder Programming Language Example



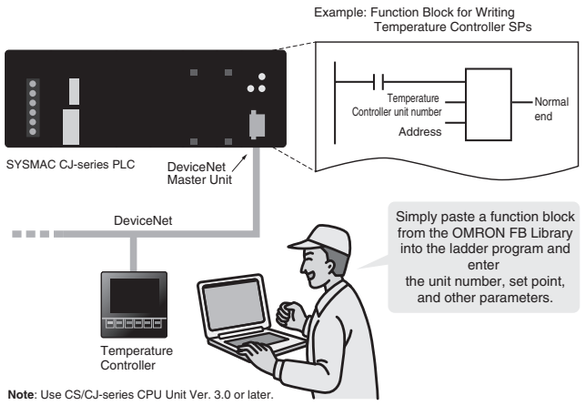
Structured Text Example



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.

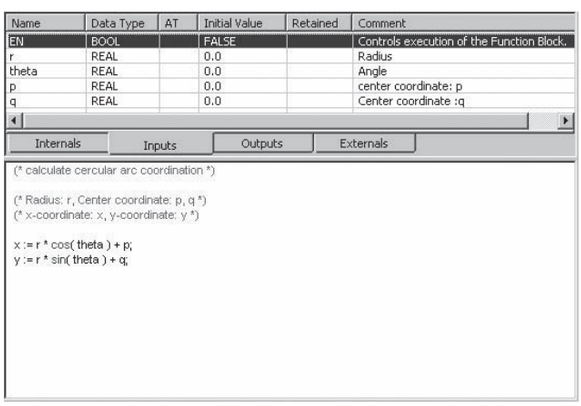
What Is the OMRON FB Library?
The OMRON FB Library is a set of functional objects for ladder programming for OMRON CS/CJ-series PLCs. By incorporating the OMRON function blocks provided by OMRON into a ladder program, the program interface for different control devices is easily completed. This reduces 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.



Name	Data Type	AT	Initial Value	Retained	Comment
EN	BOOL		FALSE		Controls execution of the Function Block.
r	REAL		0.0		Radius
theta	REAL		0.0		Angle
p	REAL		0.0		center coordinate: p
q	REAL		0.0		Center coordinate :q

Internals | Inputs | Outputs | Externals

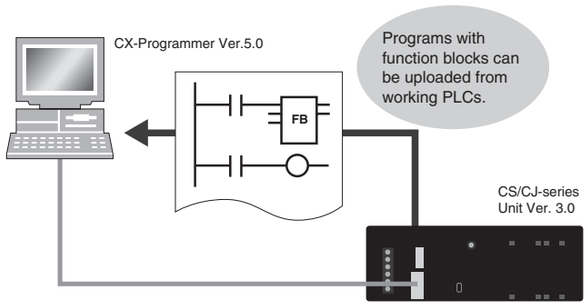
```
(* calculate cercular arc coordination *)

(* Radius: r, Center coordinate: p, q *)
(* x-coordinate: x, y-coordinate: y *)

x := r * cos( theta ) + p;
y := r * sin( theta ) + q;
```

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.



OMRON

Truly Seamless Incorporation of OMRON Components and Other Devices into Networks

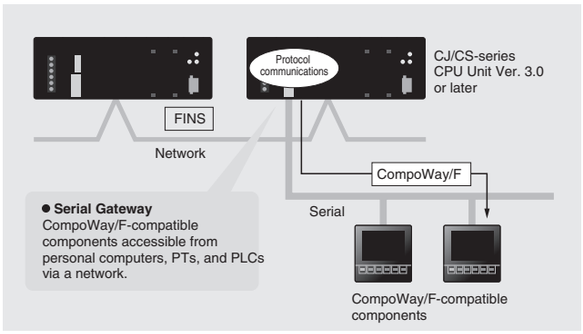
Serial Gateway

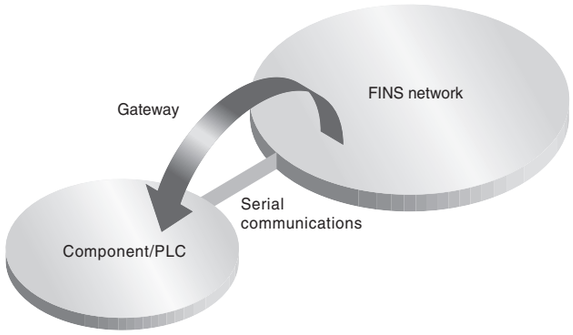
NEW CPU Units with Ver. 3.0 or later
Serial Communications Units with Ver. 1.2 or later

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



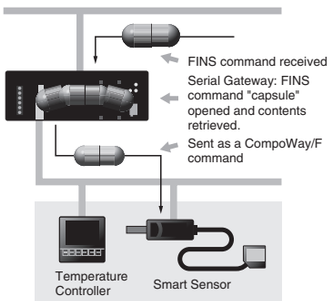


Note 1: FINS
Abbreviation for Factory Interface Network Service. A command system for message services common to OMRON networks. FINS commands can be sent across up to 8 network levels, including serial communications paths using a serial gateway. (Possible only with CS/CJ-series CPU Unit Ver. 2.0 or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

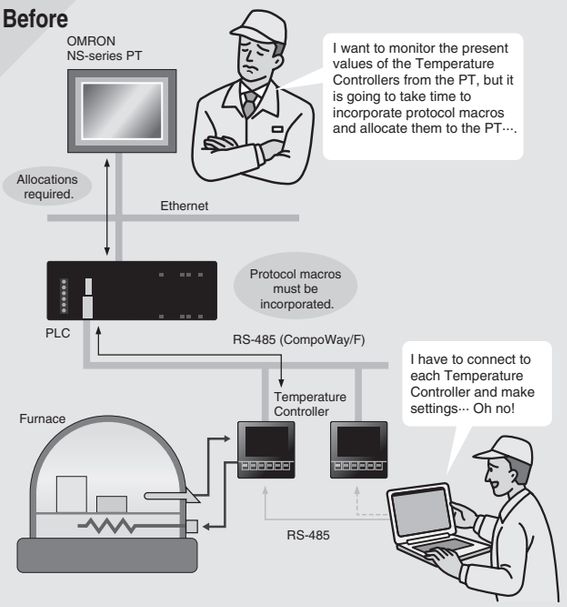
When CompoWay/F commands are enclosed in FINS commands and sent to Serial Communications Boards or Serial Communications Units (Ver. 1.2) or serial ports on CPU Unit Ver. 3.0, the enclosed CompoWay/F command is retrieved using a Serial Gateway Function and sent as a CompoWay/F command.



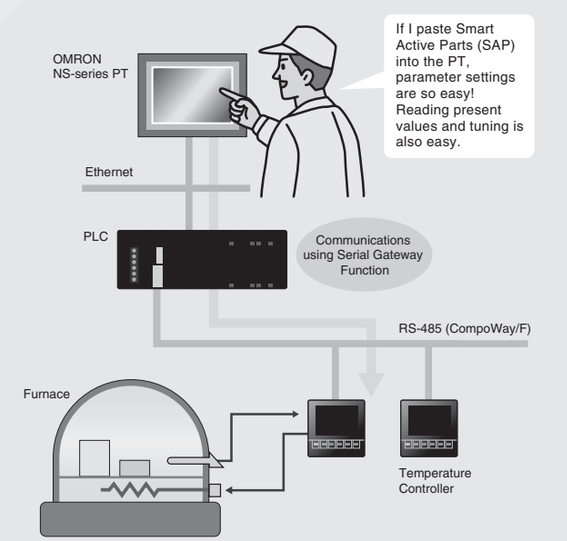
OMRON Components

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

Before



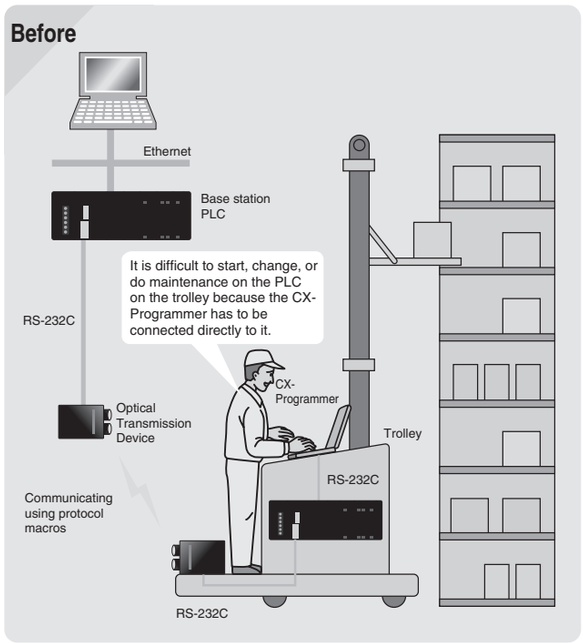
Now **Use the Serial Gateway with a Serial Communications Board or Serial Communications Unit**

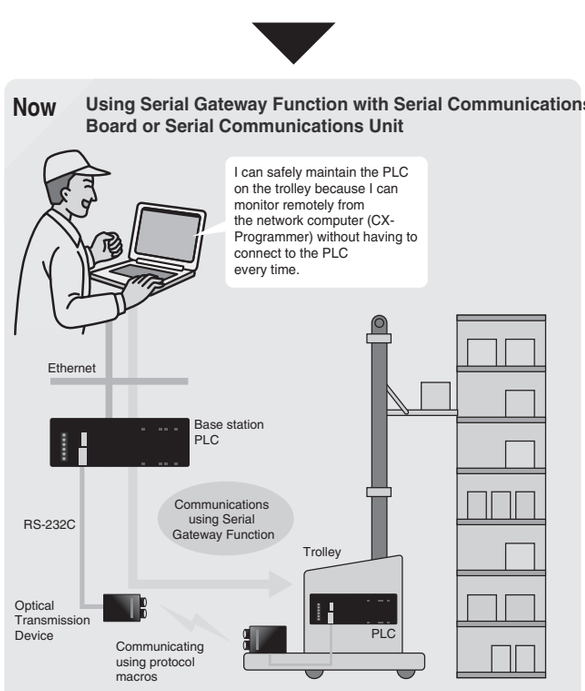


Serial PLC Links

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

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

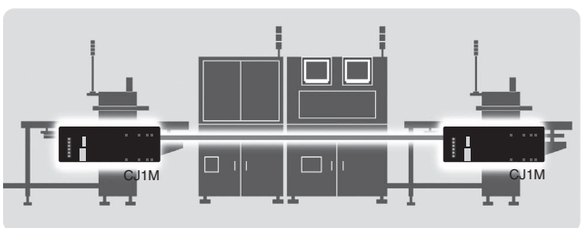


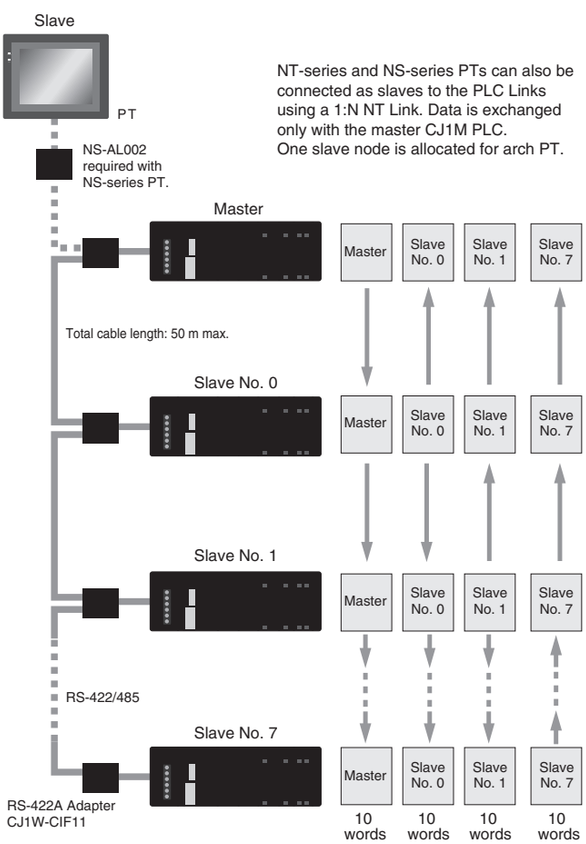


Note: Supported by Serial Communications Units only.

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

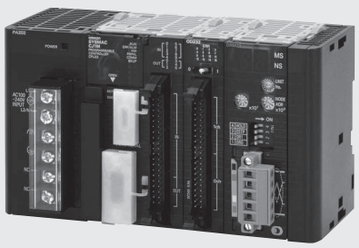
Data links can be created between up to nine CJ1M PLCs with up to 10 words each using the built-in RS-232C ports. RS-422A Adapters (CJ1W-CIF11) can be used to easily convert between RS-232C and RS-422A.





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

PULSE I/O Built-in Pulse I/O



SYSMAC CJ1M-CPU21/22/23

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.

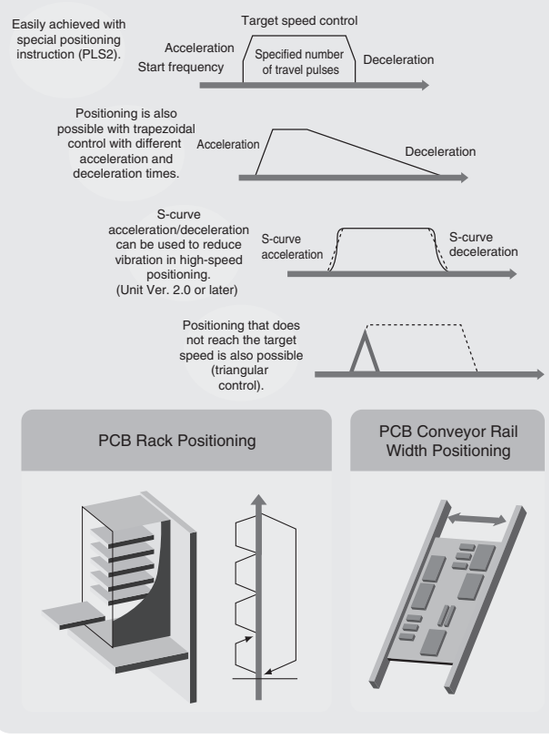
Pulse Outputs (CJ1M-CPU21/22/23)

Two Pulse Outputs at 100 kHz

■ Origin Searches (ORG Instruction)

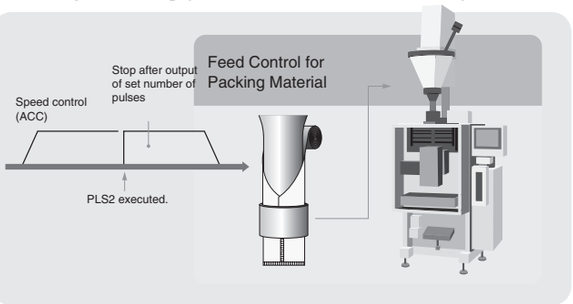
- Origin searches are possible with one ORG instruction.
- Even with servomotors, a differential-phase counter reset output minimizes position deviations for origin searches.

■ Positioning with Trapezoidal Acceleration/Deceleration (PLS2 Instruction)



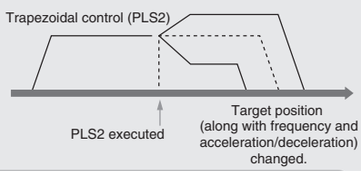
- Fast startup times (the time from instruction execution to start of pulse output): 46 μs minimum, 70 μs for trapezoidal acceleration/deceleration.

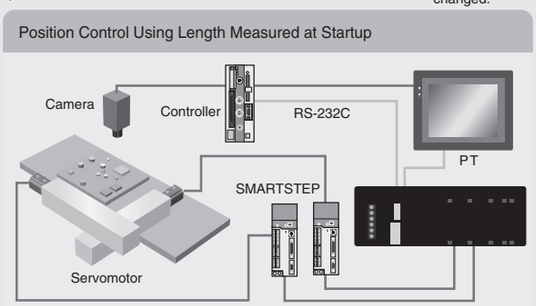
■ Interrupt Feeding (ACC and PLS2 Instructions)



■ 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.

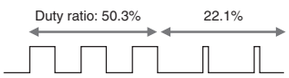




High-precision Variable Duty Ratio (PWM output)

(Unit Ver. 2.0 or later)

Specify a duty ratio in 0.1% units.



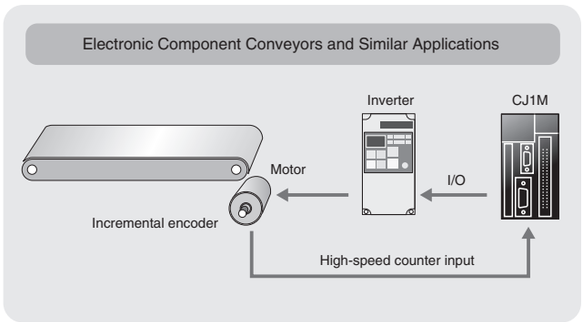
Fine-tune the opening/closing times of the valve.

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

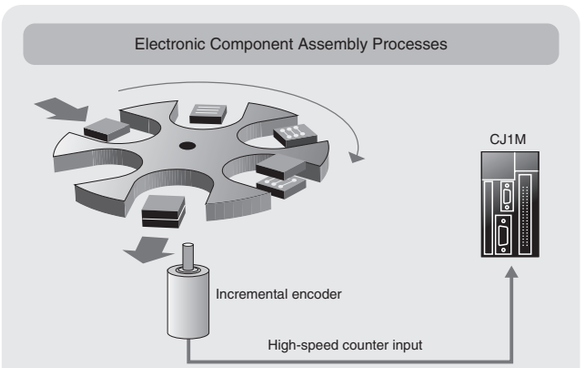
Two counter inputs, either single-phase, 100 kHz, or differential phases, 50 kHz

■ High-speed Counter in Linear Mode

High-speed 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 in Ring Mode

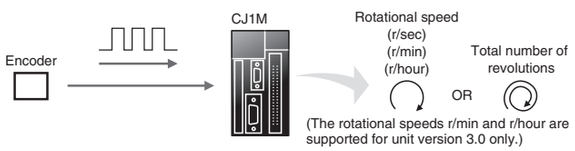


■ High-speed Counter Frequency (Speed) Measurements

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.

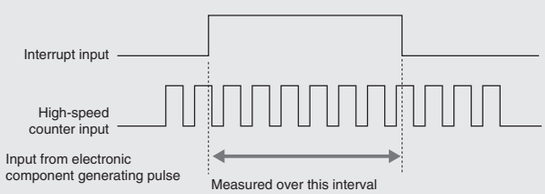


(The rotational speeds r/min and r/hour are supported for unit version 3.0 only.)

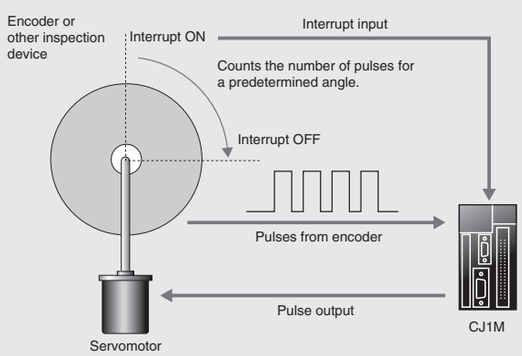
Interrupt Inputs (CJ1M-CPU21/22/23)

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



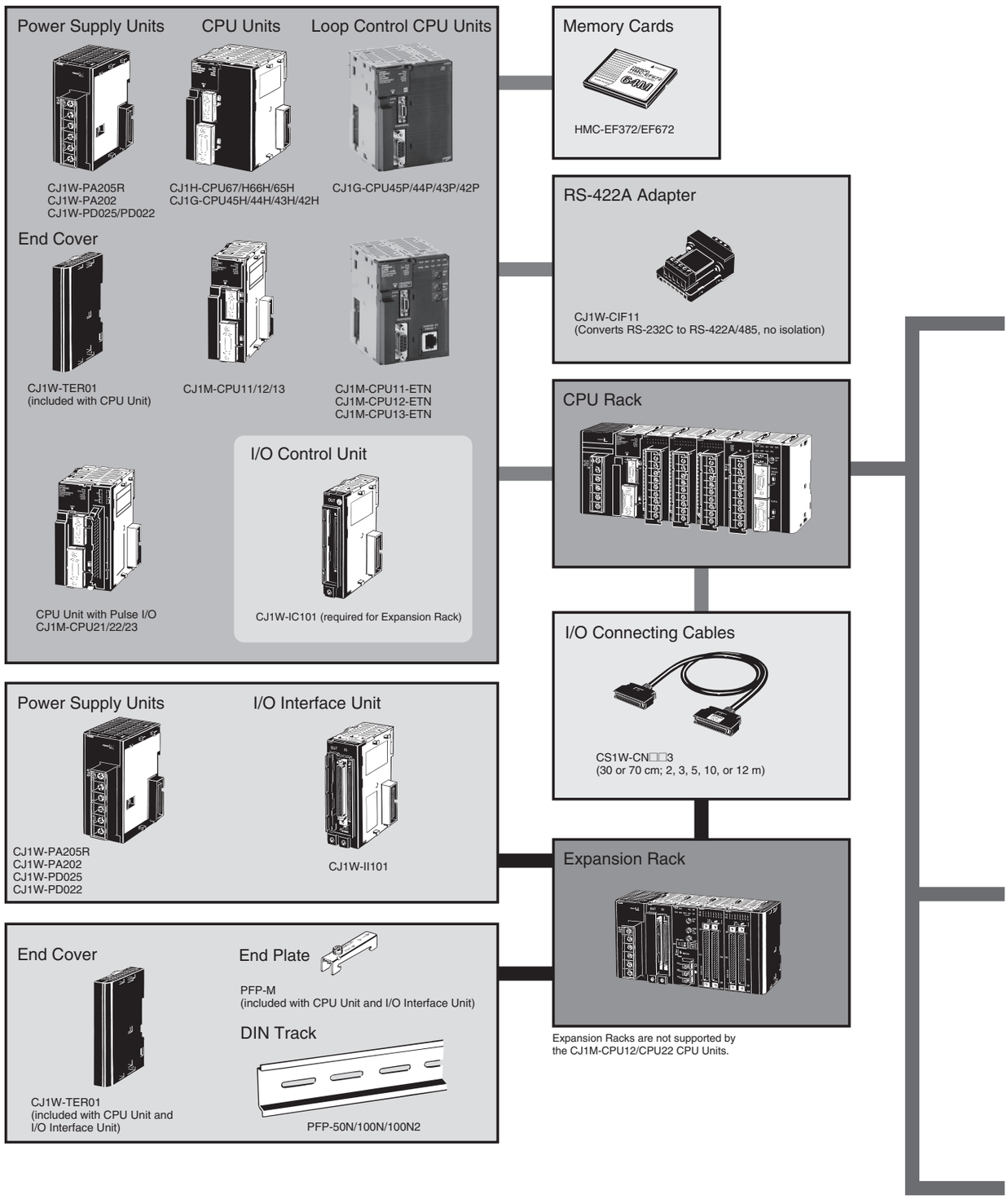
Inspection device rotated by motor.

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.

OMRON

A Complete Lineup to mix-and-match for your application.



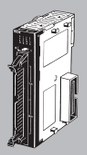
Note: HMC-172/372/672 Memory Cards cannot be used with CS1G-CPU□□H, CS1H-CPU□□H, CJ1G-CPU□□H, or CJ1H-CPU□□H CPU Units prior to Lot No. 02108 (manufactured prior to January 8, 2002, nor with NS-7-series PTs prior to Lot. No. 0852 (manufactured prior to May 8, 2002). Check lot numbers before ordering.

Basic I/O Units (See note.)

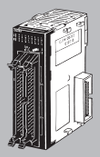
■ Input Units

8 or 16-point
DC Input Unit
CJ1W-ID201/211

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



32-point
DC Input Unit
CJ1W-ID231
CJ1W-ID232

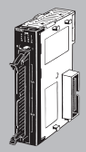


64-point
DC Input Unit
CJ1W-ID261
CJ1W-ID262

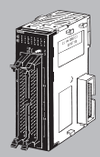
■ Output Units

8-point
Transistor Output Units
CJ1W-OD201/202
CJ1W-OD203/204

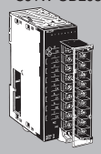
16-point
Transistor Output Units
CJ1W-OD211/212



32-point
Transistor Output Unit
CJ1W-OD231
CJ1W-OD232/233



64-point
Transistor Output Unit
CJ1W-OD261
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

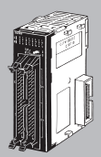
16-point
Interrupt Input Unit
CJ1W-INT01

■ High-speed Input Unit

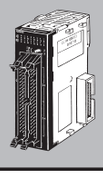
16-point
High-speed Input Unit
CJ1W-IDP01

■ I/O Units

32-point
DC Input/Transistor
Output Unit
CJ1W-MD231/232/233



64-point
DC Input/Transistor
Output Unit
CJ1W-MD261
CJ1W-MD263



64-point
TTL I/O Unit
CJ1W-MD563

■ Temperature Sensor Units

6-channel Thermocouple
Input Unit
CJ1W-TS561
6-channel RTD
Input Unit
CJ1W-TS562

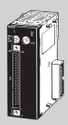
Special I/O Units (See note.)

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

Analog Output Units
CJ1W-DA041/021
CJ1W-DA08V/08C
(2, 4, or 8 outputs)

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

CJ1W-TC□□□
(2 or 4 temperature
control loops)



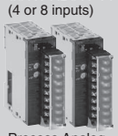
Position Control
Units
CJ1W-NC□□□
(1 to 4 axes)

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

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

PROFIBUS-DP
slave Unit
CJ1W-PRT21

CompoBus/S
Master Unit
CJ1W-SRM21



Process Analog
Units
CJ1W-PTS□□
CJ1W-PDC11

4-Channel Counter
Unit
CJ1W-CTL41-E

2-Cannel SSI Unit

CJ1W-CTS21-E

CPU Bus Units

Serial Communications Units
CJ1W-SCU41-V1
(RS-232C and RS-422/485)
CJ1W-SCU21-V1 (RS-232C x 2)

Ethernet Units
CJ1W-ETN21

Controller Link Unit
CJ1W-CLK21-V1

CAN Unit
CJ1W-CORT21

Position Control Unit
CJ1W-NCF71

PROFIBUS-DP
master Unit
CJ1W-PRM21

DeviceNet Units
CJ1W-DRM21

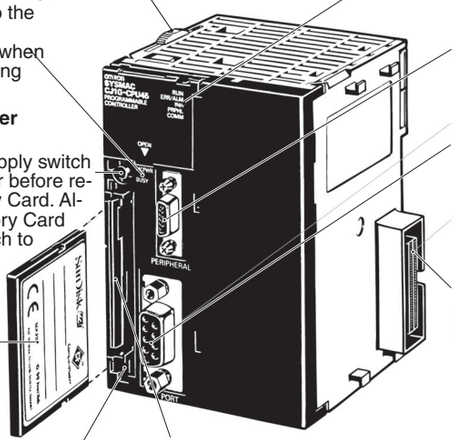
Note: Most units with 18-point front connector are available with screw terminals, or with screwless terminal block. Units with screwless terminal block have (SL) added to the model code.

OMRON

CJ1H-, CJ1G-CPU□□H, CJ1M-CPU□□

CJ1 series CPU Units

CJ1H-CPU6□H
CJ1G-CPU4□H



Slider
Secures the neighboring Unit.

Indicators

Memory Card Indicators
MCPWR (green): Lit when power is supplied to the Memory Card.
BUSY (orange): Lit when Memory Card is being accessed.

Memory Card Power Supply Switch
Press the power supply switch to disconnect power before removing the Memory Card. Also, press the Memory Card Power Supply Switch to perform an easy backup operation.

Peripheral Port
The peripheral port is connected to Programming Devices, such as Programming Consoles, or host computers.

RS-232C Port
The RS-232C port is connected to Programming Devices other than Programming Consoles, host computers, general-purpose external devices, or Programmable Terminals.

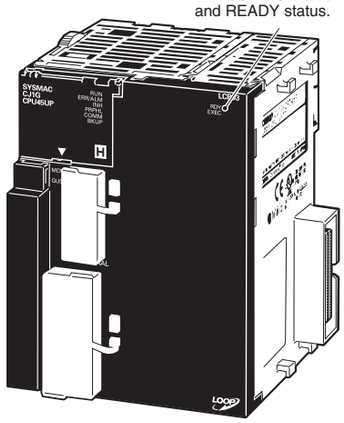
Connector
Connect to neighboring Unit by joining Connectors.

Memory Card

Memory Card Connector

Memory Card Eject Button
Press the eject button to remove the Memory Card from the CPU Unit.

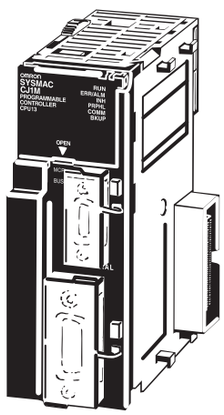
CJ1-CPU□□P



Loop Controller Element Indicators
Show the EXECUTING status and READY status.

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

CJ1M-CPU1□

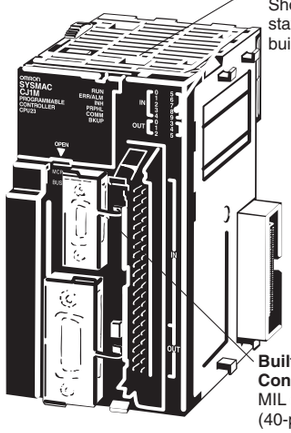


Components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

CJ1M-CPU1□-ETN

100Base-TX Ethernet Port
for data communication, programming, monitoring and FTP server functions

CJ1M-CPU2□



I/O Indicators
Show the status of the built-in I/O.

Built-in I/O Connector
MIL connector (40-pin)

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

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)	250 kSteps	448 kWords (DM: 32 kWords, EM: 32 kWords x 13 banks)	0.02 µs	Peripheral port and RS-232C port. -ETN models include a 100Base-Tx Ethernet port.	Memory Cards	CPU□□P models include Process Control Engine
CJ1H-CPU66H		120 kSteps	256 kWords (DM: 32 kWords, EM: 32 kWords x 7 banks)				
CJ1H-CPU65H		60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)				
CJ1G-CPU45H CJ1G-CPU45P	1,280 bits (Up to 3 Expansion Racks)			0.04 µs			
CJ1G-CPU44H CJ1G-CPU44P		30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)				
CJ1G-CPU43H CJ1G-CPU43P	960 bits (Up to 2 Expansion Racks)	20 kSteps					
CJ1G-CPU42H CJ1G-CPU42P		10 kSteps					
CJ1M-CPU13 CJ1M-CPU13-ETN	640 bits (Only 1 Expansion Rack)	20 kSteps	32 kWords (DM: 32 kWords, EM: None)	0.10 µs			
CJ1M-CPU12 CJ1M-CPU12-ETN	320 bits (No Expansion Rack)	10 kSteps					
CJ1M-CPU11 CJ1M-CPU11-ETN	160 bits (No Expansion Rack)	5 kSteps					
CJ1M-CPU23	640 bits (Only 1 Expansion Rack)	20 kSteps					Inputs: 10 Outputs: 6
CJ1M-CPU22	320 bits (No Expansion Rack)	10 kSteps					
CJ1M-CPU21	160 bits (No Expansion Rack)	5 kSteps					

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

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: 0.3 ms CJ1G-CPU□□P: 0.3ms CJ1M-CPU□□(-ETN): 0.5 ms CJ1M-CPU□1(-ETN): 0.7 ms
Unit connection method	No backplane (Units joined together with connectors.)
Mounting method	DIN rail 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. **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.
Functions Blocks (CPU Ver. 3.0 or higher)	Languages supported for use in function block programming: Ladder program language and IEC 61131-3 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 (19 Units for CJ1M-CPU13-ETN).
The CJ1M-CPU11/12/21/22 do not support Expansion Racks and support a total maximum of 10 Units (9 Units for CJ1M-CPU11/CPU12-ETN).

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 / PROFIBUS-DP Area **Note:** Other areas than these default areas can be allocated	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 1Outputs:CIO 3200 to CIO 3263 Inputs:CIO 3300 to CIO 3363 Fixed allocation setting 2Outputs:CIO 3400 to CIO 3463 Inputs:CIO 3500 to CIO 3563 Fixed allocation setting 3Outputs: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 1Outputs:CIO 3370 (master to slave) Inputs:CIO 3270 (slave to master) Fixed allocation setting 2Outputs:CIO 3570 (master to slave) Inputs:CIO 3470 (slave to master) Fixed allocation setting 3Outputs: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. In CPU Ver.3.0 and higher, Words H512 to H1535 exist, but are internally allocated as Function Block Holding Area and cannot be used.	
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		32 kWords: 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		32 kWords 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 for up to 20 days.	
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). CPU Ver. 2.0 or higher. Older CPUs support up to three levels.	
Storing comments in CPU Unit	I/O comments can be stored in Memory Cards, EM file memory, or (Ver. 3.0 and higher) in the comment memory (See note 3.) integrated in the CPU.	
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.

Power Supply Unit Specifications

Power Supply Unit	CJ1W-PA205R	CJ1W-PA202	CJ1W-PD025	CJ1W-PD022
Supply voltage	100 to 240 V AC (wide-range), 50/60 Hz		24 V DC	24 V DC
Operating voltage and frequency ranges	85 to 264 V AC, 47 to 63 Hz		19.2 to 28.8 V DC	21.6 to 26.4 V DC
Power consumption	100 VA max.	50 VA max.	50 W max.	35 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 V DC: 30 A/20 ms max. for cold start	At 24 V DC: 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)	2.0 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.	0.4 A 24 V DC. Total 16.6 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		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.)	No Isolation

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.

General Specifications

Item	Specifications
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See note 1.) Leakage current: 10 mA max.
	1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See note 1.) 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 x coefficient factor 10 = total time 80 min.) (according to IEC 60068-2-6/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 IEC 60068-2-27/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.
Safety measures	Conforms to cULus and EC Directives.

Note: 1. 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.			
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.			

OMRON

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.

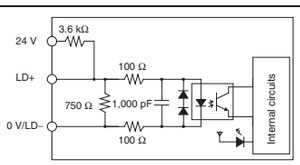
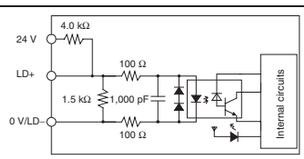
Note: CJ1M CPU Unit Ver. 2.0 or later only. (0% to 100%, set in 1% units for Pre-Ver. 2.0 CPU Units.)

Hardware Specifications

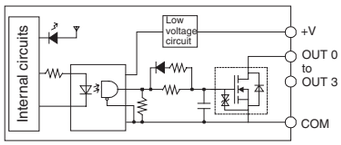
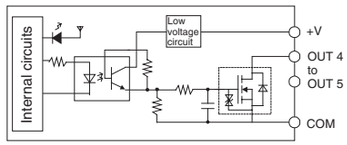
Input Specifications

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.)			

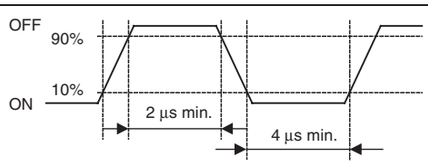
Input Circuit Configuration

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	

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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

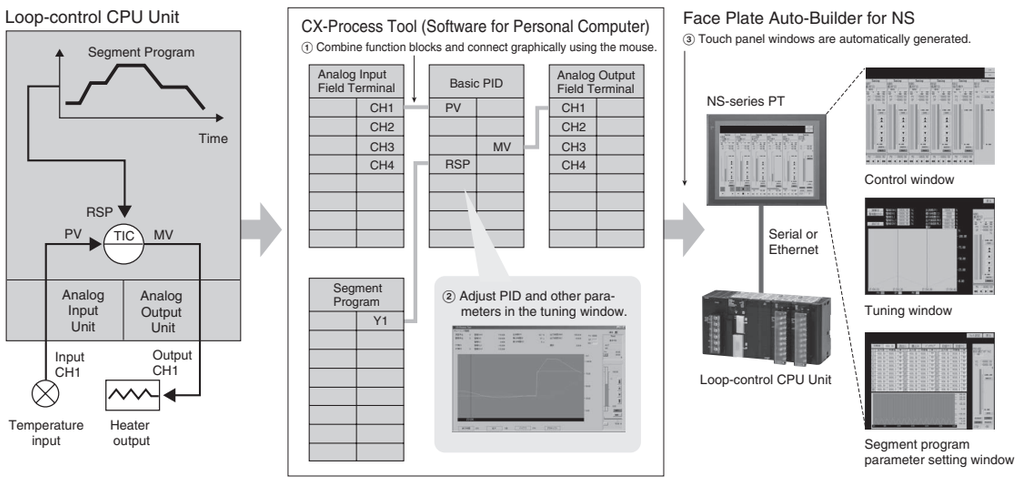
An engine for controlling analog quantities (e.g., temperature, pressure, flowrate) is built into the same CPU Unit as the engine for executing sequence control, delivering high-speed sequence control and high-speed, advanced analog quantity control in a single Unit.

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)

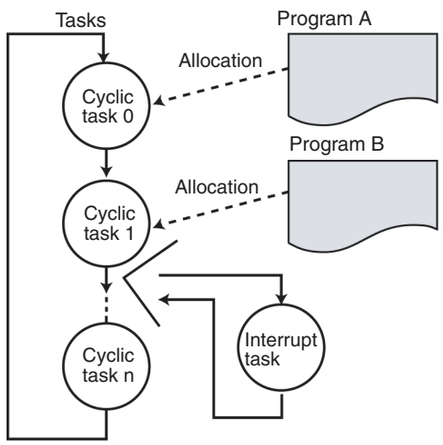
Item		Model	CJ1G-CPU42P	CJ1G-CPU43P	CJ1G-CPU44P	CJ1G-CPU45P
Operation method			Function block method			
Operation cycle			0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) Can be set for each function block.			
Number of function blocks	Analog operations	Control and operation blocks	50 blocks 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.			

Item		Model	CJ1G-CPU42P	CJ1G-CPU43P	CJ1G-CPU44P	CJ1G-CPU45P
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			

Task Programming

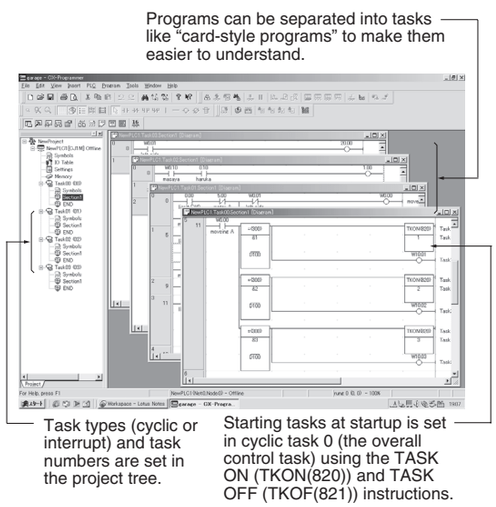
Better Design/Development Efficiency
Structured Programming and Team Program Development Using Tasks

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.

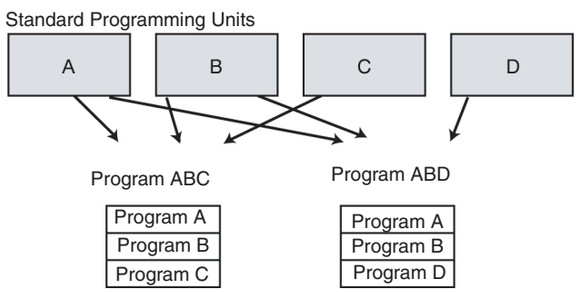
Task Programming Example with CX-Programmer



Advantages

Program Standardization

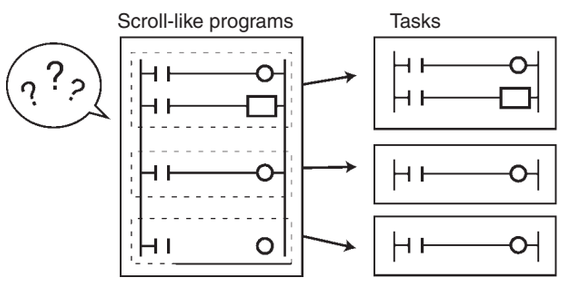
Task programs are created in units divided by functionally by purpose. These functional units can be easily reused when programming new PLCs or systems with the same functionality.



Easier-to-understand Programs

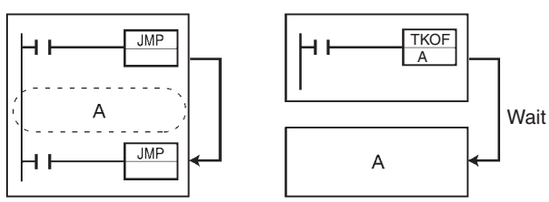
With scroll-like programs, individual functional units are extremely difficult to find just by looking at the program.

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



Shorter Cycle Times

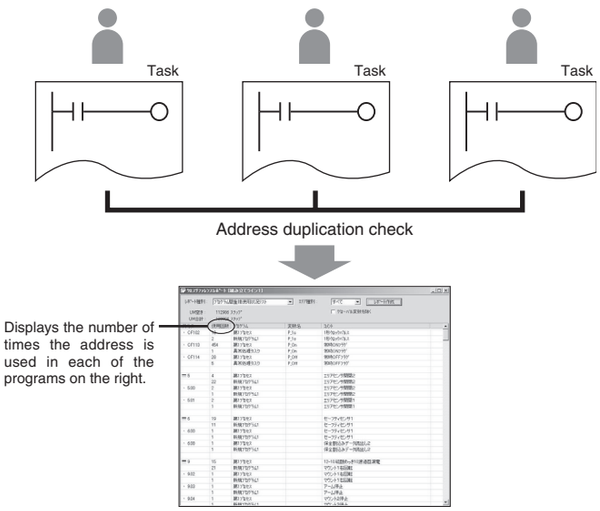
With a scroll-like program, many jump and similar instructions had to be used to avoid executing specific parts of the program. This not only slows down the programs, but makes them more difficult to understand. With task programming, special instructions enable controlling the execution of tasks so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

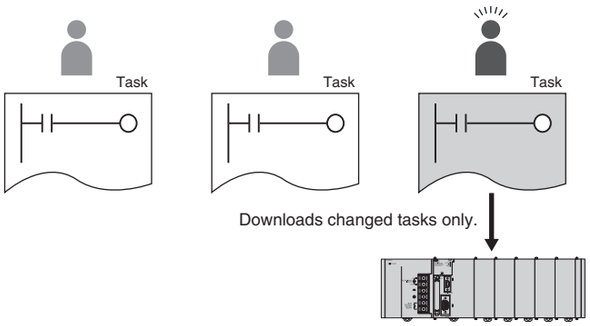


List of duplicated addresses on CX-Programmer

Downloading in Task Units

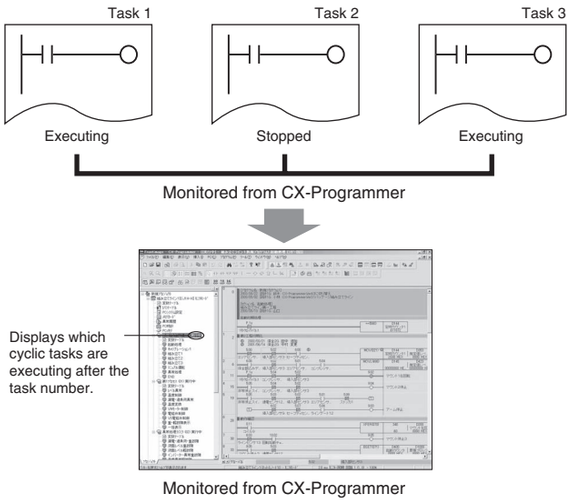
(CX-Programmer Ver. 4.0 or Higher)

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.

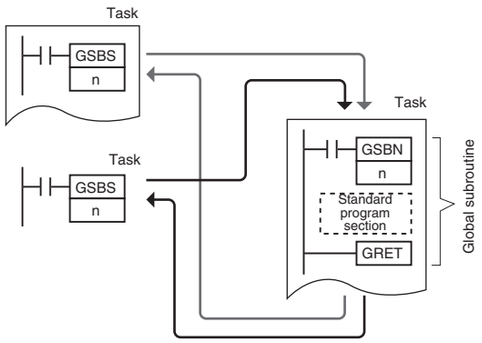


Monitored from CX-Programmer

Task Features

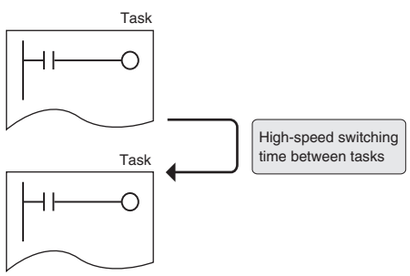
Standardization of Common Processing

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.



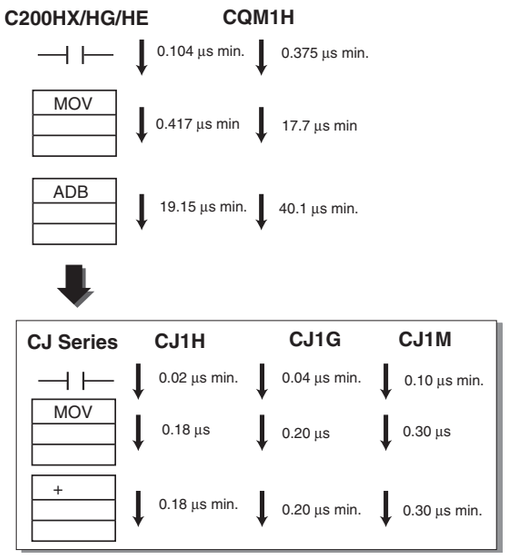
High-speed Processing

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

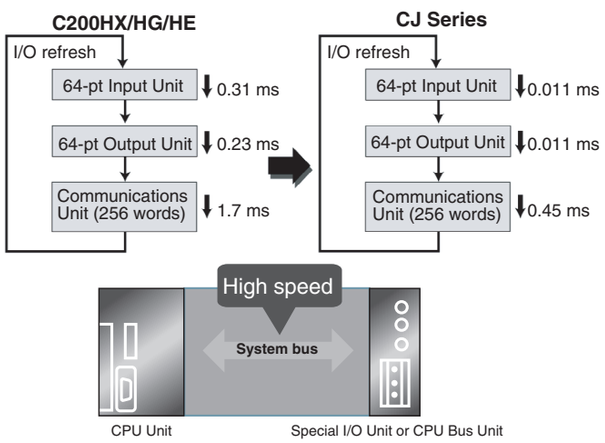
Faster instruction processing includes 0.02 μs for LD and 0.18 μs for MOV. A complete range of instructions (more than 400) is supported, more than 100 of which are frequently used special instructions that can be processed almost as fast as basic instructions, as fast as 0.18 μs for some instructions.



Four Times the Peripheral Servicing and I/O Refresh Speed

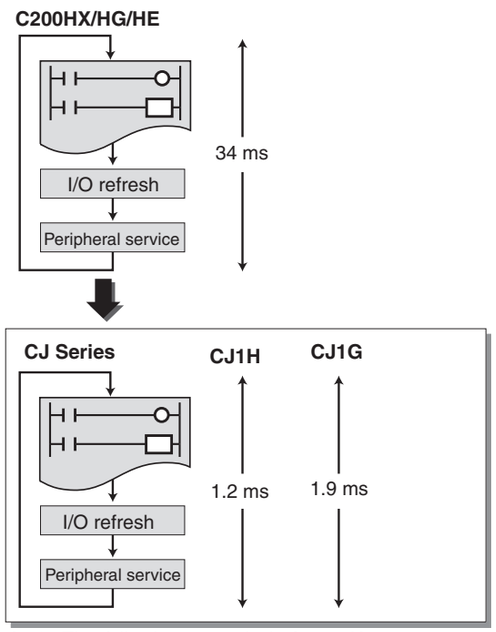
Increased efficiency in data transmission between the CPU Unit and Special I/O Units/CPU Bus Units further improves performance of the entire system.

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)

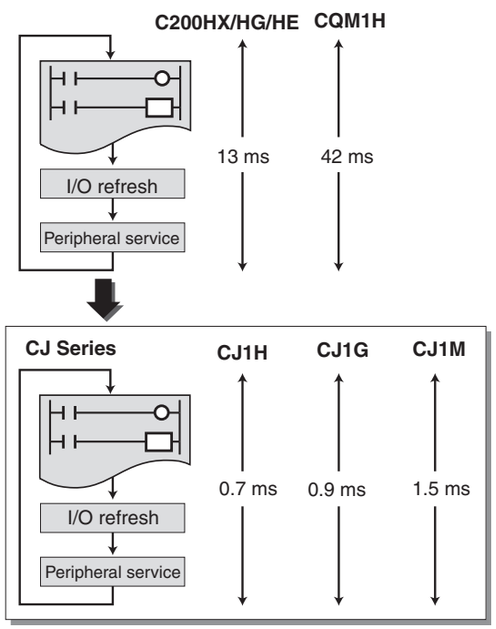


30 Times the Overall Cycle Speed

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%).



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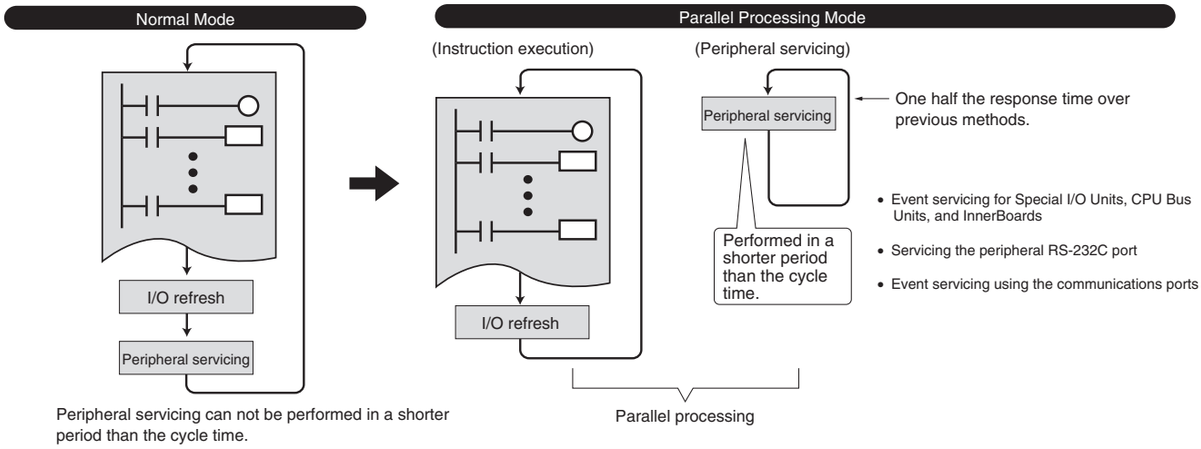
High-speed Exchange with Communications Units and High-speed Data Processing

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

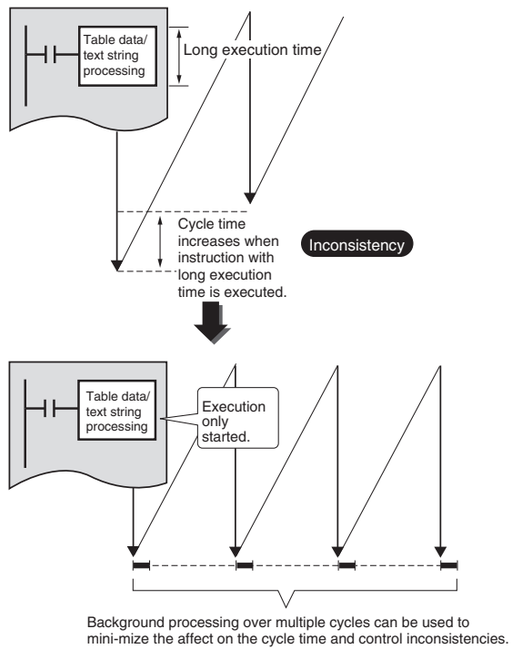
With CJ1G and CJ1H CPU Units, a Parallel Processing Mode can be used to perform program execution and peripheral servicing in parallel. Parallel processing doubles the speed of peripheral serving time over previous PLCs, enabling the following types of application.

- 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.



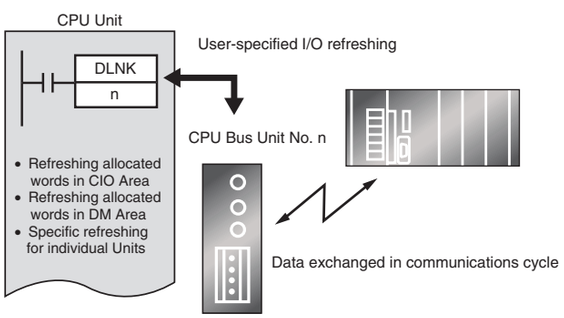
Control Inconsistencies in the Cycle Time for Data Processing

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

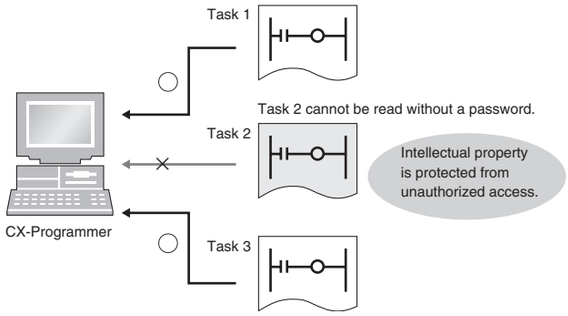
Increased Security

Various Forms of Protection Provide Better Security

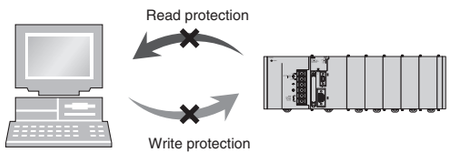
Conceal Intellectual Property Contained in Programs (Unit Ver. 2.0 or Later)

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.



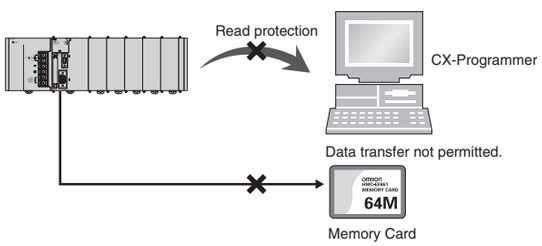
This function enables concealment of intellectual property contained in programs. The overwrite prohibit function also protects programs concealing intellectual property from being carelessly overwritten.



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)

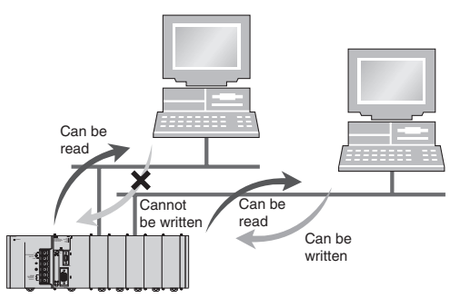
In addition to UM read protection and task read protection, user programs can also be protected from being illegally transferred to a Memory Card. This function enables complete read protection of programs in the PLC and prevents leakage of intellectual property.



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.



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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

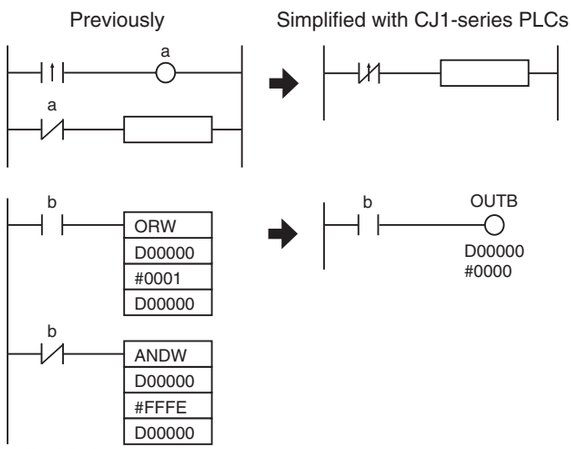
Applicable Instructions:

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.

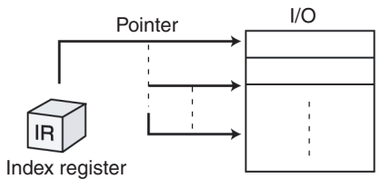


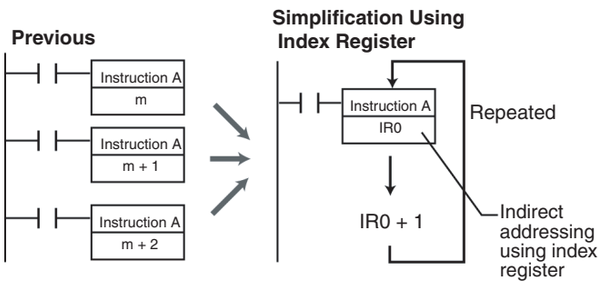
Applicable Instructions:

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.

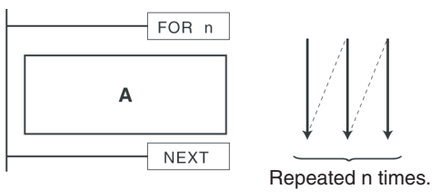




Index Registers: IR00 to IR15

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.



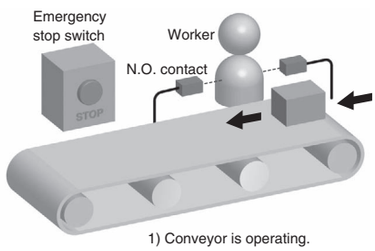
Applicable Instructions:

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)

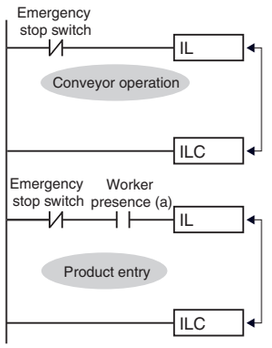
(CX-Programmer Ver 4.0 or Higher)

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.

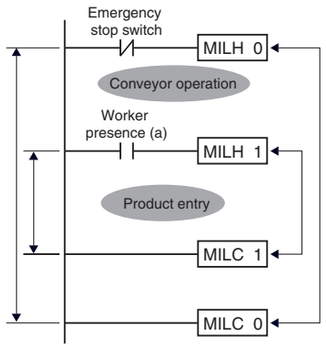


1) Conveyor is operating.
2) When a worker is present, the N.O. contact turns ON, and the product enters the conveyor.
3) When the emergency stop switch is pressed, the conveyor and product entry stop.

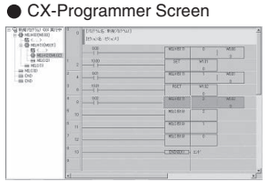
Using Existing IL Instructions



Using Multi-interlock Instructions



● CX-Programmer Screen



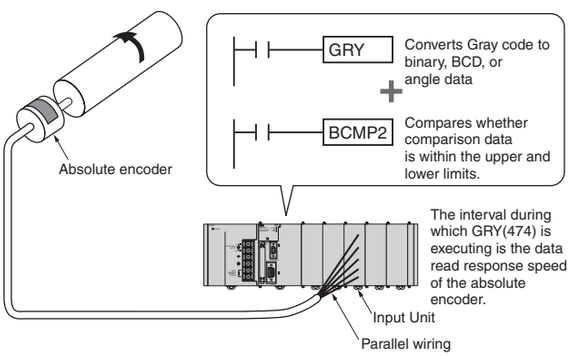
Interlock status is easy to understand using the software.

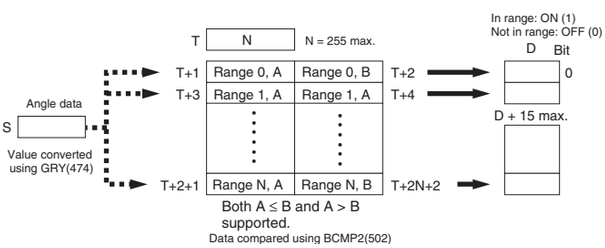
Applicable Instructions:

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)

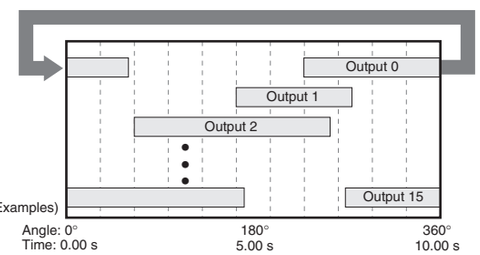
The EXPANDED BLOCK COMPARE (BCMP2(502)) instruction can be used to compare data converted from Gray binary code to binary data, BCD data, or an angle using the GRAY CODE CONVERT (GRY(474)) instruction. It can also compare data in ranges including 0, such as angle data.





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:

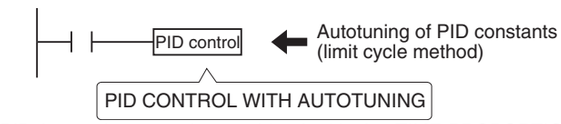
EXPANDED BLOCK COMPARE (BCMP2(502))

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

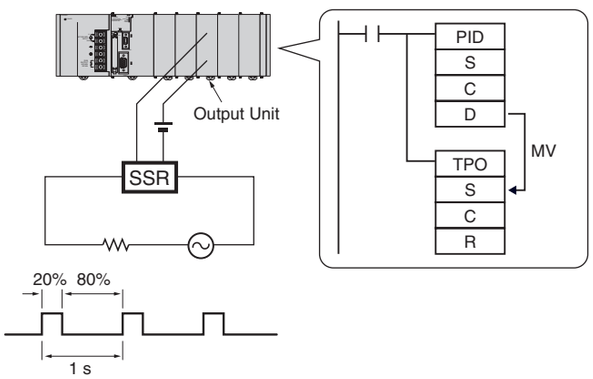
OMRON

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:

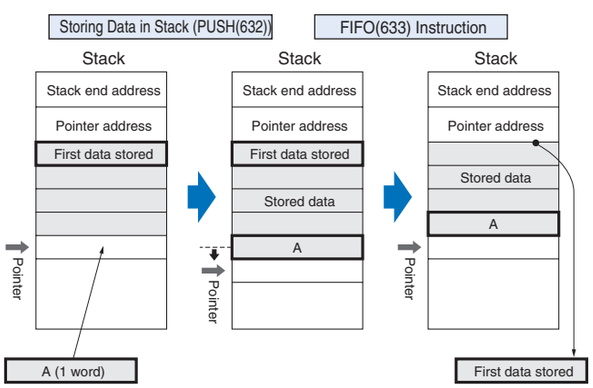
Control instructions:

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))

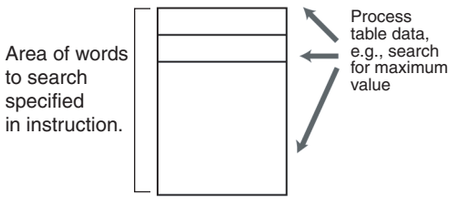
PUSH ONTO STACK (PUSH(632))

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:

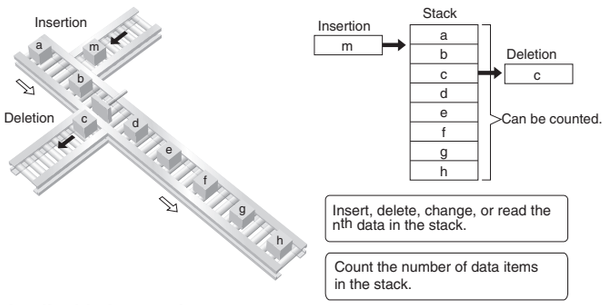
DATA SEARCH (SRCH(181))

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))

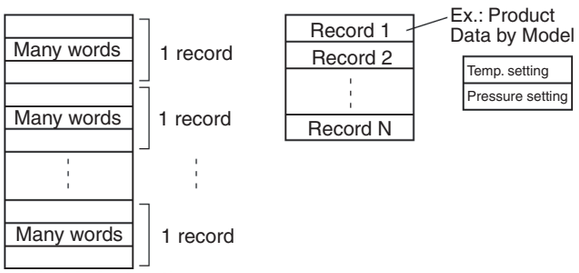
STACK DATA INSERT (SINS(641))

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:

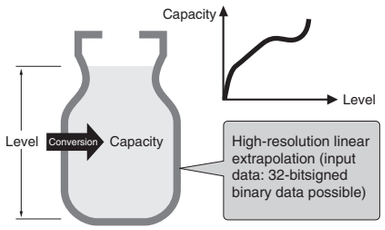
DIMENSION RECORD TABLE (DIM(631))

SET RECORD LOCATION (SETR(635))

GET RECORD NUMBER (GETR(636))

High-precision Approximations

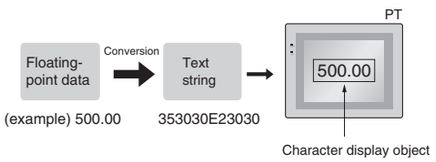
Converting a level meter reading in mm to tank capacity in liters according to the shape of the tank and other difficult linear extrapolations requiring high data resolution can be performed. (Linear data can be handled as 16-bit unsigned binary or BCD data, 16-bit or 32-bit signed binary data, or floating-point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



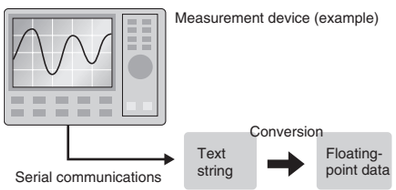
Applicable Instructions:
ARITHMETIC PROCESS (APR(069))

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.



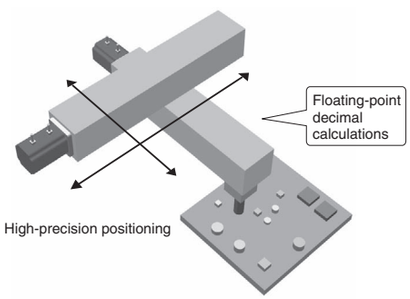
You can also convert ASCII data (text strings) received from measurement devices to floating-point decimal data for use in calculations.



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

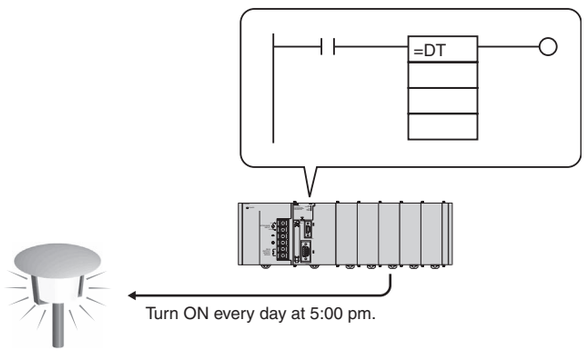
Floating-point decimal and double-precision calculation instruction have been supported. These are essential for position control operations. Now more precise position control is possible than ever before.



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).

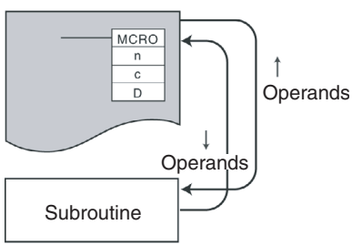
Applicable Instructions:
Comparison instructions

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))

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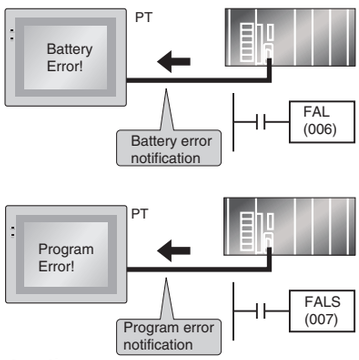
Simulate Specific Error Statuses for Debugging

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.

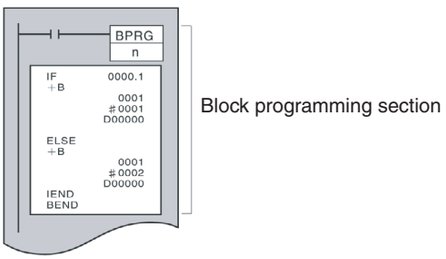
Example



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

Easily Program Logic Flow Control with Block Programming Sections

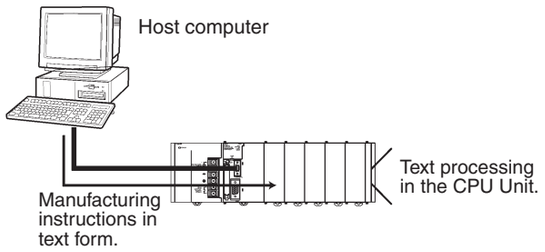
A block of mnemonic programming instructions can be executed as a group based on a single execution condition. IF/THEN, WAIT, TIMER WAIT, and other instructions can be used inside the block programming section to easily program logic flow control that is difficult to program with ladder diagrams.



Applicable Instructions:
Block Programming instructions

Easily Handle Text Strings

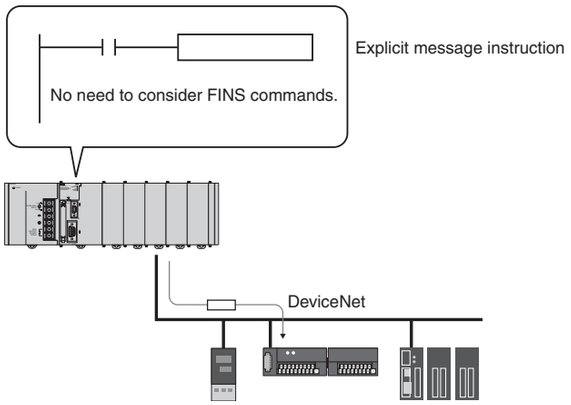
Manufacturing instruction can be obtained from a host computer or other external source, stored in memory, and then manipulated as text strings (ASCII data) as required by the applications. The text strings can be searched, fetched, reordered, or other processed in the CPU Unit of the PLC.



Applicable Instructions:
Text String Processing instructions

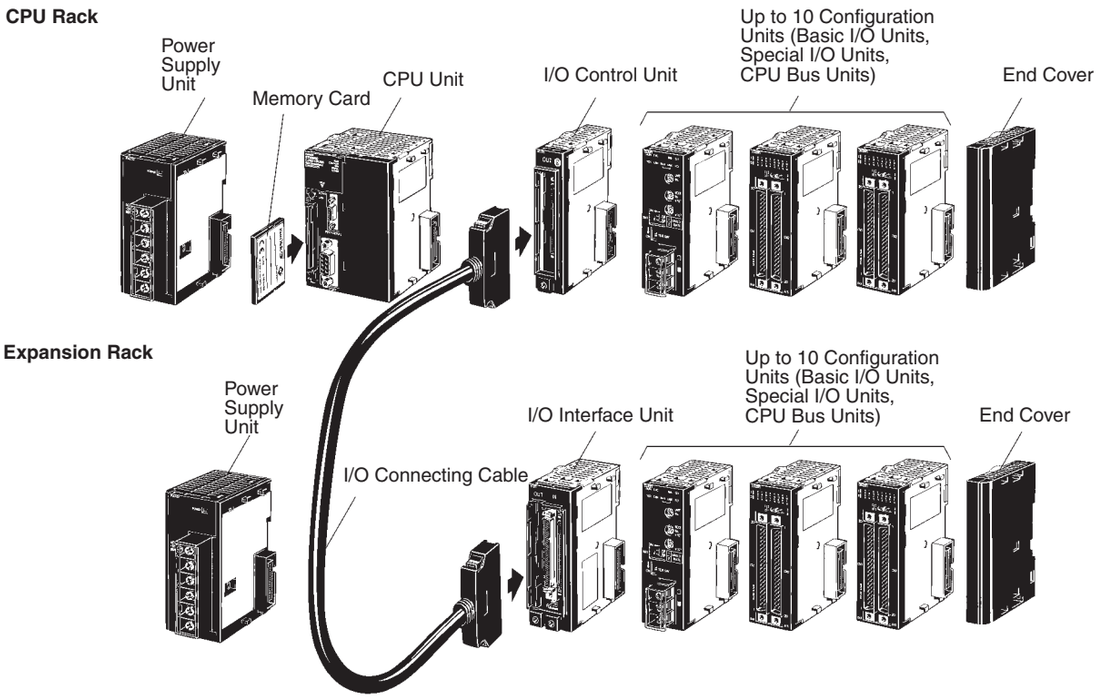
Read Maintenance Information Easily through DeviceNet (Unit Ver. 2.0 or Later) NEW!

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))

Basic 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.

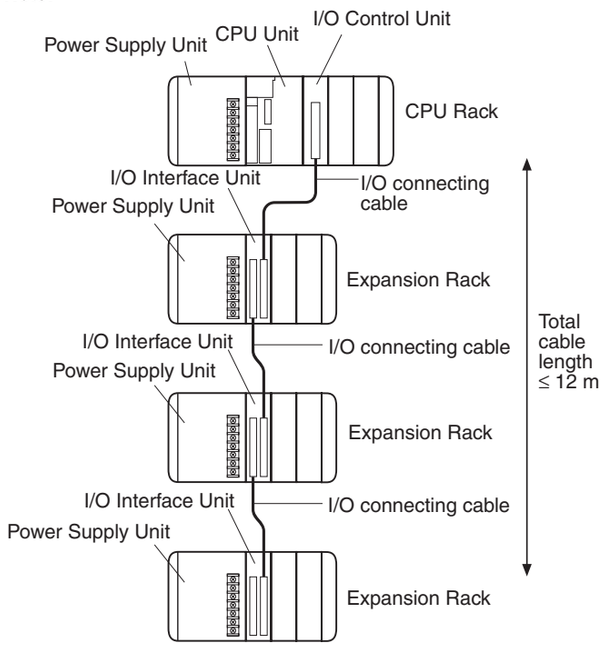
A CJ-series Expansion Rack consists of a Power Supply Unit, an I/O Interface Unit, Basic I/O Units, Special I/O Units, CPU Bus Units, and an End Cover.

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-CPU23	1	20
CJ1M-CPU13	1	20
CJ1M-CPU13-ETN	1	19
CJ1M-CPU22	none	10
CJ1M-CPU12	none	10
CJ1M-CPU12-ETN	none	9
CJ1M-CPU21	none	10
CJ1M-CPU11	none	10
CJ1M-CPU11-ETN	none	9

Note:



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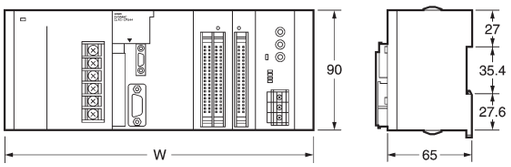
Dimensions

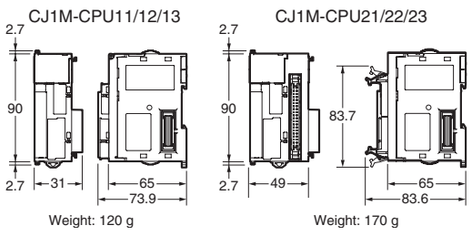
Note: Units are in mm unless specified otherwise.

Product Dimensions



Unit/product	Model number	Width
Power Supply Unit	CJ1W-PA205R	80
	CJ1W-PA202	45
	CJ1W-PD025	60
	CJ1W-PD022	27
CPU Unit	CJ1M-CPU11/12/13	31
	CJ1M-CPU21/22/23	49
	CJ1H-CPU□□H CJ1G-CPU□□H	62
	CJ1G-CPU□□P	69
	CJ1M-CPU1□-ETN	62
End Cover	CJ1W-TER01	14.7

CPU Unit

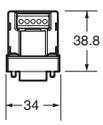


End Plate

(Provided with the CPU Unit.)

RS-422A Converter

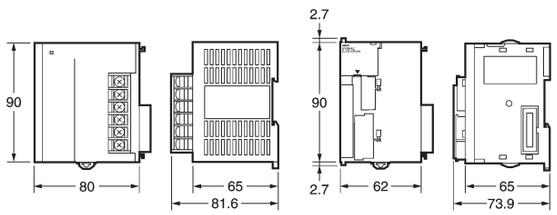
CJ1W-CIF11



Weight: 20 g

Width W (mm) When Used with a CJ1W-PA202 Power Supply Unit (AC, 14 W)

Number of I/O Units with 31-mm width	CJ1M-CPU11/12/13	CJ1M-CPU21/22/23
1	121.7	139.7
2	152.7	170.7
3	183.7	201.7
4	214.7	232.7
5	245.7	263.7
6	276.7	294.7
7	307.7	325.7
8	338.7	356.7
9	369.7	387.7
10	400.7	418.7

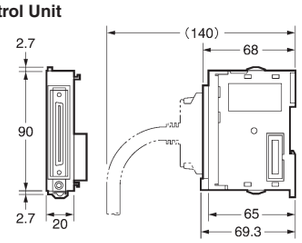


CJ-series Units other than CPU Units and Power Supply Units have a width of either 20 mm or 31 mm, as shown in the tables below.

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	
CompoBus/S Master Unit	CJ1W-SRM21	

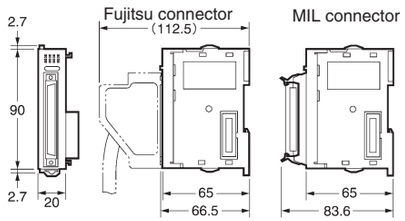
I/O Control Unit



Units of Width 80 mm

Unit	Model number	Width
Motion Control Unit	CJ1W-MCH71	80

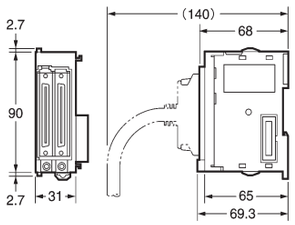
32-point I/O Unit



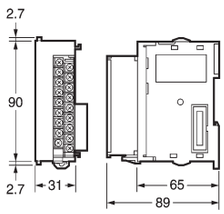
Units of Width 31 mm

Unit	Model number	Width
I/O Interface Unit	CJ1W-II101	31
8/16-point Basic I/O Units	CJ1W-ID201/211 CJ1W-IA111/201 CJ1W-OD201/202/203/204 CJ1W-OD211/212 CJ1W-OC201/211 CJ1W-OA201	
32-point Basic I/O Units	CJ1W-MD231/232/233	
64-point Basic I/O Units	CJ1W-ID261/262 CJ1W-OD261/262/263 CJ1W-MD261/263/563	
Interrupt Input Unit	CJ1W-INT01	
High-Speed Input Unit	CJ1W-IDP01	
Analog I/O Unit	CJ1W-AD□□□ CJ1W-DA□□□ CJ1W-MAD42	
Process Input Units	CJ1W-PDC15 CJ1W-PTS15/16 CJ1W-PTS51/52	
Temperature Input Units	CJ1W-TS561/562	
Temperature Control Units	CJ1W-TC□□□	
Position Control Units	CJ1W-NC113/133	
	CJ1W-NC213/233	
	CJ1W-NC413/433	
High-speed Counter Unit	CJ1W-CT021	
4-channel Counter Unit	CJ1W-CTL41-E	
SSI encoder Unit	CJ1W-CTS21-E	
Controller Link Unit	CJ1W-CLK21	
Serial Communications Unit	CJ1W-SCU21-V1 CJ1W-SCU41-V1	
Ethernet Unit	CJ1W-ETN11/21	
DeviceNet Unit	CJ1W-DRM21	
PROFIBUS-DP Units	CJ1W-PRM21	
	CJ1W-PRT21	
CAN Unit	CJ1W-CORT21	
RFID Sensor Units	CJ1W-V600C11	
	CJ1W-V600C12	
Position Control Unit	CJ1W-NCF71	

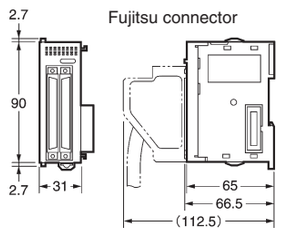
I/O Interface Unit



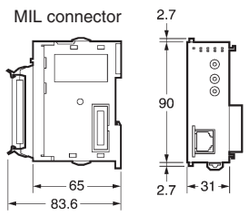
8/16-point Basic I/O Unit and Interrupt Input Unit



64-point Basic I/O Unit



Special I/O Unit /CPU Bus Unit



W, the total width is given by the following formula:

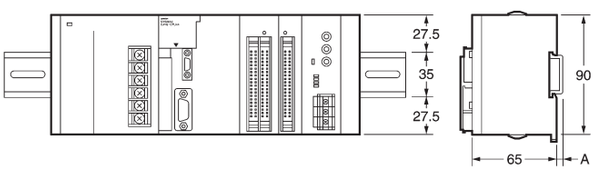
W = 80 (Power Supply Unit) + 62 (CPU Unit) + 20 x n + 31 x m + 14.7 (End Cover) (mm)

where n is the number of Units of width 20 mm and m is the number of Units of width 31mm.

Example:For configurations with 2 32-point Basic I/O Units and 8 Units of width 31 mm:

W = 156.7 + 20 x 2 + 31 x 8 = 444.7 mm

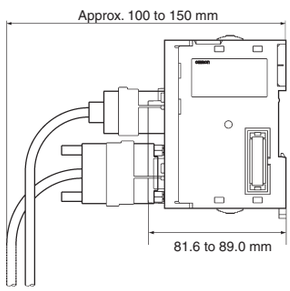
Mounting Dimensions



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

Mounting Depth

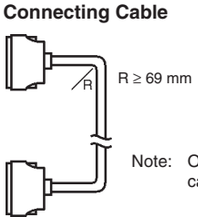
The mounting depth of CJ-series CPU Racks and Expansion Racks is from 81.6 to 89.0 mm depending on the Units that are mounted. Additional depth is required to connect Programming Devices (e.g., CX-Programmer or Programming Console) and Cables. Be sure to allow sufficient mounting depth.



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.

CS/CJ-series Connecting Cable



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
CJ1W-PD022	2.0 A	0.4 A	None	19.6 W

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

Condition 1: Maximum Current Supply

1. Current required at 5 V DC by all Units (A) ≤Maximum current consumption shown in table
2. Current required at 24 V DC by all Units (B) ≤Maximum current consumption shown in table

Condition 2: Maximum Total Power Supply
A x 5 V DC + B x 24 V DC + C x 24 V DC £ 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- V DC	24- V DC
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+0.090x2+ 0.090x2+0.120+0.350	0.048 Ax2
	Result		1.92 A (£5.0 A)	0.096 A (£0.8 A)
Power consumption	Calculation		1.92x5 V=9.60 W	0.096 Ax24 V=2.304 W
	Result		9.60+2.304=11.904 W (£25 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-CPU45P/44P/43P/42P	1.06 (See note.)
	CJ1G-CPU45H/44H/43H/42H	0.91 (See note.)
	CJ1M-CPU11/12/13	0.58 (See note.)
	CJ1M-CPU21/22/23	0.64 (See note.)
	CJ1M-CPU1□-ETN	0.95 (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 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	0.08	---
		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-MD234	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	
Thermocouple Input Unit		CJ1W-TS561	0.22	
RTD Input Unit		CJ1W-TS562	0.25	

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-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 Untis	CJ1W-PDC15	0.18	0.09 (external)
	CJ1W-PTS15	0.18	0.06 (external)
	CJ1W-PTS16	0.18	0.07 (external)
	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	
Counter Unit	CJ1W-CTL41-E	0.32	
SSI encoder Unit	CJ1W-CTS21-E	0.30	
ID Sensor Units	CJ1W-V600C11	0.26	0.12
	CJ1W-V600C12	0.32	0.24
PROFIBUS-DP Slave Unit	CJ1W-PRT21	0.40	---
CompoBus/S Master Unit	CJ1W-SRM21	0.15	---

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.)
Position Control Unit	CJ1W-NCF71	0.36
Motion Control Unit	CJ1W-MCH71	0.60
CAN Unit	CJ1W-CORT21	0.33
Ethernet Unit	CJ1W-ETN11/21	0.38
DeviceNet Unit	CJ1W-DRM21	0.33
PROFIBUS-DP Master Unit	CJ1W-PRM21	0.40

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.

Note: This table may contain Units that are no longer in production

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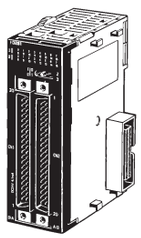
I/O Allocations

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



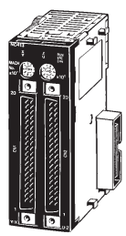
Basic I/O Units

Allocations

CIO Area:
CIO 0000 to CIO 0079 (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



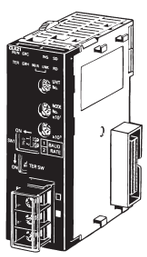
Special I/O Units

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

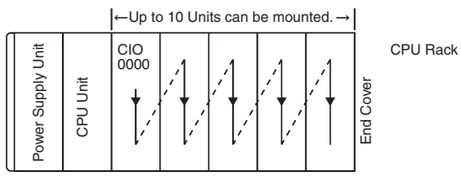
Allocated words in the CIO Area: CIO 0000 to CIO 0079

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

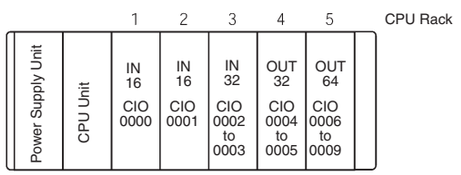
Allocation Methods

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. Words can be reserved using the CX-Programmer.



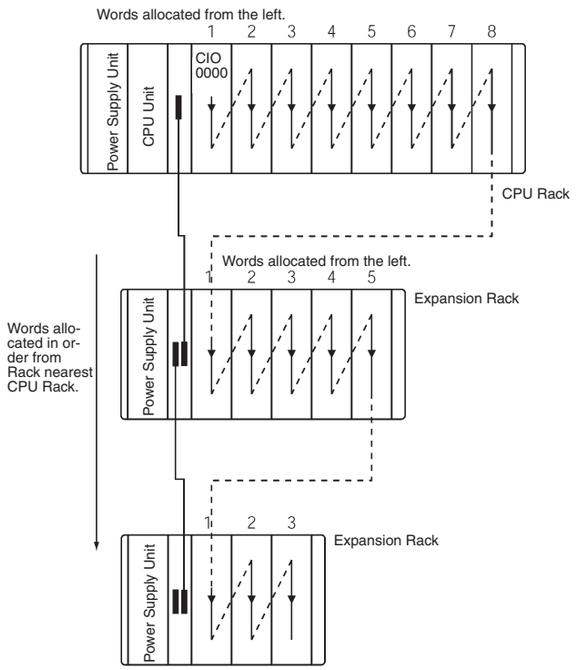
Example Words allocated from the left.



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.



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.

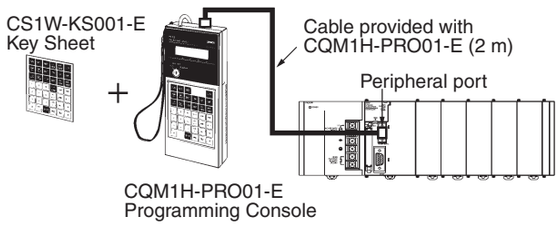
Each Unit is allocated 25 words in the CPU Bus Unit Area according to its unit number, as shown in the following table.

Unit number	Words allocated
0	CIO 1500 to CIO 1524
1	CIO 1525 to CIO 1549
2	CIO 1550 to CIO 1574
⋮	⋮
15	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.

Programming Consoles

CQM1H-PRO01-E



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

Windows-based Programming Software: CX-One

Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.

Name	Model	Specifications
CX-One	CX-ONE-AL□□C-E*1	Windows 2000 / XP

*1 □□ = Number of licences; 01, 03, 10

Note: CX-One includes the PLC programming tool CX-Programmer, previously released as a separate package. CX-Programmer Version 2.04 or higher is required to program CJ-series PLCs.

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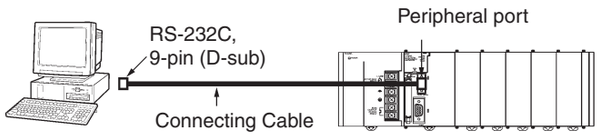
Connecting to the Peripheral Port

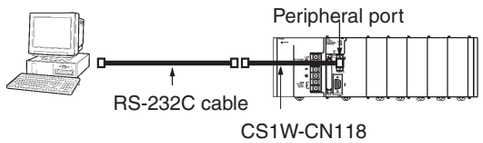


Peripheral Port Connecting Cables

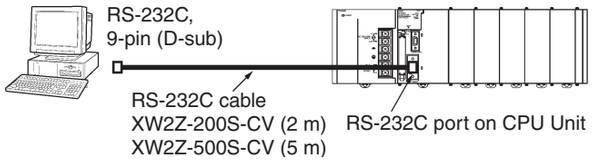
Cable	Length	Computer connector
CS1W-CN226	2.0 m	D-sub, 9-pin, male
CS1W-CN626	6.0 m	

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	XW2Z-200S-CV or XW2Z-500S-CV	CS1W-CN118	2 or 5 m + 0.1 m	D-sub, 9-pin, male
Host Link	XW2Z-200S-V or XW2Z-500S-V			



Connecting to the RS-232C Port



RS-232C Port Connecting Cables

Mode	Cable	Length	Computer connector
Peripheral Bus or Host Link	XW2Z-200S-CV	2.0 m	D-sub, 9-pin
	XW2Z-500S-CV	5.0 m	

Note: Cables with model numbers ending in “CV” are anti-static.

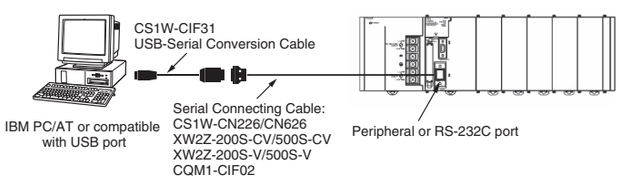
The following cables can be used for an RS-232C connection from the computer to an RS-232C port. (Unlike “CV” models, however, they do not support Peripheral Bus and do not use anti-static connectors.)

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

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 with the CJ1.
Host Link	A standard protocol for host computers. Slower than peripheral bus, but allows modem or optical adapter connections, or long-distance or 1:N connections via RS-422A/485.

Using a USB-Serial Conversion Cable to Connect to a Peripheral or RS-232C Port



General Specifications of USB-Serial Conversion Cable

USB interface standard		Conforms to USB Specification 1.1.
DTE speed		115.2 Kbits/s
Connectors	On computer	USB (A plug connector, male)
	On PLC	RS-232C (D-sub, 9-pin, female)
Power supply		Bus power (supplied from upstream, 5 V DC)

Current consumption		35 mA
Operating environment	Ambient temperature	0 to 55 °C
	Ambient humidity	10% to 90% (with no condensation)
	Ambient atmosphere	No corrosive gases
Weight		50 g

OS with Drivers for USB-Serial Conversion Cable
Windows 98, ME, 2000, or XP

Applicable Software

CX-One is the integrated software for programming and configuration of all Omron control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.

It includes the functionality of previously released individual software tools like CX-Programmer, CX-Designer, CX-Simulator, CX-Protocol, and network configuration tools.

Peripheral Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number			Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	CS1W-CN226		0.5 m + 2.0 m	USB (A plug connector)
			CS1W-CN626		0.5 m + 6.0 m	
		CS1W-CIF31	XW2Z-200S-CV/ XW2Z-500S-CV	CS1W-CN118	0.5 m + (2.0 m or 5.0 m) + 0.1 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V/ XW2Z-500S-V		0.5 m + (2.0 m or 5.0 m) + 0.1 m	

RS-232C Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number		Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	XW2Z-200S-CV	0.5 m + 2.0 m	USB (A plug connector)
			XW2Z-500S-CV	0.5 m + 5.0 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V (See note.)	0.5 m + 2.0 m	
			XW2Z-500S-V (See note.)	0.5 m + 5.0 m	

Connection in Tool Bus Mode is not possible. The connector does not have ESD measures.

CJ1 Unit Descriptions

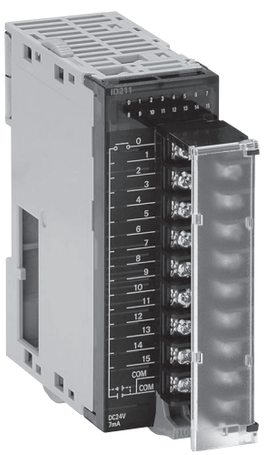
Table of Units

Unit		Classification	Model	Page
I/O Units	Input Units	Basic I/O Unit	CJ1W-ID□□□/IA□□□	182
	Output Units		CJ1W-OD□□□/ OC□□□/OA□□□	182
	I/O Units		CJ1W-MD□□□	183
Interrupt Input Unit		Basic I/O Unit	CJ1W-INT01	194
High-speed Input Units		Basic I/O Unit	CJ1W-IDP01	195
Temperature Input Units		Basic I/O Unit	CJ1W-TS561/TS562	196
Analog I/O Units	Input Units	Special I/O Unit	CJ1W-AD□□□	198
	Output Units		CJ1W-DA□□□	199
	I/O Unit		CJ1W-MAD42	201
Process Input Units		Special I/O Unit	CJ1W-PTS□□/PDC11	202
Temperature Control Units		Special I/O Unit	CJ1W-TC□□□	205
Position Control Units		Special I/O Unit	CJ1W-NC□□□	207
Motion Control Unit			CJ1W-MCH71 - MECHATROLINK-II	208
Position Control Unit			CJ1W-NCF71 - MECHATROLINK-II	210
High-speed Counter Unit		Special I/O Unit	CJ1W-CT021	213
Counter Unit		Special I/O Unit	CJ1W-CTL41E	214
SSI Input Unit		Special I/O Unit	CJ1W-CTS21-E	215
ID Sensor Units		Special I/O Unit	CJ1W-V600C1□	222
Serial Communications Units		CPU Bus Unit	CJ1W-SCU□1	219
RS-232C/RS-422A Adapter Units		---	NT-AL001	221
Communications Networks				224
Ethernet Units		CPU Bus Unit	CJ1W-ETN21	228
Controller Link Boards/ Units	Controller Link Units	CPU Bus Unit	CJ1W-CLK21-V1	230
	Controller Link Boards	Personal computer board (for PCI bus)	3G8F7-CLK21-EV1	
	Repeater Units	Wired/Optical	CS1W-RPT0□	231
DeviceNet Units	DeviceNet Units	CPU Bus Unit	CJ1W-DRM21	233
CAN Unit	User-specified CAN protocols	CPU Bus Unit	CJ1W-CORT21	235
PROFIBUS-DP Units	PROFIBUS-DP Master	CPU Bus Unit	CJ1W-PRM21	236
	PROFIBUS-DP Slave	Special I/O Unit	CJ1W-PRT21	237
CompoBus/S Units	Master Unit	Special I/O Unit	CJ1W-SRM21	238

I/O Terminal Blocks

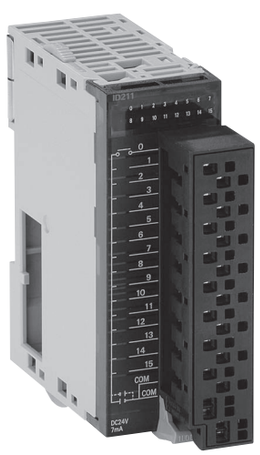
Most I/O units that use a 18-point removable terminal block are available in two variations:

- Conventional M3 Screw type connection



This type requires wiring to be terminated by fork- or ring terminals

- Screwless clamp connection



This type can be used with standard or solid wire up to 1.5 mm², with or without ferrules.This option is designated by the suffix (SL).

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CJ1W-ID/-IA/-OC/-OD/-OA/-MD

Basic I/O Units

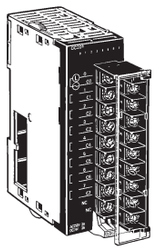
I/O Units

Input Unit (8/16 points)
CJ1W-ID201/211
CJ1W-IA□□□
Output Units (8/16 points)
CJ1W-OD20□/21□
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□



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

DC Input Units

Classification	Inputs	Input Specifications	Connections	Model
Basic I/O Unit	8 pts	24 V DC, 10 mA	Removable terminal block	CJ1W-ID201
	16 pts	24 V DC, 7 mA	Removable terminal block	CJ1W-ID211(SL)
	32 pts	24 V DC, 4.1 mA	Fujitsu-compatible connector	CJ1W-ID231
	32 pts	24 V DC, 4.1 mA	MIL connector	CJ1W-ID232
	64 pts	24 V DC, 4.1 mA	Fujitsu-compatible connector	CJ1W-ID261
	64 pts	24 V DC, 4.1 mA	MIL connector	CJ1W-ID262

AC Input Units

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

Relay Contact Output Units

Classification	Outputs	Maximum switching capacity	Connections	Model
Basic I/O Unit	8 pts (independent contacts)	2 A 250 V AC per contact, max. 8A per common	Removable terminal block	CJ1W-OC201(SL)
	16 pts			CJ1W-OC211(SL)

Transistor Output Units

Classification	Outputs	Maximum switching capacity	Connections	Model
Basic I/O Unit	8 pts	12 to 24 V DC, 2 A/pt, 8 A/Unit sinking	Removable terminal block	CJ1W-OD201
		24 V DC, 2 A/pt, 8 A/Unit, sourcing, load short protection, disconnection detection, alarm		CJ1W-OD202
		12 to 24 V DC, 0.5 A/pt, 4 A/Unit, sinking	Removable terminal block	CJ1W-OD203
		24 V DC, 0.5 A/pt, 4 A/Unit, sourcing, load short protection, disconnection detection, alarm	Removable terminal block	CJ1W-OD204
	16 pts	12 to 24 V DC, 0.5 A/pt, 5 A/Unit sinking	Removable terminal block	CJ1W-OD211(SL)
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, load short protection, alarm		CJ1W-OD212(SL)
	32 pts	12 to 24 V DC, 0.5 A/pt, 4 A/Unit, sinking	Fujitsu-compatible connector	CJ1W-OD231
		24 V DC, 0.5 A/pt, 4 A/Unit, sourcing, load short protection, alarm	MIL connector	CJ1W-OD232
		12 to 24 V DC, 0.5 A/pt, 4 A/Unit, sinking		CJ1W-OD233
	64 pts	12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sinking	Fujitsu-compatible connector	CJ1W-OD261
		12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sourcing	MIL connector	CJ1W-OD262
		12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sinking	MIL connector	CJ1W-OD263
	8 pts	250 V AC, 0.6 A/pt. 2.4 A/Unit, 50/60 Hz	Removable terminal block	CJ1W-OA201

Note: Units with a suffix "(SL)" are available with screwless terminal blocks as well as M3 screw terminals.

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
					MIL connector	CJ1W-MD233
				12 to 24 V DC inputs, 24 V DC outputs, 0.5 A/pt, 2 A/Unit, sourcing, load short circuit protection, alarm	MIL connector	CJ1W-MD232
	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

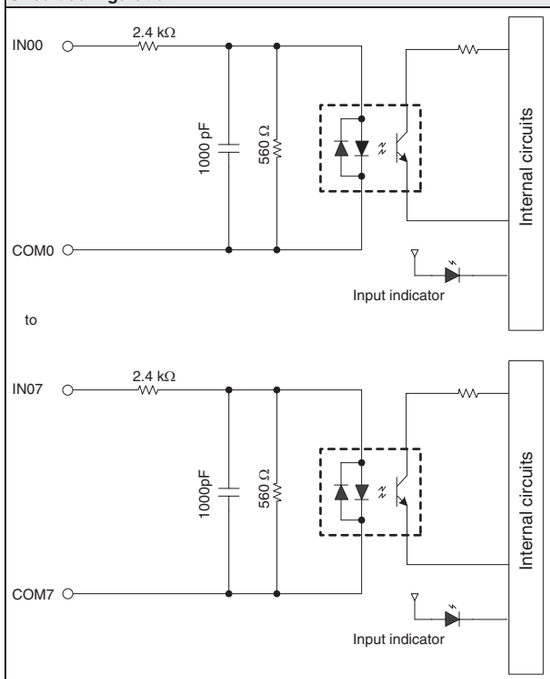
TTL I/O Units

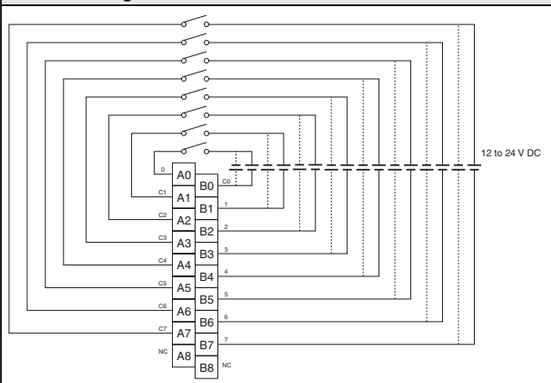
Classification	Inputs/ Outputs	Input voltage	Input current (typical)	Max. output switching capacity	Connections	Model
Basic I/O Unit	32 inputs/ 32 outputs	5 V DC	3.5 mA	5 V DC, 35 mA/pt. 1.12 A/Unit	MIL connector	CJ1W-MD563

Circuit Configuration and Terminal Arrangement

CJ1W-ID201

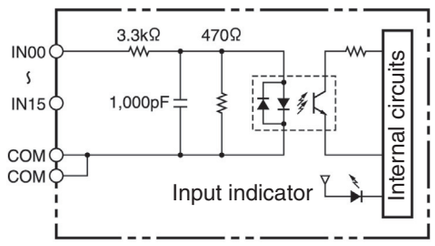
Circuit configuration	Terminal arrangement

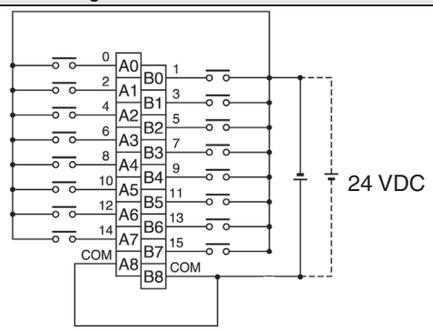




CJ1W-ID211(SL)

Circuit configuration	Terminal arrangement





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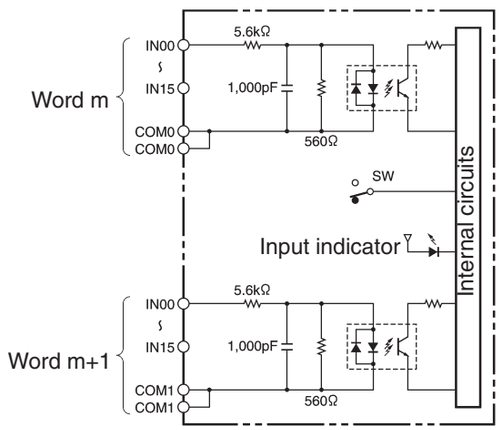
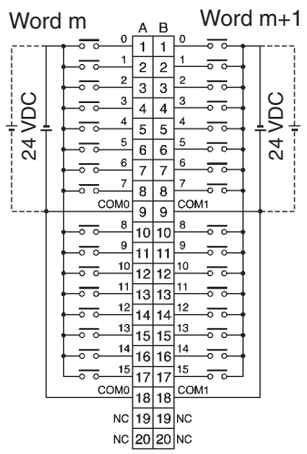
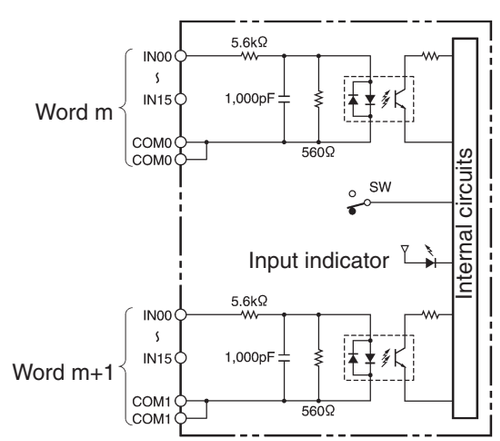
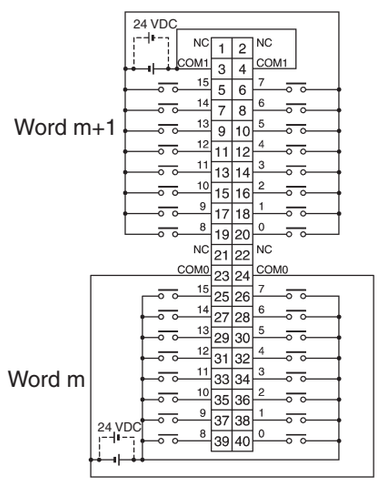
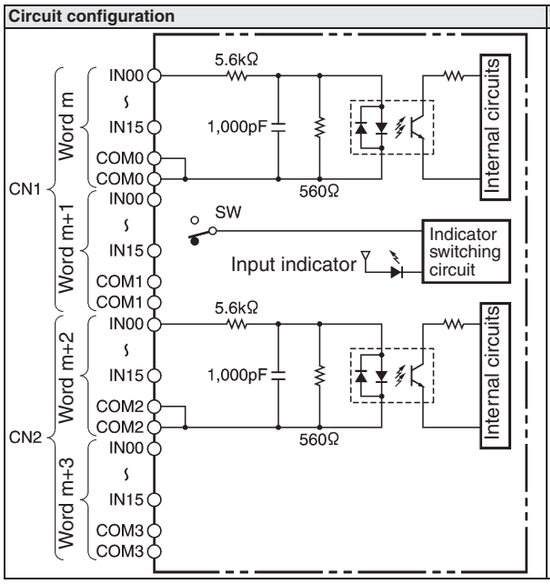
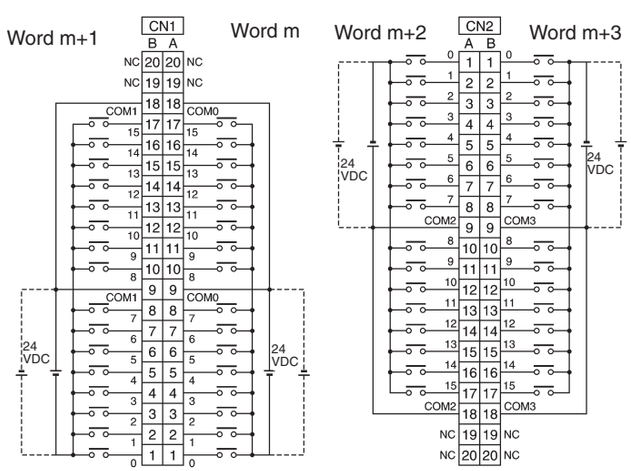
CJ1W-ID231

Circuit configuration	Terminal arrangement
	

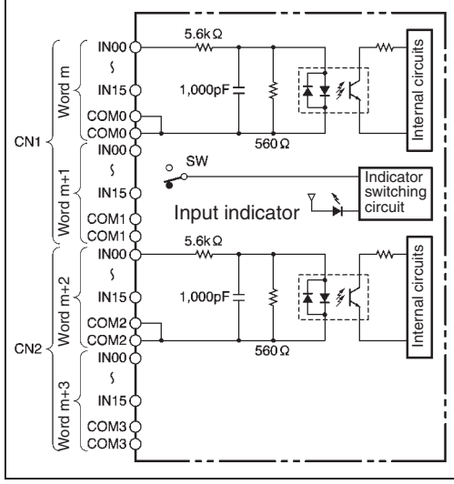
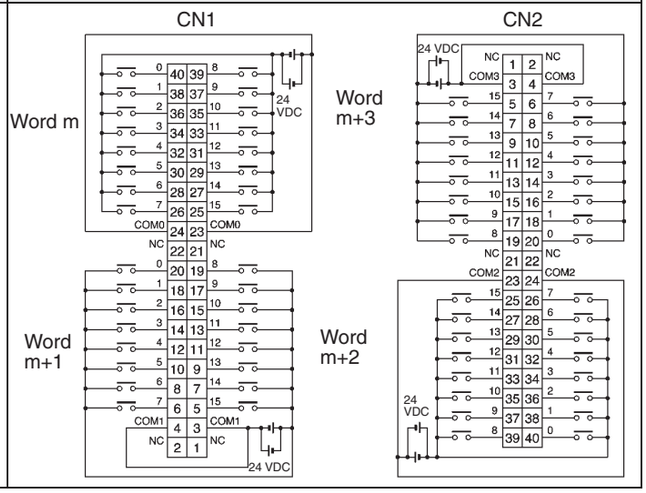
CJ1W-ID232

Circuit configuration	Terminal arrangement
	

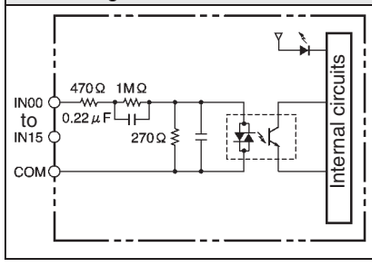
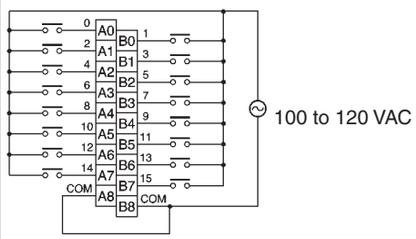
CJ1W-ID261

Circuit configuration	Terminal arrangement
	

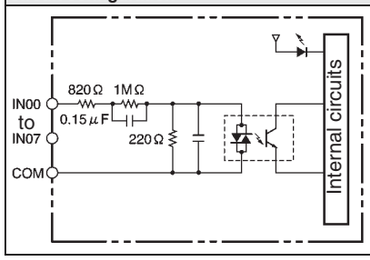
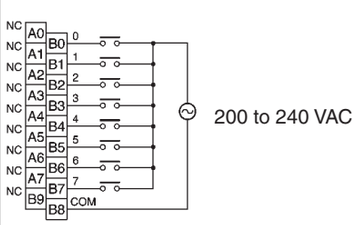
CJ1W-ID262

Circuit configuration	Terminal arrangement
	

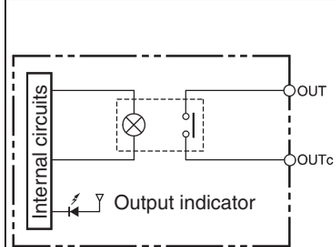
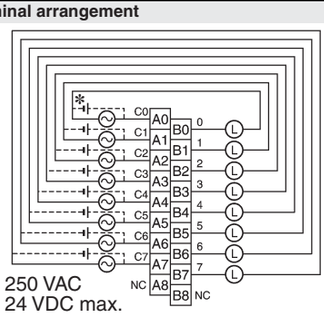
CJ1W-IA111

Circuit configuration	Terminal arrangement
	

CJ1W-IA201

Circuit configuration	Terminal arrangement
	

CJ1W-OC201(SL)

Circuit configuration	Terminal arrangement
	

2 A, 250 VAC
2 A, 24 VDC max.

* These are relay contacts and so the DC power supply can be connected with either polarity.

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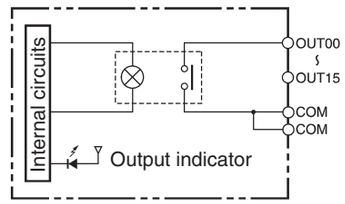
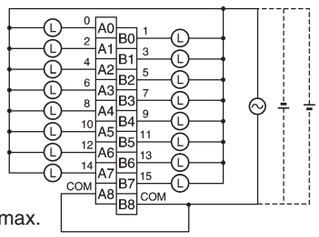
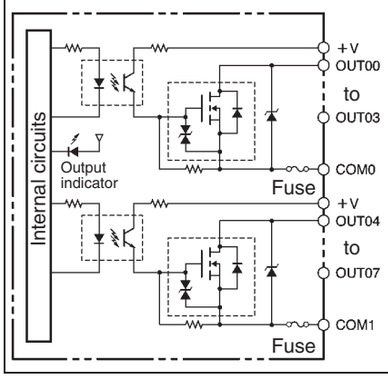
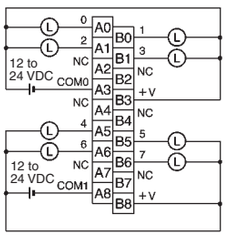
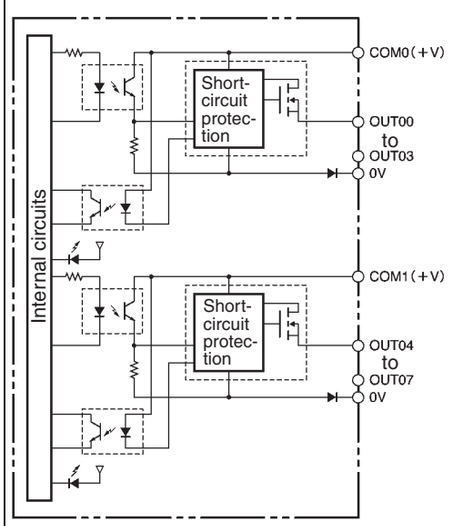
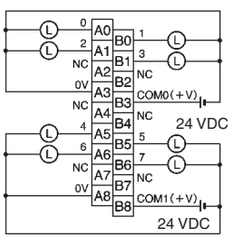
CJ1W-OC211(SL)

Circuit configuration	Terminal arrangement
	

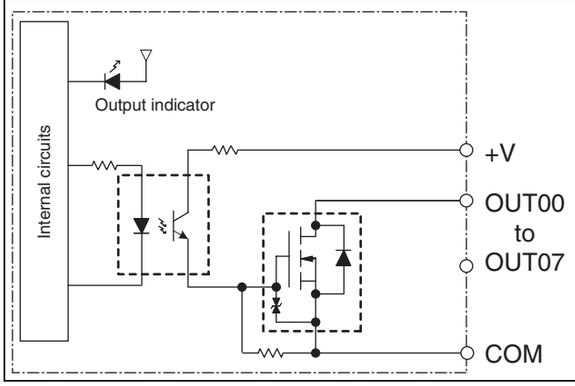
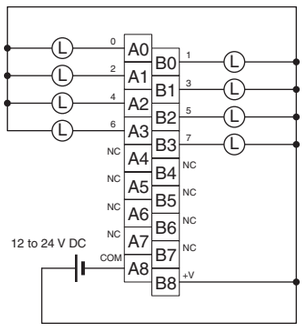
CJ1W-OD201

Circuit configuration	Terminal arrangement
	

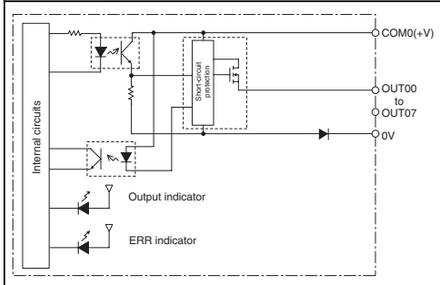
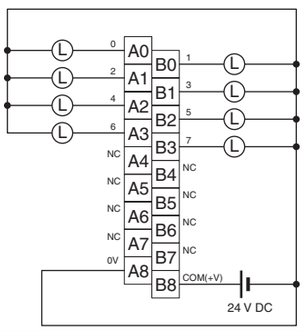
CJ1W-OD202

Circuit configuration	Terminal arrangement
	

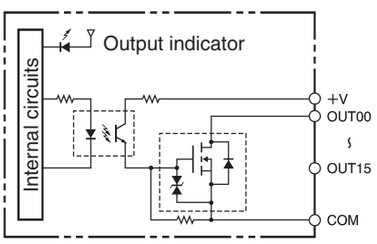
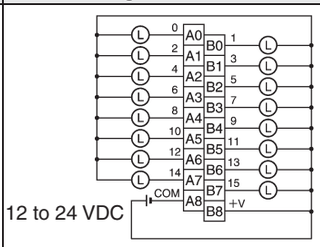
CJ1W-OD203

Circuit configuration	Terminal arrangement
	

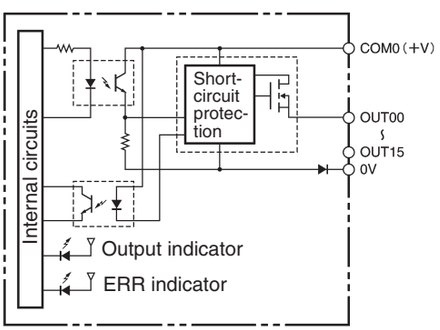
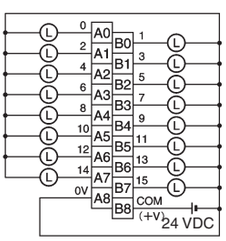
CJ1W-OD204

Circuit configuration	Terminal arrangement
	

CJ1W-OD211(SL)

Circuit configuration	Terminal arrangement
	

CJ1W-OD212(SL)

Circuit configuration	Terminal arrangement
	

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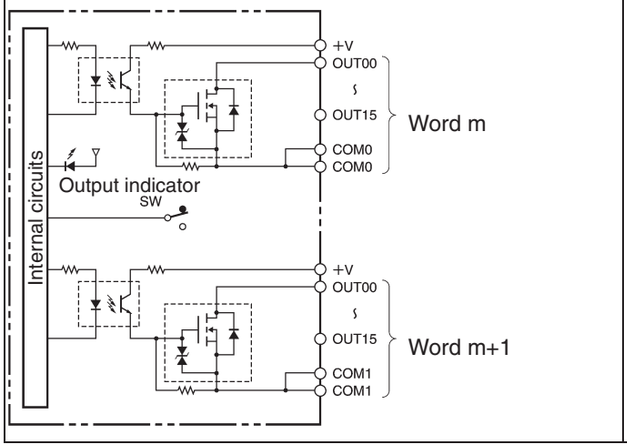
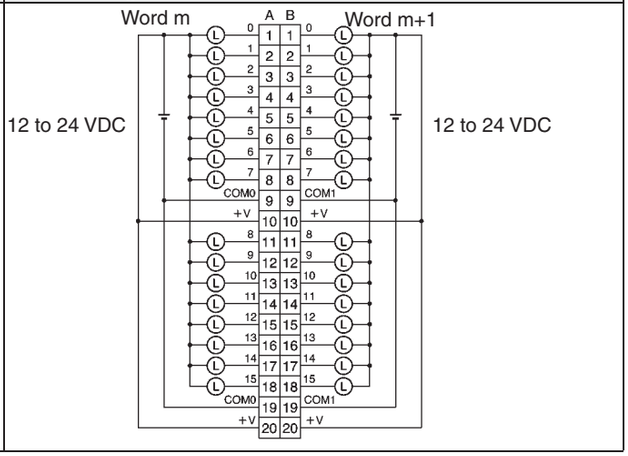
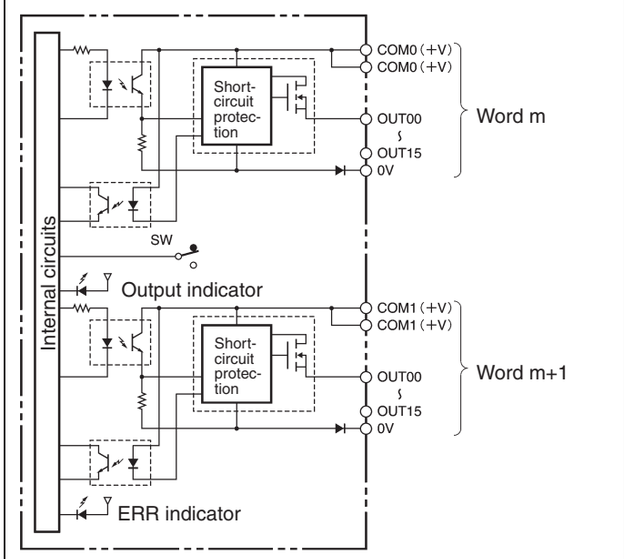
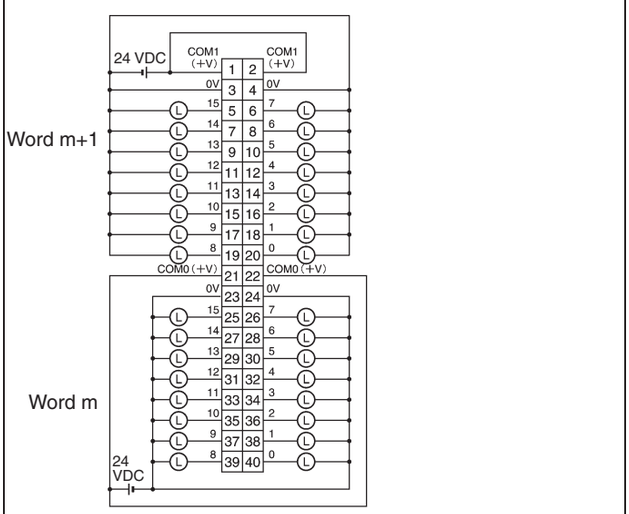
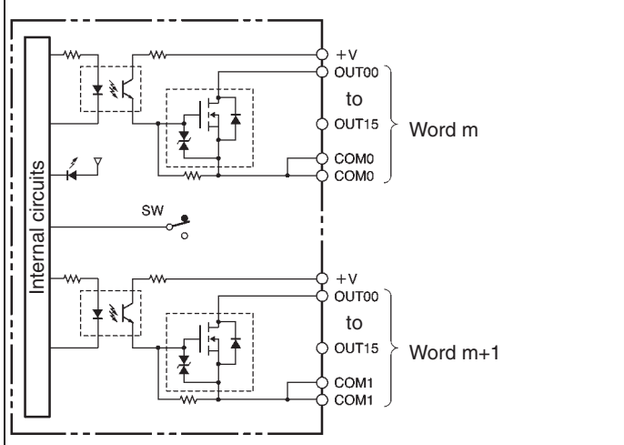
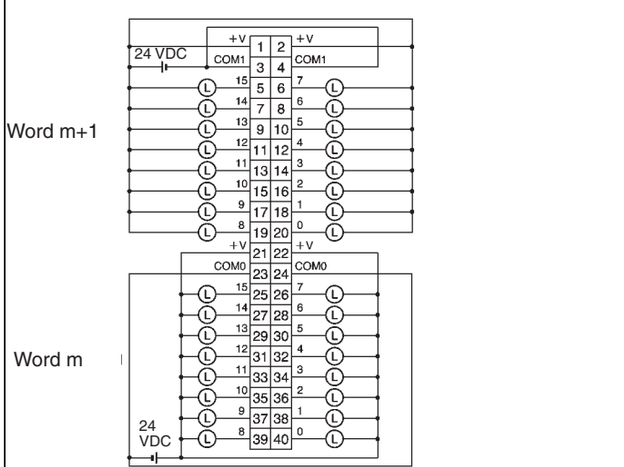
CJ1W-OD231

Circuit configuration	Terminal arrangement
	

CJ1W-OD232

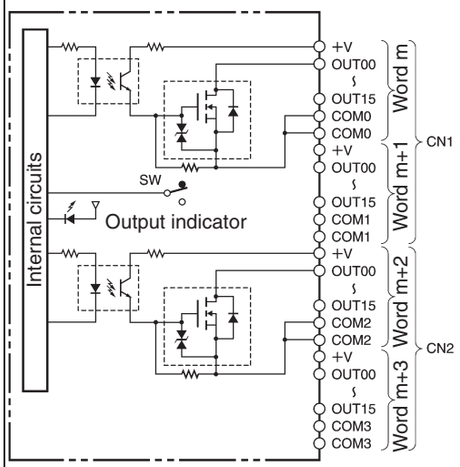
Circuit configuration	Terminal arrangement
	

CJ1W-OD233

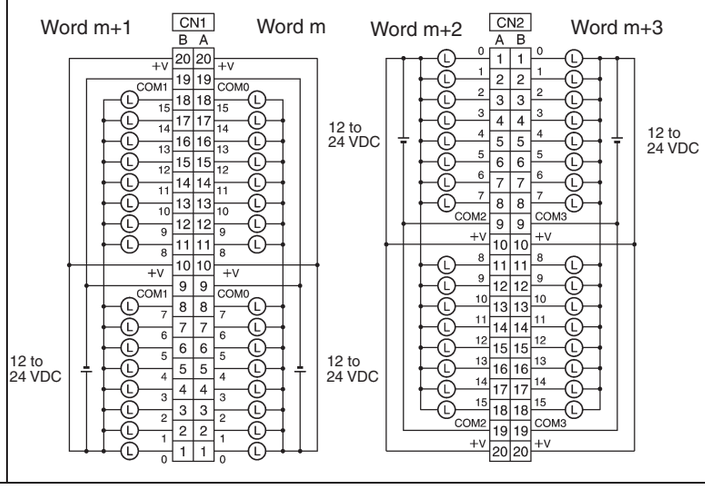
Circuit configuration	Terminal arrangement
	

CJ1W-OD261

Circuit configuration

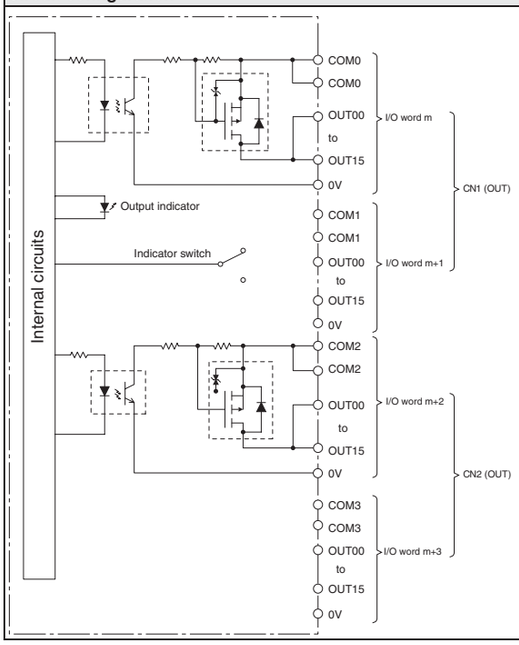


Terminal arrangement

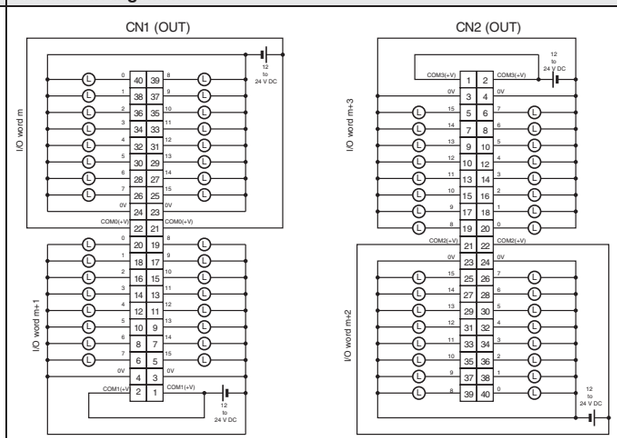


CJ1W-OD262

Circuit configuration



Terminal arrangement



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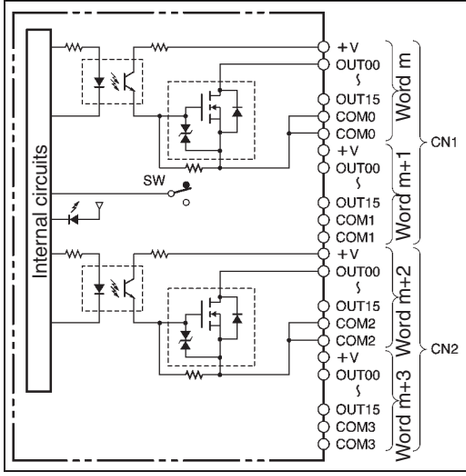
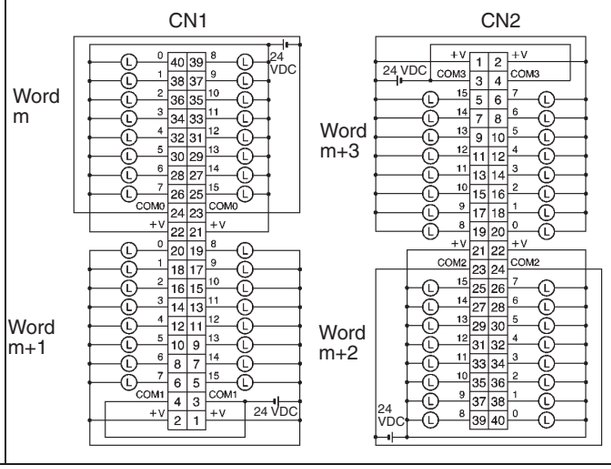
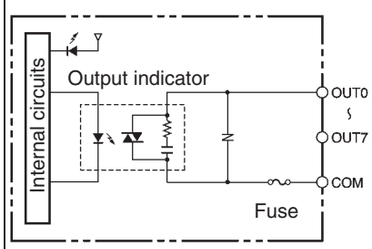
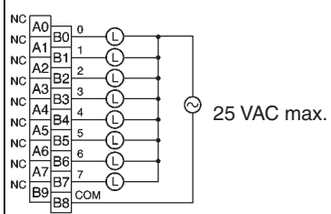
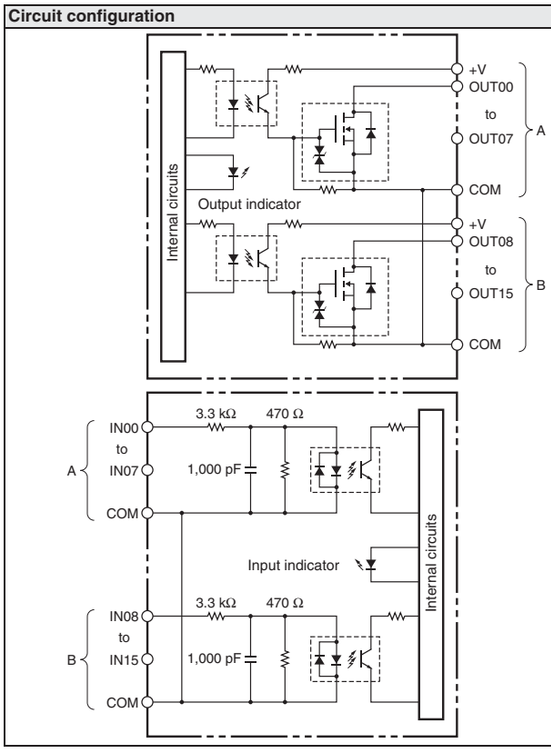
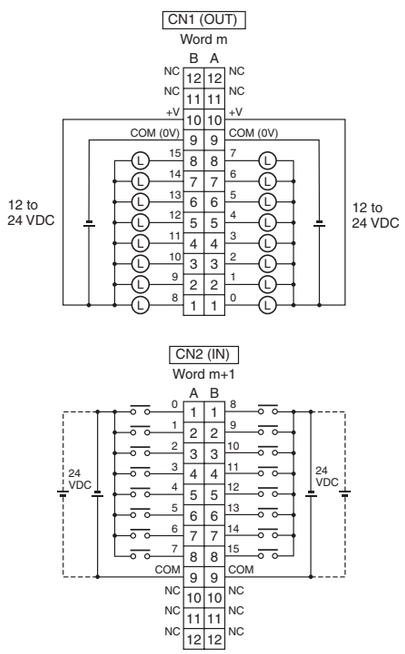
CJ1W-OD263

Circuit configuration	Terminal arrangement
	

CJ1W-OA201

Circuit configuration	Terminal arrangement
	

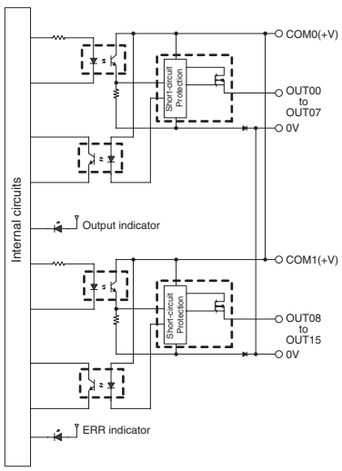
CJ1W-MD231

Circuit configuration	Terminal arrangement
	

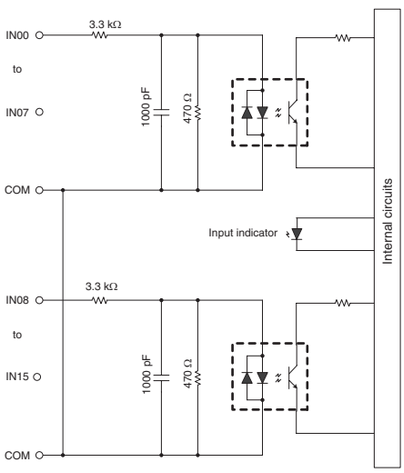
CJ1W-MD232

Circuit configuration	Terminal arrangement

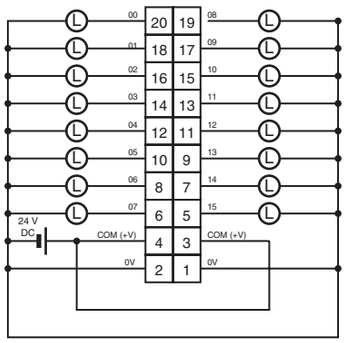
CN1(OUT)



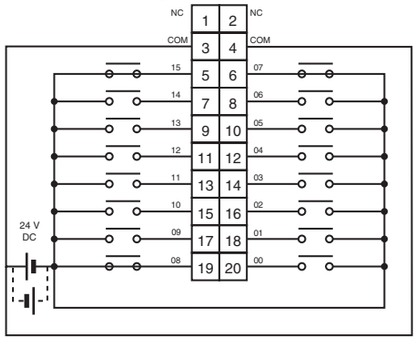
CN2(IN)



CN1 (Outputs)
I/O word "m"



CN2 (Inputs)
I/O word "m+1"



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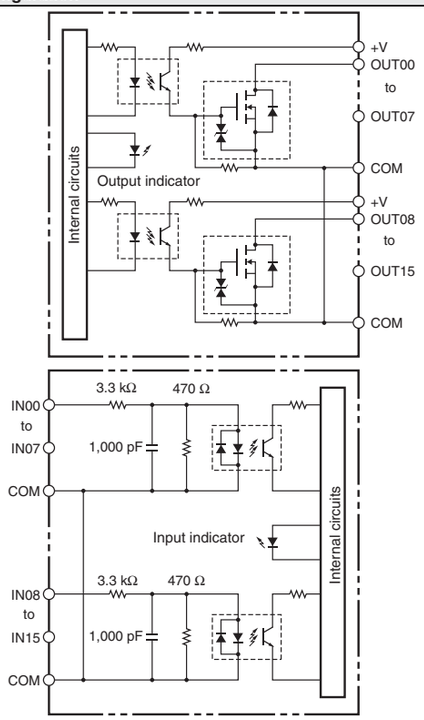
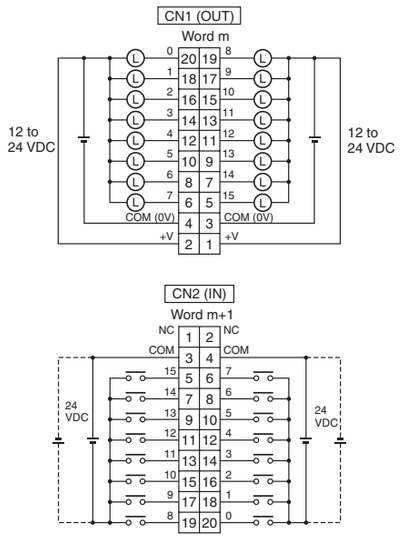
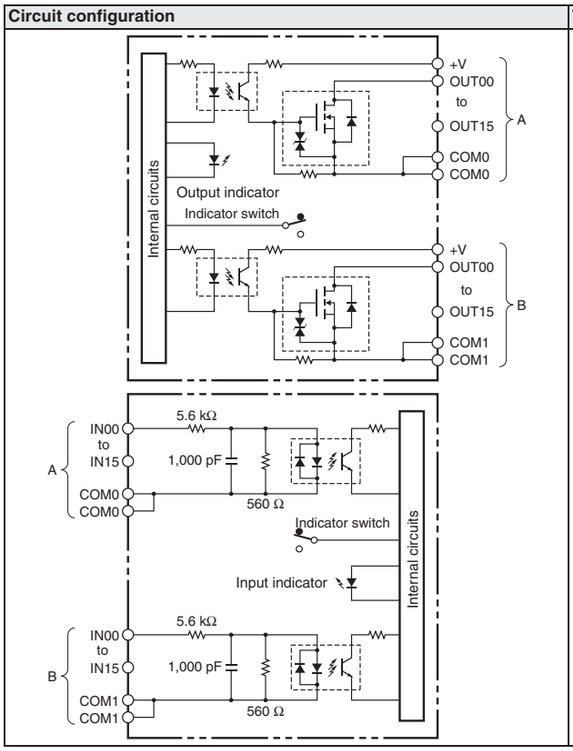
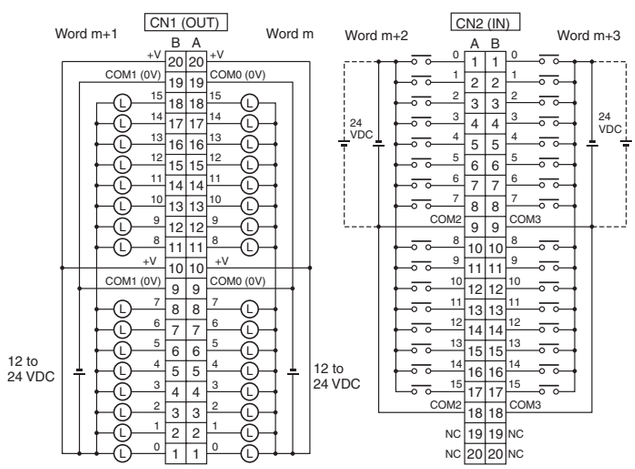
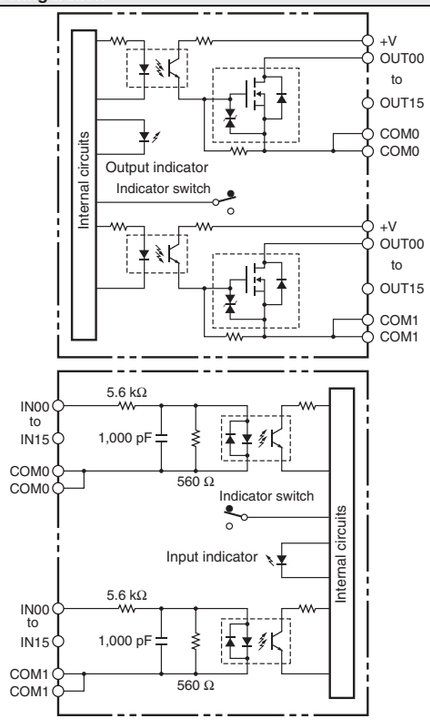
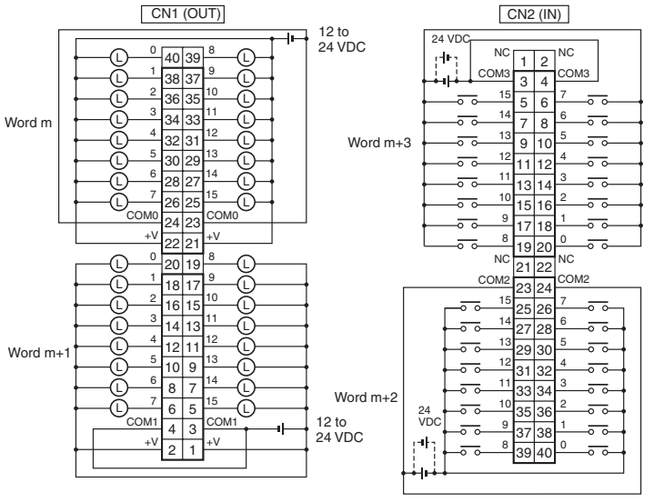
CJ1W-MD233

Circuit configuration	Terminal arrangement
	

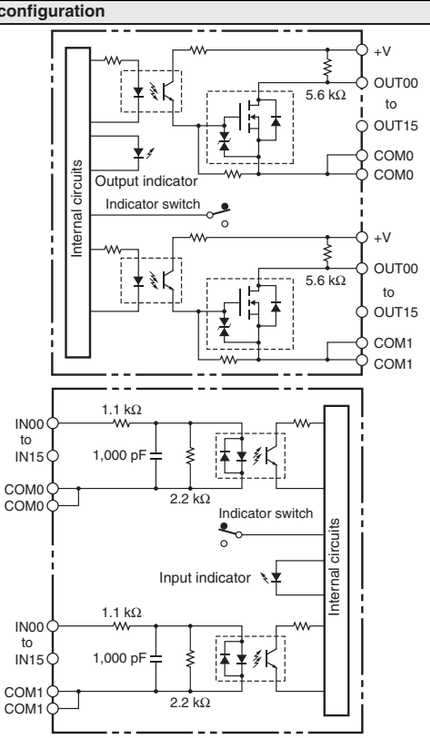
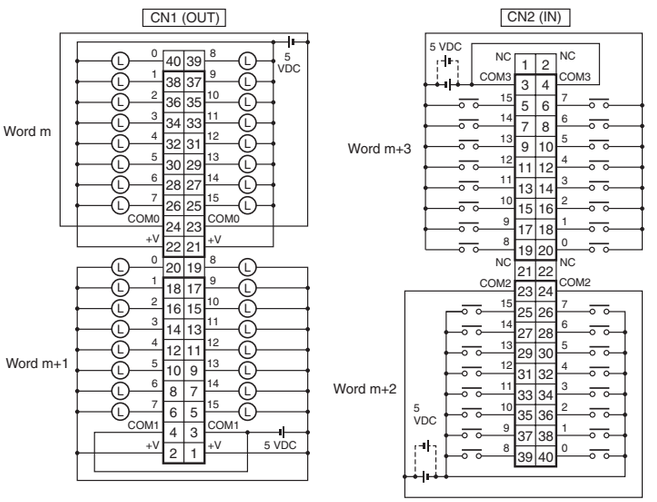
CJ1W-MD261

Circuit configuration	Terminal arrangement
	

CJ1W-MD263

Circuit configuration	Terminal arrangement
	

CJ1W-MD563

Circuit configuration	Terminal arrangement
	

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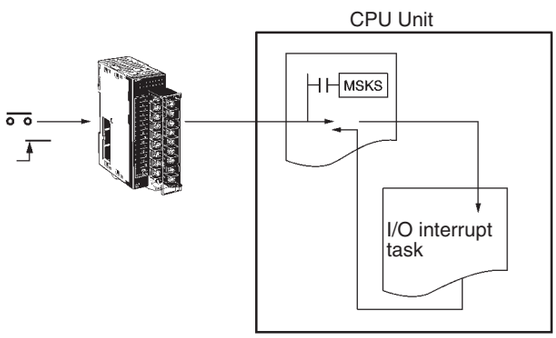
CJ1W-INT01

Interrupt Input Unit

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

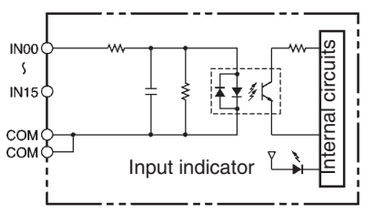
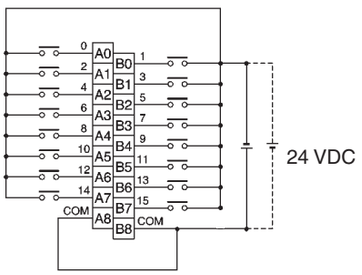
- An input to the Interrupt Input Unit immediately interrupts CPU Unit processing to suspend execution of cyclic tasks (i.e., the normal programming) and execute an I/O interrupt task.

System Configuration



Specifications

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

Circuit configuration	Terminal connections
	

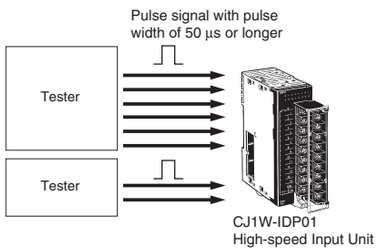
CJ1W-IDP01

High-speed Input Unit

Latches input pulses as short as 50 µs.

- Reads pulses that are too fast for normal I/O, such as is often requried 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.

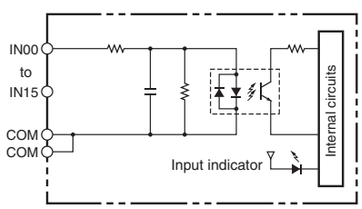
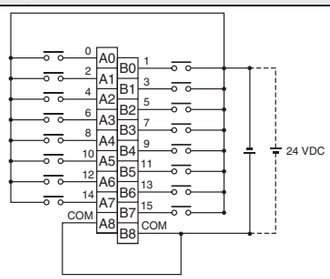
System Configuration



Specifications

Input voltage	Inputs	Input signal pulse width	No. of mountable Units	Mounting location	External connections
24 V DC	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
	

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CJ1W-TS561/-TS562

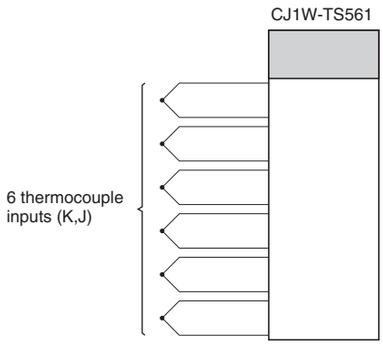
Temperature Input Units

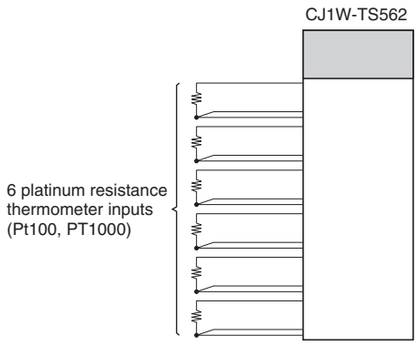
Connect up to 6 temperature sensors per Unit.

These Basic I/O units allow up to 6 temperature sensors to be connected.

- Input types (TS561: thermocouple J/K, TS562 : Pt100/Pt1000) can be selected per channel.
- The unit presents the temperature data in the basic I/O area of the PLC occupying from 3 to 6 CIO words.
- Cold junction compensation (TS561) is provided internally.
- Adjustable filtering allows mains frequencies (50/60 Hz) to be suppressed.
- Broken wire (TC/RTD)and short-circuit alarms (RTD) are provided as error code in the PLC, and by LED indication.
- The unit does not provide galvanic isolation between the input signals.

System Configuration





Terminal arrangement

CJ1W-TS561(SL)

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

CJ1W-TS562(SL)

Input 2 B'	B1	A1	Input 1 B'
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
Input 4 B'	B4	A4	Input 3 B'
Input 4 B	B5	A5	Input 3 B
Input 4 A	B6	A6	Input 3 A
Input 6 B'	B7	A7	Input 5 B'
Input 6 B	B8	A8	Input 5 B
Input 6 A	B9	A9	Input 5 A

Specifications

Item	Classification: Basic I/O Unit	
	CJ1W-TS561 (SL)	CJ1W-TS562 (SL)
Inputs	6 points	
Input Type	Thermocouple types J or K (IEC 60584)	3-wire RTD types Pt100 or Pt1000 (IEC 60751)
Measurement Range	Type J: -100.0 to +850.0 °C, Type K:-200.0 to 1300.0 °C	Pt100/Pt1000: -200.0 to +650.0 °C
Input Assignment	by DIP-switch, any combination of input types is possible	
Output Data	16-bit signed integer, resolution 0.1 °C	
Conversion time	40 ms to 400 ms per active input (depending on filter setting OFF / 50 Hz / 60 Hz / 10 Hz)	
Accuracy	+/- 0.5% of PV or +/- 0.7 °C, whichever is larger, +/- 1 digit max.	+/- 0.5% of PV or +/- 0.8 °C, whichever is larger, +/- 1 digit max.
Cold Junction accuracy	+/- 2.0 °C	n.a.
Sensor connection	terminal block, screw type or screwless clamp (model code + (SL))	

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CJ1W-AD□□□(SL)

Analog Input Units

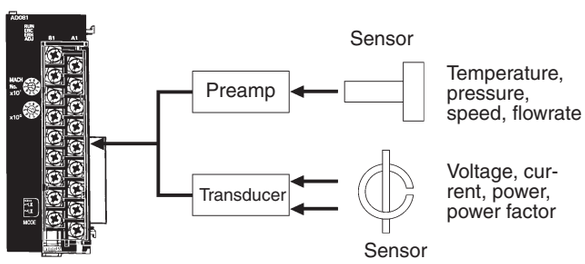
Convert Analog Signals to Binary Data

- Wire burnout detection
- Peak-hold function
- Mean function
- Offset gain setting
- Range selection per intput
- 1/8000 resolution
- 2 ms conversion time for 8 channels

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 used to scale the data to the desired range.

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(SL)	CH1W-AD041-V1(SL)
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			1/4000 (default) or 1/8000 (selectable)	
Conversion speed			1 ms/point (default), or 250 μs/point (selectable)	
Overall accuracy (at 23 °C)			Voltage: ±0.2% Current: ±0.4%	
Overall accuracy (0 to 55 °C)			Voltage: ±0.4% Current: ±0.6%	
Connections			Terminal block	
Features	Wire burnout detection		Yes	
	Peak-hold function		Yes	
	Averaging		Yes	
Unit No.			0 to 95	

CJ1W-DA□□□(SL)

Analog Output Units

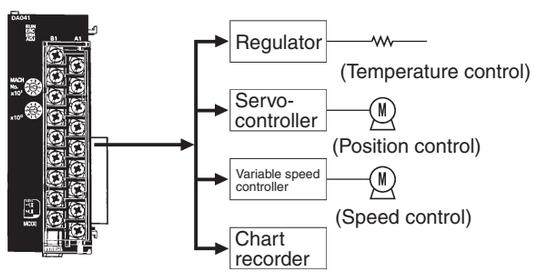
Convert Binary Data to Analog Signals

- Output hold
- Offset gain adjustment
- Range selection per output
- 1 ms conversion time per channel
- 1/8000 resolution

Function

Binary data between 0000 to 0FA0 Hex in the allocated words can be 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 Arrangement

CJ1W-DA08V/DA08C(SL)

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(SL)

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(SL)

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

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Specifications

Item			Classification: Special I/O Unit			
			CJ1W-DA08V(SL)	CJ1W-DA08C(SL)	CJ1W-DA041(SL)	CJ1W-DA021(SL)
Outputs			8 points	8 points	4 points	2 points
Signal range	Voltages	1 to 5 V	Yes	No	Yes	Yes
		0 to 10 V	Yes	No	Yes	Yes
		0 to 5 V	Yes	No	Yes	Yes
		–10 to 10 V	Yes	No	Yes	Yes
	Currents	4 to 20 mA	No	Yes		
Maximum load current (for voltage outputs):			2,4 mA	n.a.	12 mA	
Maximum load resistance (current outputs):			n.a.	350 Ω	600 Ω	
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 (default) or 1/8000 (selectable)	1/4000 (default) or 1/8000 (selectable)	1/4000	
Conversion speed			1.0 ms/point (default) or 250 µs/point (selectable)	1.0 ms/point (default) or 250 µs/point (selectable)	1.0 ms/pt max.	
Overall accuracy (at 23 °C)			Voltage: ±0.3% Current: ±0.5%			
Overall accuracy (0 to 55 °C)			Voltage: ±0.5% Current: ±0.8%			
Connections			Terminal block			
Unit No.			0 to 95			
External power supply			24 V DC +10%/–15%, 140 mA max.	24 V DC +10%/–15%, 170 mA max.	24 V DC +10%/–15%, 200 mA max.	24 V DC +10%/–15%, 140 mA max.

CJ1W-MAD42(SL)

Analog I/O Unit

Handles 4 Analog Inputs and 2 Analog Outputs

- Conversion time: 3 ms for all 6 channels combined
- Resolution: 1/8000

Analog Inputs

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

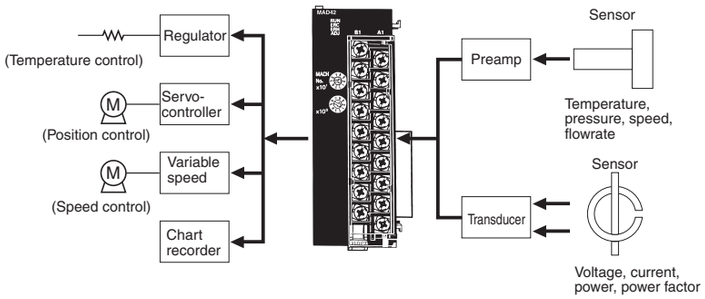
Analog Outputs

- Output hold
- Offset gain adjustment

Other Features

- Scaling function

System Configuration



Terminal Arrangement

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.
Input 2 (+)	B5	A5	Input 1 (+)
Input 2 (–)	B6	A6	Input 1 (–)
AG	B7	A7	AG
Input 4 (+)	B8	A8	Input 3 (+)
Input 4 (–)	B9	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	
Input impedance			Voltage inputs 1 MΩ, Current inputs 250 Ω	---
Maximum load current (for voltage outputs)				2.4 mA
Maximum load resistance (current outputs)				600 Ω
Signal range settings			4 settings (one for each point)	2 settings (one for each point)
Resolution			1/4000 (default), 1/8000 (selectable)	
Conversion speed			1.0 ms/point (default) or 500 μs/point (selectable)	
Overall accuracy (at 23 °C)			Voltage: ±0.2% Current: ±0.2%	Voltage: ±0.3% Current: ±0.3%
Overall accuracy (0 to 55 °C)			Voltage: ±0.5% Current: ±0.6%	
Connections			Terminal block	
Functions		Wire burnout	Yes	---
		Peak hold	Yes	---
		Mean	Yes	---
		Output hold	---	Yes
		Scaling	Yes	
Unit No.			0 to 95	

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CJ1W-PTS5□

Process Input Units

Directly Input Four Temperature Sensors

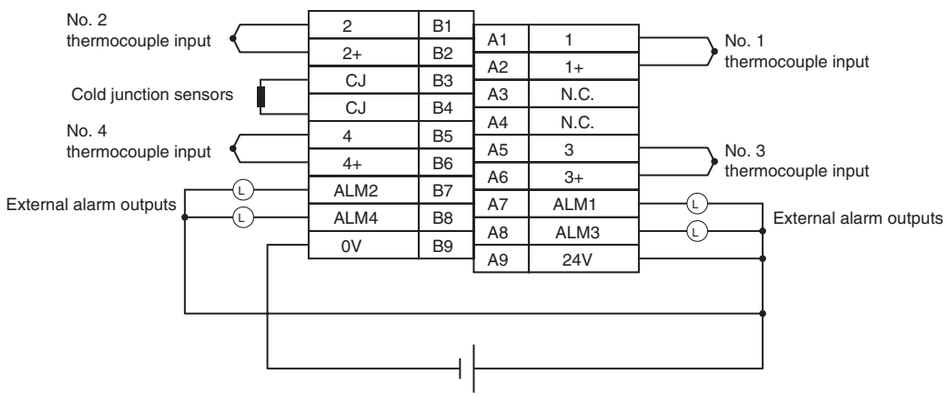
- Up to four temperature sensor inputs can be directly connected to a single Unit (input signal/range shared by the four inputs)
- Models with isolation between channels prevent unwanted current paths between Temperature Sensor inputs.
- Measurement value alarm with hysteresis/ON delay (two inputs per channel, one of which can be set as a DO output from the Unit).
- High-resolution, high-speed 2 channel input models provide configurable alarms and maintenance functions

Function

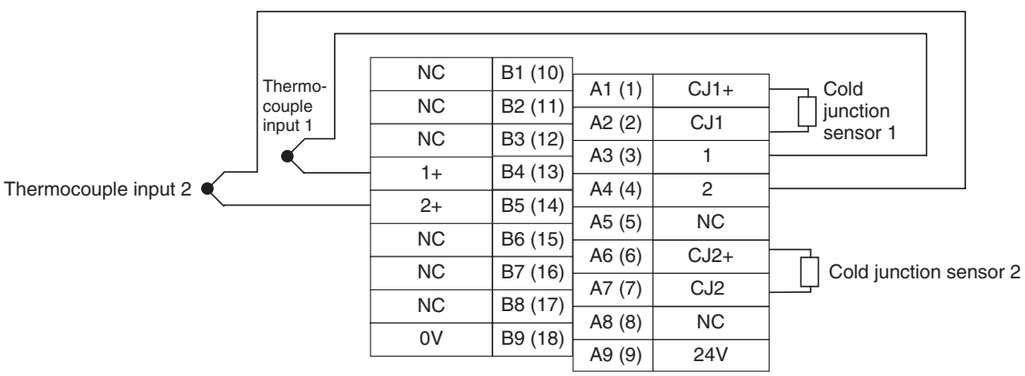
Converts the measured value of DC voltage/current signals, thermocouple or platinum-resistance thermometer inputs (up to 4 points) into binary or BCD code, and stores in the allocated memory area every cycle. The ladder program can be used to transfer the data to a specified words in data memory for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

Terminal arrangements

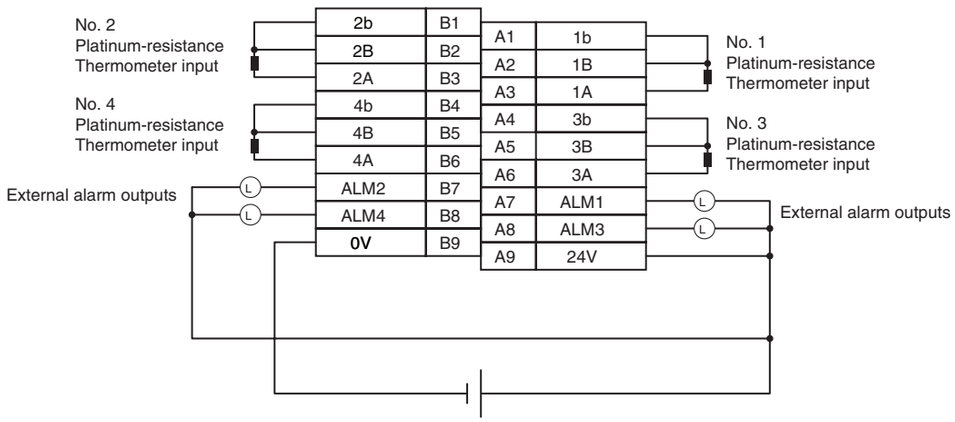
CJ1W-PTS51



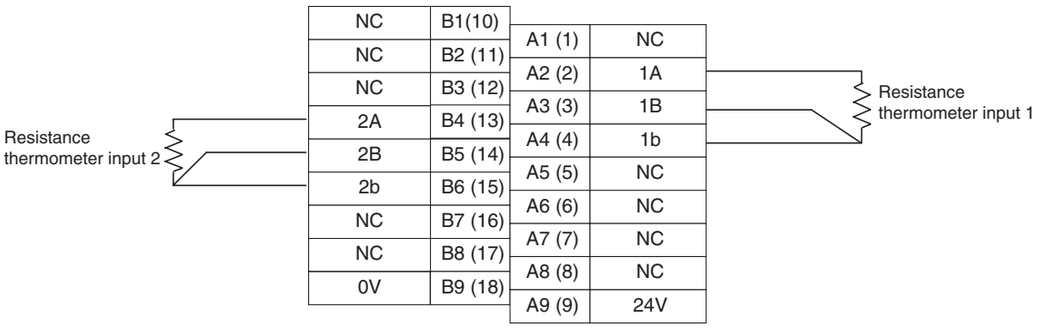
CJ1W-PTS15



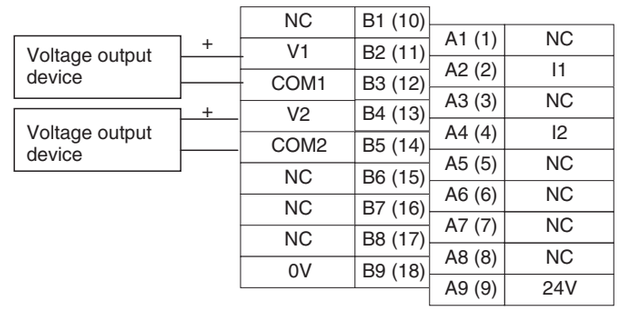
CJ1W-PTS52

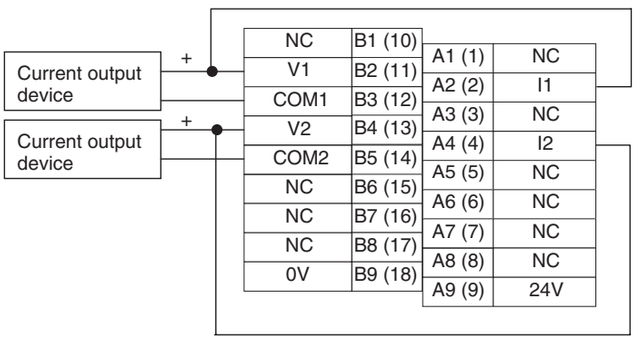


CJ1W-PTS16



CJ1W-PDC15





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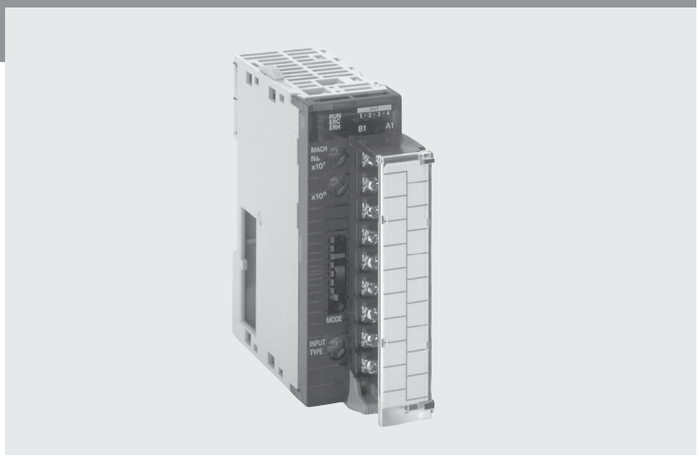
Specifications

Item	Specification				
	CJ1W-PDC15	CJ1W-PTS15	CJ1W-PTS16	CJ1W-PTS51	CJ1W-PTS52
Inputs	2 inputs			4 inputs	
Input signals	4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, -1.25 to 1.25 V, User-defined	Thermocouple B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, -100 to 100 mV	Pt50, Pt100 JPt100, Ni508.4	Thermocouple B, J, K, L, R, S, T	Pt100, JPt100
Input signal ranges	Selectable per input			Same for all 4 inputs	
A/D conversion output data	16-bit binary data, user-adjustable zero/span			Temperature data in binary or BCD (16 bit)	
Conversion speed	10 ms / 2 inputs			250 ms / 4 inputs	
Overall accuracy	± 0.05% at 25 °C	± 0.05% at 25 °C *1 Cold junction compensation error ±1°C, at 20 ±10°C	± 0.05 % or ± 0.1 °C, whichever is larger (at 25 °C)	± 0.3 % of PV or ± 1 °C, whichever is larger, ± 1 digit max.*1	± 0.3 % of PV or ± 0.8 °C, whichever is larger, ± 1 digit max.
Connections	Terminal block				
Unit classification	CJ1-series Special I/O Unit				
Unit No.	0 to 95				

*1 Accuracy of the measured value depends on thermocouple type and actual temperature. Consult Operation Manual W368-E1 for details.

CJ1W-TC□□

Temperature Control Units



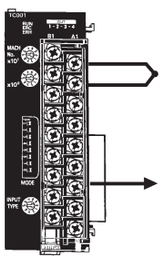
One Unit Functions as Four Temperature Controllers

- Supports 2-loop or 4-loop PID control or ON/OFF control.
- 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.

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



Terminal Wiring Examples

Thermocouple Temperature Control Units

CJ1W-TC001 (4 loops, NPN outputs)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
Input 4 –	B5	A5	Input 3 –
Input 4 +	B6	A6	Input 3 +
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V COM (–)	B9	A9	24 V

CJ1W-TC002 (4 loops, PNP outputs)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
Input 4 –	B5	A5	Input 3 –
Input 4 +	B6	A6	Input 3 +
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V	B9	A9	24 V COM (+)

CJ1W-TC003 (2 loops, NPN outputs, HB alarm)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V COM (–)	B9	A9	24 V

CJ1W-TC004 (2 loops, PNP outputs, HB alarm)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V	B9	A9	24 V COM (+)

Note: Do not connect any wiring to the N. C. terminals.

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Platinum Resistance Thermometer Temperature Control Units

CJ1W-TC101 (4 loops, NPN outputs)

Input 2 B'	B1	A1	Input 1 B'
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
Input 4 B'	B4	A4	Input 3 B'
Input 4 B	B5	A5	Input 3 B
Input 4 A	B6	A6	Input 3 A
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V COM (-)	B9	A9	24 V

CJ1W-TC102 (4 loops, PNP outputs)

Input 2 B'	B1	A1	Input 1 B'
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
Input 4 B'	B4	A4	Input 3 B'
Input 4 B	B5	A5	Input 3 B
Input 4 A	B6	A6	Input 3 A
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V COM (-)	B9	A9	24 V COM (-)

CJ1W-TC103 (2 loops, NPN outputs, HB alarm)

Input 2 B'	B1	A1	Input 1 B'
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
N.C.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V COM (-)	B9	A9	24 V

CJ1W-TC104 (2 loops, PNP outputs, HB alarm)

Input 2 B'	B1	A1	Input 1 B'
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
N.C.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V	B9	A9	24 V COM (-)

Note: Do not connect any wiring to the N. C. terminals.

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

CJ1W-NC□□

Position Control Units

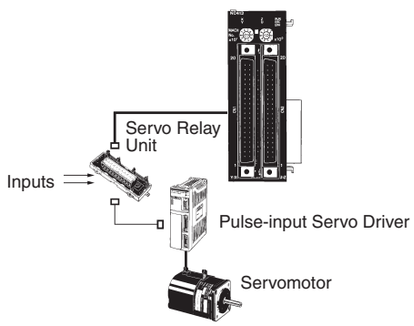
High-speed, High-precision Positioning with 1, 2, or 4 Axes

- 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 settings can be changed during operation
  - Speed and acceleration can be modified during Jog operation
  - Parameters and data are easily backed up to a memory card in the CPU unit

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

Model	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 or memory 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		
Speed data	1 to 500 kpps (in 1-pps units)		
No. of speeds	100 per axis		
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
External power supply	24 V DC ±10%, 5 V DC ±5% (line driver only)		24 V DC ±5%, 5 V DC ±5% (line driver only)

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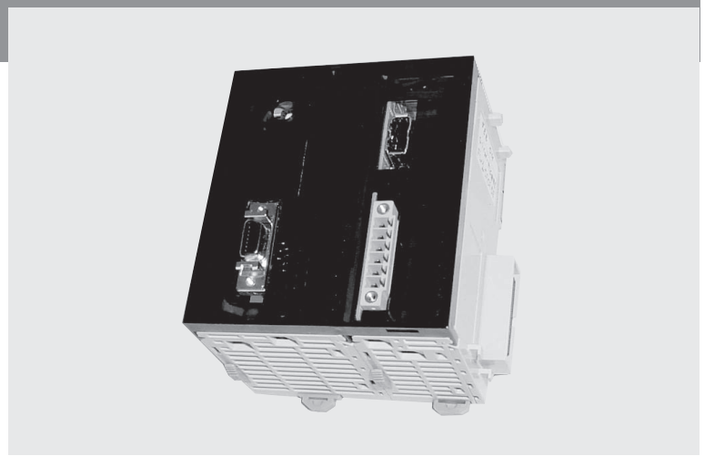
CJ1W-MCH71 - MECHATROLINK-II

Motion Control Unit



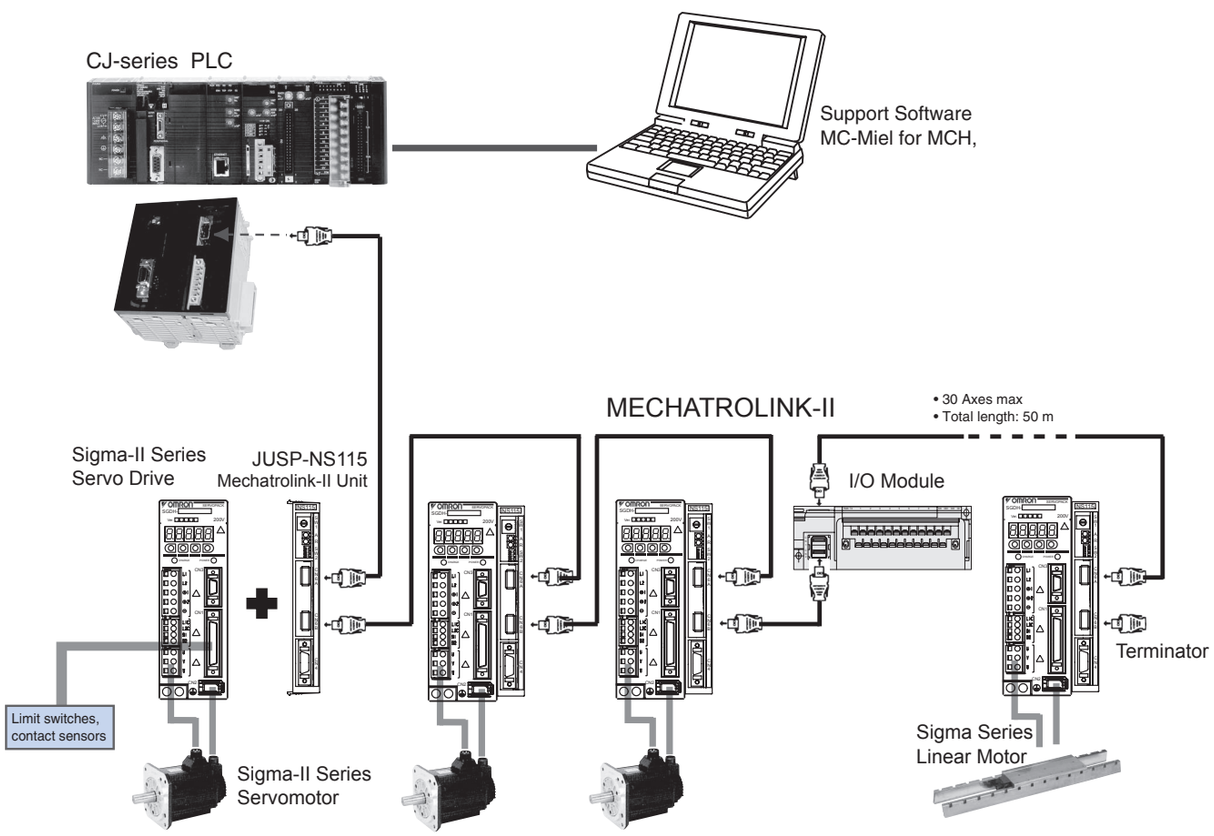
Multi-axes Motion Control over high-speed MECHATROLINK-II

- Up to 30 axes controlled with minimum wiring
- High-speed bus MECHATROLINK-II is specially designed for Motion Control
- Supports Position, speed and Torque control
- Electronic CAM profiles and axes synchronization
- Hardware registration input for every axis
- Program control commands, like Multi-task programming and branching commands, and various arithmetic operations for maximum program efficiency
- Access to the complete system from one point

Function

Multi-axes control is made easy by freely combining control axes. Up to 32 axes can be used, including 30 physical axes and two virtual axes, and each axis can be set individually. Position Control, synchronized control (electronic gear, electronic Cam, follow-up), speed control, and torque control are all supported, enabling a wide range of applications. By using the high-speed servo communications MECHATROLINK-II, motion programs, system parameters, system data, and servo drive parameters can be set and read from the software tool.

System Configuration



Specifications

Motion Control Unit

Model		CJ1W-MCH71
Classification		CJ-series CPU Bus unit
Applicable PLCs		CJ-series V. 2.0 or later
Control Method		MECHATROLINK-II (Position, Speed and Torque control)
Controlled devices		Sigma-II series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface and various I/O Units.
Programming language		BASIC type motion control language
Controlled axes		32 max, including 30 physical or virtual axes and 2 virtual axes
Operating modes		RUN Mode, CPU Mode, Tool Mode/System (depending on Tool)
Automatic/Manual Mode		Automatic Mode: Mode for executing programs in the Unit Manual Mode: Mode for executing commands from the CPU Unit (via allocated words)
Minimum setting unit		1, 0.1, 0.01, 0.001, 0.0001 (Unit: mm, inch, degree, pulse)
Maximum command value		–2,147,483,648 to 2,147,483,647 pulses (32 bits with sign); infinite axis feed mode supported. Example: 16,384 pulses/rev after multiplication, a minimum setting unit of 0.001 mm and 1 mm/rev would result in –1,310,720,000 to 1,310,719,999 command units.
Control functions by command from CPU Unit	Servo lock/unlock	Locks and unlocks the servo driver.
	Jogging	Executes continuous feeding for each axis independently at the speed system parameter times the override.
	Origin search	Determines the machine origin in the direction set in the system parameters. Can be executed with an absolute encoder.
	Absolute origin setting	Sets the origin for when an absolute encoder is used. (Offset value: 32 bits [pulses] with sign)
	Machine lock	Stops the output of move commands to axes.
	Single block	Executes motion programs one block at a time.
Control functions by motion program	Positioning (PTP)	Executes positioning independently for each axis at a specified speed or the speed system parameter. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/Unit)
	Linear interpolation	Executes linear interpolation for up to eight axes at a time at the specified interpolation feed speed. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/system)
	Circular interpolation	Executes circular interpolation for two axes in either clockwise or counterclockwise at the specified interpolation feed speed. Helical circular interpolation is also possible with single-axis linear interpolation added. (Simultaneous specification: Two or three axes/block, Simultaneous execution: Up to 16 blocks/system)
	Other functions	Origin searches, interrupt feeding, timed positioning, traverse positioning, independent electronic CAM, synchronized electronic CAM, link operation, electronic gear, follow-up synchronization, speed reference, torque reference
Acceleration/deceleration curve, acceleration/deceleration time		Trapezoidal or S-curve, 60,000 ms max. (S-curve: Constant 30,000 ms max.)
External I/O		One port for MECHATROLINK-II Servo communications, one deceleration stop input, two general inputs, two general outputs
Feed rate		Rapid, interpolation feed rate: 1 to 2,147,483,647 (command units/min)
Override		0.00% to 327.67% (setting unit: 0.01%; Can be set for each axis or task.)
Motion programs	Number of tasks, number of programs	Up to 8 tasks and 256 programs/Unit (8 parallel branches per task max.)
	Program numbers	0000 to 0499 for main program; 0500 to 0999 for subroutine
	Program capacity	In motion program conversion, 8,000 blocks/Unit max. (2 Mbytes); number of blocks: 800
	Data capacity	Position data: 10,240 points/Unit; Cam data: 32 max.; 16,000 points/Unit
	Subroutine nesting	Five levels max.
	Start	Programs in other tasks can be started from a program.
	Deceleration stop	Decelerates to a stop regardless of the block.
	Block stop	Decelerates to a stop after the block being executed is ended.
	Single block	Executes the program one block at a time.
Data exchange with CPU Unit	Words allocated to Unit in CIO Area	Uses one unit number (25 words). Used for Unit and tasks: 11 to 25 words (depending on the number of tasks)
	Words allocated to Unit in DM Area	Uses one unit number (100 words). Used for Unit and tasks: 32 to 74 words (depending on the number of tasks)
	Any area (bits)	Axes: 0 to 64 words (depending on the maximum axis number used)
	Any area (data)	Axes: 0 to 128 words (depending on the maximum axis number used)
	Any area (data)	General I/O: 0 to 1,280 words (depending on the settings)
Saving programs and data		Memory Card backup (in CPU Unit, 100,000 times max.)
Self-diagnostic functions		Watchdog, RAM check, etc.
Error detection functions		Deceleration stop inputs, unit number errors, CPU errors, software limit errors, etc.
Error log function		Read by IORD instruction from CPU Unit.
Support Software		Microsoft Windows 2000 or NT 4.0 (Processor: Pentium, 100 MHz min., with at least 64 MB of memory)
External power supply voltage		24 V DC (21.6 to 26.4 V DC)
Internal current consumption		0.6 A or less for 5 V DC
Weight (not including connectors)		300 g max.

Note: 1. Take the following factors into account when mounting Motion Control Units under a single CPU Unit:

- The maximum number of CPU Bus Units that can be allocated words in the CPU Unit

- The capacity of the Power Supply Unit on each CPU Rack or Expansion I/O Rack and the current consumption of the Units mounted on the Rack (For details, refer to the Operation Manual for the CPU Unit.)

2. The required power supply must be provided by the user.

3. A Memory Card must be used to add system software functions to the CPU Unit in order to use IOWR and IORD.

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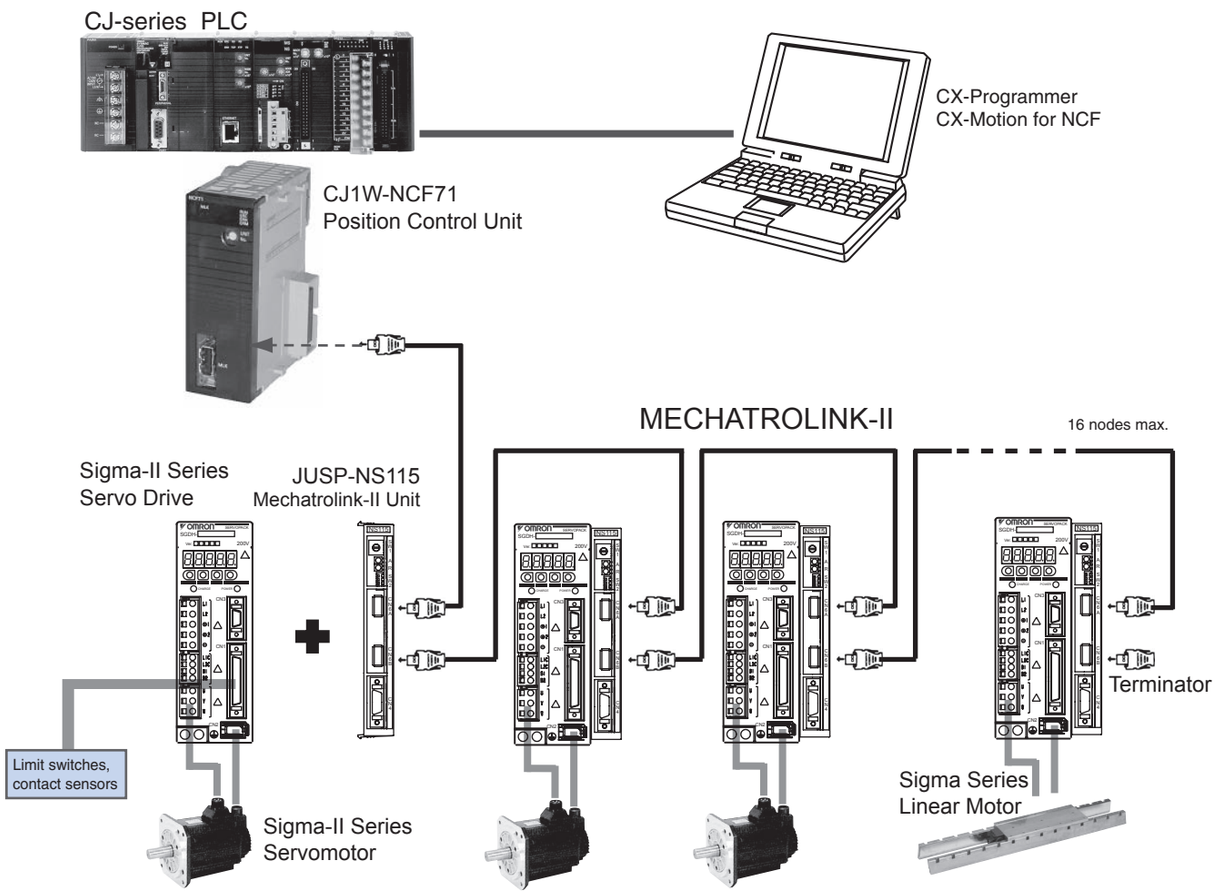
CJ1W-NCF71 - MECHATROLINK-II

Position Control Unit

Multi-axes Position Controller over high-speed MECHATROLINK-II

- Up to 16 axes controlled with minimum wiring. Only one cable between devices is needed.
- High-speed bus MECHATROLINK-II is specially designed for Motion Control
- Supports Position, speed and Torque control
- Positioning can be done by direct Ladder commands.
- Access to Servo Drives parameters can be done through PLC operation
- Access to the complete system from one point. Network setup, Servo Drives configuring and monitoring, and PLC Programming.

System Configuration



Specifications

Position Control Unit

Model		CJ1W-NCF71
Classification		CJ-series CPU Bus unit
Applicable PLCs		CJ-series
Possible unit number settings		0 to F
Control Method		MECHATROLINK-II (Position, Speed and Torque control)
Controlled devices		Sigma-II series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface
Controlled axes		16 maximum
I/O allocations	Common Operating Memory Area	Words allocated in CPU Bus Unit Area: 25 words (15 output words, 10 input words)
	Axis Operating Memory Area	Allocated in one of the following areas (user-specified): CIO, Work, Auxiliary, Holding, DM, or EM Area. Number of words allocated: 50 words (25 output words, 25 input words) × Highest axis No. used
Control units	Position command unit	Command unit: Depends on the Electronic Gear Setting in the Servo Parameters. Default setting: Pulses
	Speed command unit for position control	Command units/s
	Acceleration/deceleration speeds for position control	10,000 command units/s^2
	Speed command unit for speed control	0.001% of the motor's maximum speed
	Torque command unit for torque control	0.001% of the motor's maximum torque
Control command range	Position command range	-2,147,483,648 to 2,147,483,647 (command units)
	Speed command range for position control	0 to 2,147,483,647 (command units/s)
	Acceleration/deceleration speeds for position control	1 to 65,535 (10,000 command units/s^2)
	Speed command range for speed control	-199.999% to 199.999% The upper limit is restricted by the maximum speed of the Servomotor.
	Torque command range for torque control	-199.999% to 199.999% The upper limit is restricted by the maximum torque of the Servomotor.
Control functions	Servo lock/unlock	Locks and unlocks the Servo Driver.
	Position control	Positions to an absolute position or relative position according to the specified target position and target speed specified from the ladder program.
	Origin determination	• Origin search: Establishes the origin using the specified search method. • Present position preset: Changes the present position to a specified position to establish the origin. • Origin return: Returns the axis from any position to the established origin. • Absolute encoder origin: Establishes the origin using a Servomotor that has an absolute encoder, without having to use an origin search.
	Jogging	Outputs a fixed speed in the CW or CCW direction.
	Interrupt feeding	Performs positioning by moving the axis a fixed amount when an external interrupt input is received while the axis is moving.
	Speed control	Performs speed control by sending a command to the Servo Driver speed loop.
	Torque control	Performs torque control by sending a command to the Servo Driver current loop.
	Stop functions	• Deceleration stop: Decelerates the moving axis to a stop. • Emergency stop: Positions the moving axis for the number of pulses remaining in the deviation counter and then stops the axis.
Auxiliary functions	Acceleration/deceleration curves	Sets either a trapezoidal (linear) curve, an exponential curve, or an S-curve (moving average).
	Torque limit	Restricts the torque upper limit during position control.
	Override	Multiplies the axis command speed by a specified ratio. Override: 0.01% to 327.67%
	Servo parameter transfer	Reads and writes the Servo Driver parameters from the ladder program in the CPU Unit.
	Monitoring function	Monitors the control status of the Servo Driver's command coordinate positions, feedback position, current speed, torque, etc.
	Software limits	Limits software operation for controlling positioning.
	Backlash compensation	Compensates for the amount of play in the mechanical system according to a set value.
External I/O	Position Control Unit	One MECHATROLINK-II interface port
	Servo Driver I/O	CW/CCW limit inputs, origin proximity inputs, external interrupt inputs 1 to 3 (can be used as external origin inputs)
Self-diagnostic functions		Watchdog, flash memory check, memory corruption check
Error detection functions		Overtravel, Servo Driver alarm detection, CPU error, MECHATROLINK communications error, Unit setting error
Internal current consumption		360 mA or less for 5 VDC
Weight		95 g

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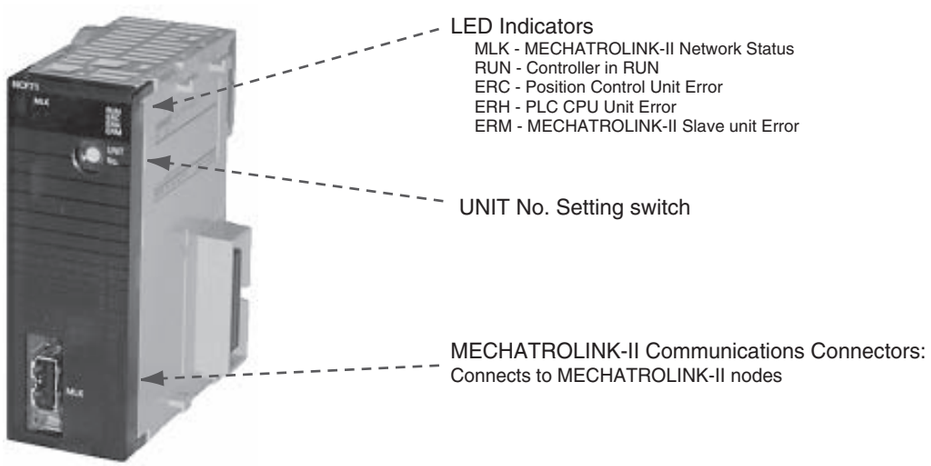
JUSP-NS115 - Mechatrolink-II Interface Unit

Item		Details
Type		JUSP-NS115
Applicable Servo Drive		SGDH-□□□E models (Version 38 or later)
Installation Method		Mounted on the SGDH Servo Drive side: CN10.
Basic Specifications	Power Supply Method	Supplied from the Servo Drive control power supply.
	Power Consumption	2 W
MECHATROLINK -II Communications	Baud Rate / Transmission Cycle	10 MHz / 500 ms or more. MECHATROLINK-II communications
Command Format	Operation Specification	Positioning using MECHATROLINK-I/II communications.
	Reference Input	MECHATROLINK-I/II communications Commands: Motion commands (position, speed), Interpolation commands, Parameter read/write, Monitor output
Position Control Functions	Acceleration/Deceleration Method	Linear first/second-step, asymmetric, exponential, S-curve
	Fully Closed Control	Position control with fully closed feedback is possible.
Fully Closed System Specifications	Fully Closed Encoder Pulse Output	5 V differential line-driver output (complies with EIA Standard RS-422A)
	Fully Closed Encoder Pulse Signal	90° Phase difference 2-phase differential pulse (phase A, phase B)
	Maximum Receivable Frequency for Servo Drive	1 Mpps
	Power Supply for Fully Closed Encoder	To be prepared by customer.
Input Signals	Signal Allocation Changes Possible	Forward/reverse run prohibited, Zero point return deceleration LS External latch signals 1, 2, 3 Forward/reverse torque control
Internal Functions	Position Data Latch Function	Position data latching is possible using phase C, and external signals 1, 2, 3
	Protection	Parameters damage, Parameter setting errors, Communications errors, WDT errors, Fully closed encoder detecting disconnection
	LED Indicators	A: Alarm, R: MECHATROLINK-I/II Communicating

Nomenclature

CJ1W-NCF71 - Position Control Unit



CJ1W-CT021

High-speed Counter Unit

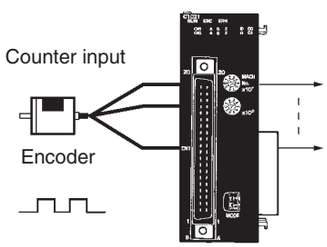
High-speed, flexible control with a wide array of features

- Input frequencies to 500 kHz.
- 32-bit counting range.
- Variable digital 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 hysteresis 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.

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 V DC	5 V DC (for ch1 only)	12 V DC (for ch2 only)	Line driver
External inputs	Number of inputs: 2			
Input voltage	24 V DC			
External outputs	Number of outputs: 2 (switchable between NPN and PNP)			
External power supply	10.2 to 26.4 V DC			
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			

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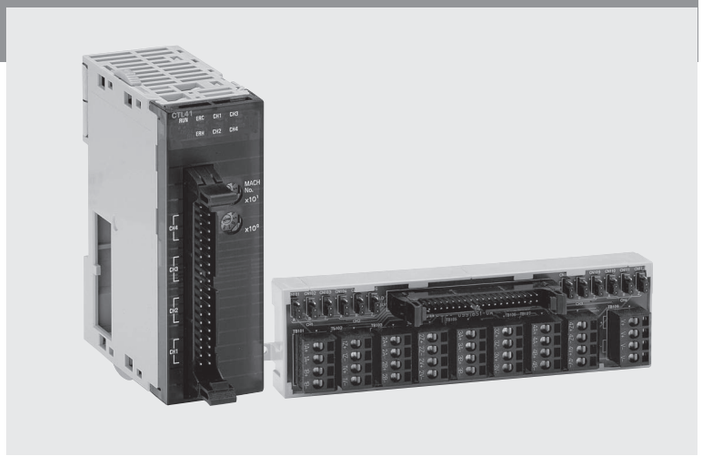
CJ1W-CTL41-E

4-Channel Counter Unit

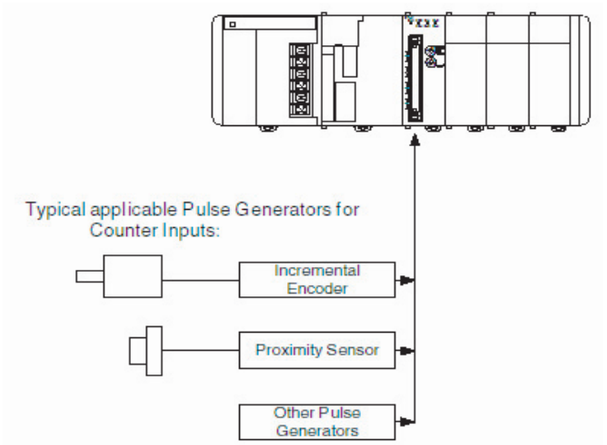


- 4 independent counter channels for encoder or pulse train inputs
- 4 Counter channels with 32-bit counter value
- Linear or circular counter mode selectable per channel.
- Max. input pulse frequency 100 kHz, or 400 k counts/second in quadrature mode
- 32 comparison values (8 per channel) can be used to trigger interrupts to the PLC CPU
- Counter channel settings can be reconfigured on-the-fly
- Input level: line driver
  (24 V inputs through dedicated terminal block).
- Easy connection (line driver or 24V) by using XW2G-40G7-E screwless terminal block)

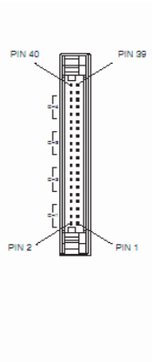
Function

This Unit offers an economical way to acquire position information from up to four encoders, or to count fast pulse trains up to 100 kHz. Dynamically adjustable counter comparison values offers flexibility in triggering interrupts to the PLC with sub-millisecond response.

System Configuration



Terminal arrangement



	Pin No.	Signal	Pin No.	Signal
Channel 4	40	Not Connected	39	Not Connected
	38		37	
	36	Z-	35	Z+
	34	B-	33	B+
	32	A-	31	A+
Channel 3	30	Not Connected	29	Not Connected
	28		27	
	26	Z-	25	Z+
	24	B-	23	B+
	22	A-	21	A+
Channel 2	20	Not Connected	19	Not Connected
	18		17	
	16	Z-	15	Z+
	14	B-	13	B+
	12	A-	11	A+
Channel 1	10	Not Connected	9	Not Connected
	8		7	
	6	Z-	5	Z+
	4	B-	3	B+
	2	A-	1	A+

Specifications

Item	Classification: Special I/O Unit
	CJ1W-CTL41-E
Unit numbers	0 to 92
Counter Inputs	2 Channels
Counter Modes	Linear, Circular
Counter Values	8000 0000 to 7FFF FFFF (–2,147,483,648 to 2,147,483,647)
Comparison values	8 values or 4 ranges per channel
Input Types	Differential Phase Inputs (1x, 2x, 4x) Pulse Up/Down Inputs Pulse + Direction Inputs
Input Voltage	RS422 Line Driver compatible level 24V via XW2G-40G7-E terminal block
Max. input Frequency	100 kHz (A and B signals)

CJ1W-CTS21-E

SSI Encoder Input Unit

2 independently configurable inputs for SSI-compatible sensors

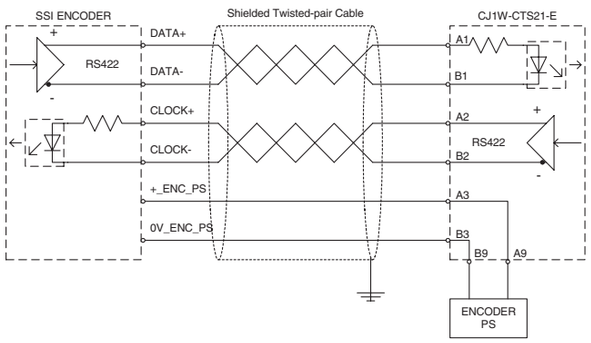
- SSI (synchronous serial interface) is a standard communication protocol mainly used for absolute encoders or distance measurement systems.
- It provides more flexibility, easier connection and reduced wiring compared to parallel connection of absolute encoders.

Function

The Units sets up and maintains data communication with up to two SSI slave devices.
Extensive setting options allow matching the coding, baud rate or data length of any SSI device.

SSI Communication

Item	Specification
CLK lines	Non-isolated differential line driver, RS422 compliant
DATA lines	Electrically isolated differential line receiver, RS422 compliant
Number of data-bits	9 to 31 (default: 24)
Value coding	Gray / Binary / Tannenbaum / Raw (default: Gray)
Clock frequency	100 kHz to 1.5 MHz
Monoflop time	10 µs to 99.990 µs (default: 40 µs)
Sample rate	About 2,500 Samples/sec with 2 encoders connected (with default settings



Terminal arrangement

Item	Description Row B	Terminal no.		Description Row A
SSI DATA CH1	DATA1-	B1		
			A1	DATA1+
SSI Clock CH1	CLOCK1-	B2		
			A2	CLOCK1+
SSI Power Supply OUT CH1	0V_ENC_PS	B3		
			A3	+_ENC_PS
	N.C.	B4		
			A4	N.C.
SSI DATA CH2	DATA2-	B5		
			A5	DATA2+
SSI Clock CH2	CLOCK2-	B6		
			A6	CLOCK2+
SSI Power Supply OUT CH2	0V_ENC_PS	B7		
			A7	+_ENC_PS
	N.C.	B8		
			A8	N.C.
Encoder Power Supply Input	0V_ENC_PS	B9		
			A9	+_ENC_PS

Specifications

Item	Classification: Special I/O Unit
	CJ1W-CTS21-E
Unit numbers	0 to 94
SSI Inputs	2 Channels
SSI Configuration options (per channel)	Baud Rate, Value coding (see above) Resolution (9-31 bits) Leading/trailing bits (0-31 bits) Encoder Status bits (0-8 bits) Parity (Odd, Even, None) Monoflop time

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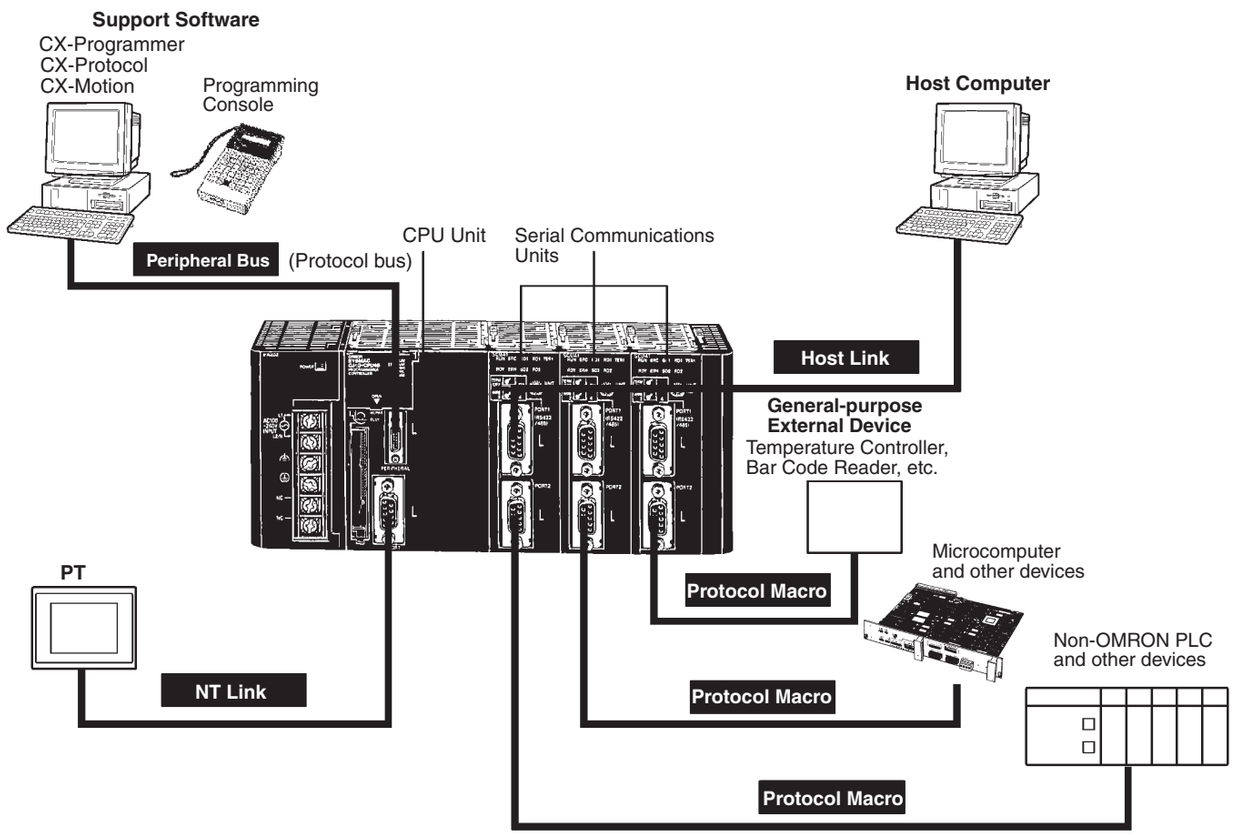
Serial Communications

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.)
			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

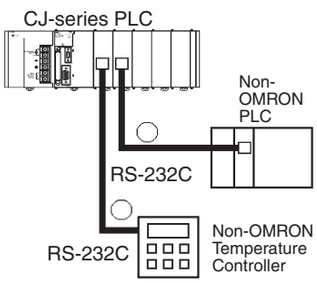
Easily Create Protocols for Data Exchange with External Devices Using One Instruction

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.

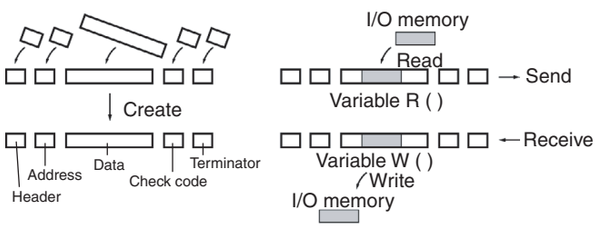
PLCs with Protocol Macros



The Two Main Functions of Protocol Macros

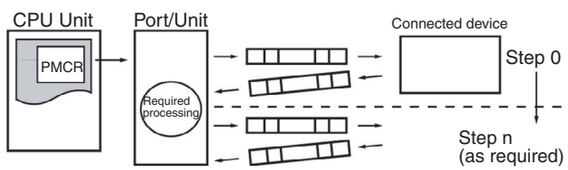
1. Creating Communications Frames

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

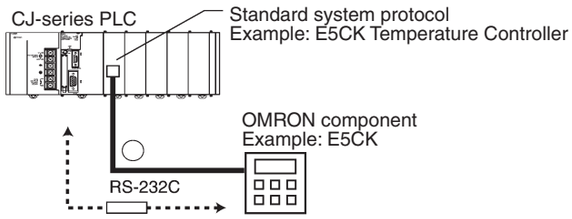
The required processing, including sending and receiving communications frames, can be performed one step at a time according to the results of the previous step, and then CX-Protocol an be used to trace send and receive data.



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.

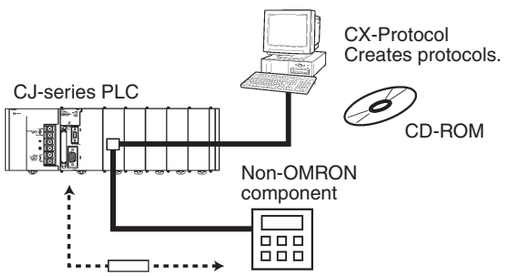


Component		Model
CompoWay/F-compatible components		OMRON CompoWay/F slave components
Digital Controllers and Temperature Controllers	Small Digital Controller with Communications (53 x 53 mm)	E5CK
	Temperature Controllers with Digital Indications (Thermac J with communications) (96 x 96 mm or 48 x 96 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.



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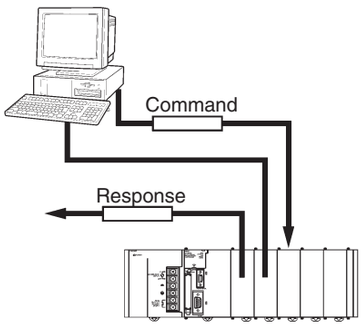
Other Protocols

Host Links

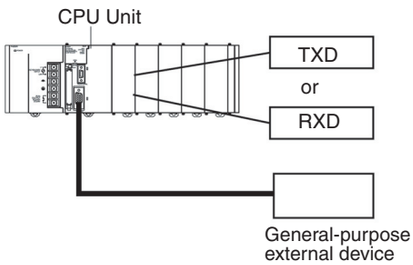
Host Link (C-mode) commands or FINS commands placed within host link headers and terminators can be sent to a host computer to read/write I/O memory, read/control the operating mode, and perform other operations for the PLC.

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.



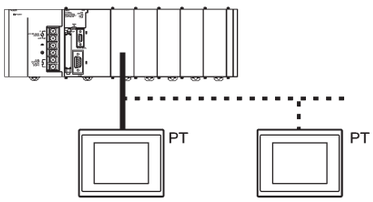
Custom Protocols

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.



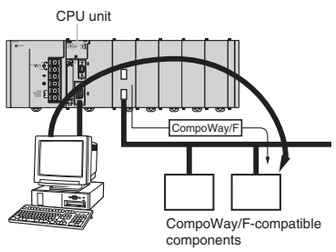
Note: Either one or up to eight PTs can be connected to a PLC in 1:N NT Links.

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*

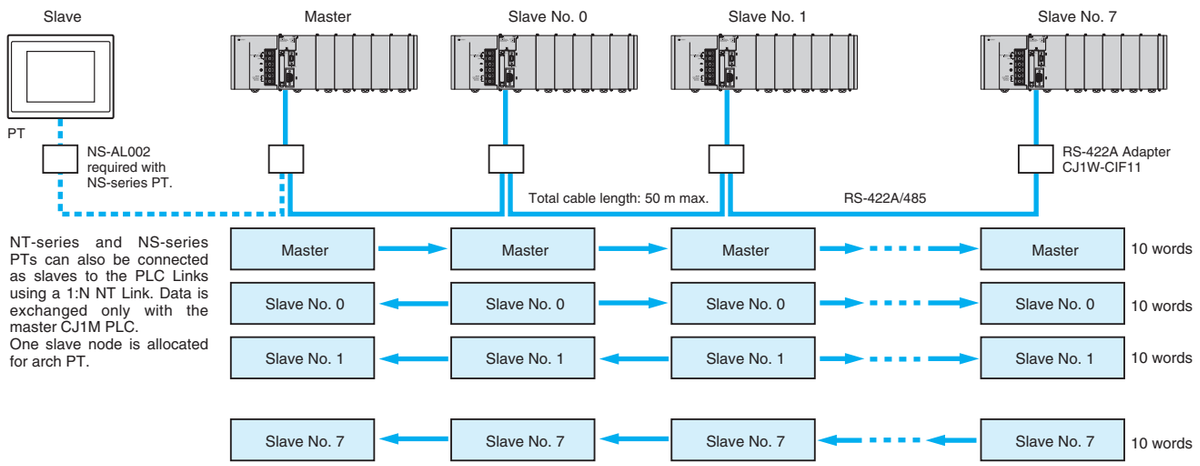
(CPU Unit Ver. 3.0 or later, Serial Communications Unit Ver. 1.2 or later only)

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.



CS1W-SCU□1-V1

Serial Communication Unit

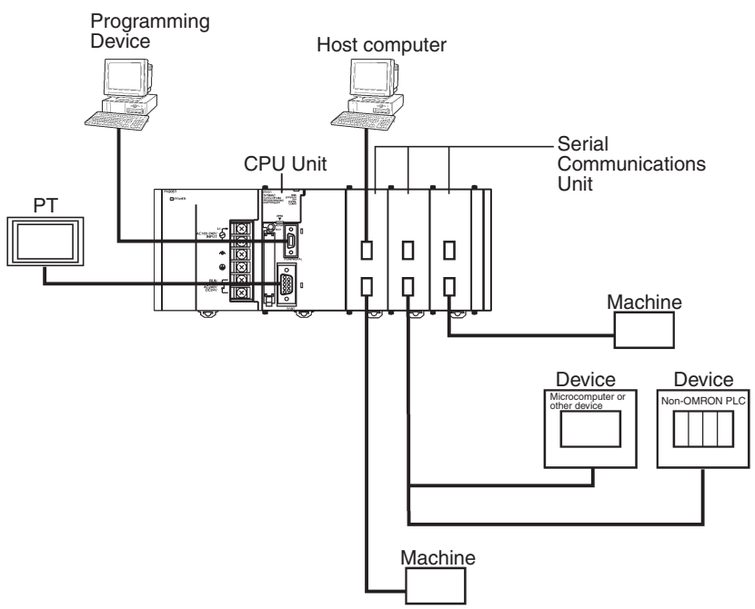
Support Protocol Macros, Host Link Communications, and 1:N NT Links

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

Function

The SCU21 and SCU41 CPU Bus Unit can be used to increase the number of serial ports (RS-232C or RS-422A/485) two at a time. The SCU21 provides two RS232C ports, the SCU41 has one RS232C port and one RS422/RS485 port. Specify Serial Gateway, Protocol Macros, Host Link Communications, or 1:N NT Links separately for each port. With the CJ Series, you can easily provide the right number of serial ports for your system.

System Configuration



Specifications

Unit	Classification	Serial communications modes	Serial	Unit numbers	Model
Serial Communications Unit	CPU Bus Unit	Protocol Macro, Host Link, 1:N NT Link, Serial Gateway, or non-protocol communications	RS-232C x 1 RS-422A/485 x 1	0 to F	CJ1W-SCU41-V1
			RS232C x 2		CJ1W-SCU21-V1

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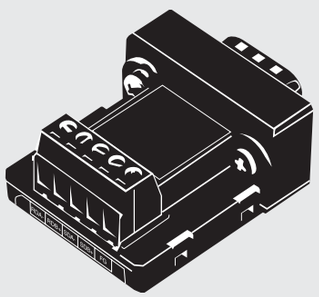
CJ1W-CIF11

RS-422A Adapter

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).



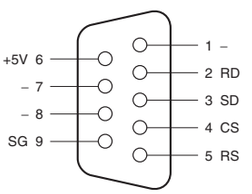
Specifications

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

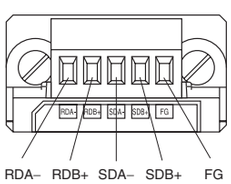
RS-232C Connector

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

NT-AL001

RS-232C/RS-422A Adapter Unit

- 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.)

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, or an RS422A multi-drop network..

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-422A Interface

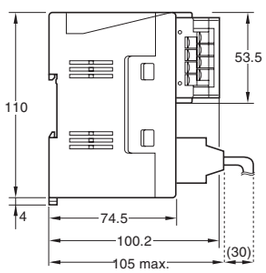
Item	Specification
Baud rate	64 Kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminal block	8 terminals, M3.0; detachable

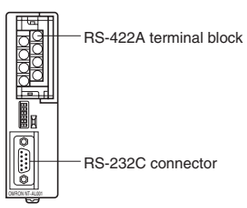
RS-232C Interface

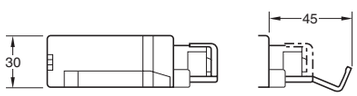
Item	Specification
Baud rate	64 Kbps max.
Transmission distance	2 m max.
Connector	9-pin, D-sub connector (female)

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)

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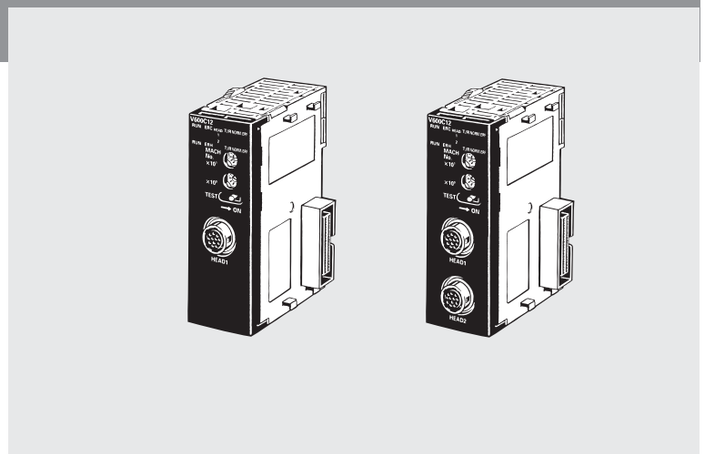
CJ1W-V600C1□

RFID Sensor Units



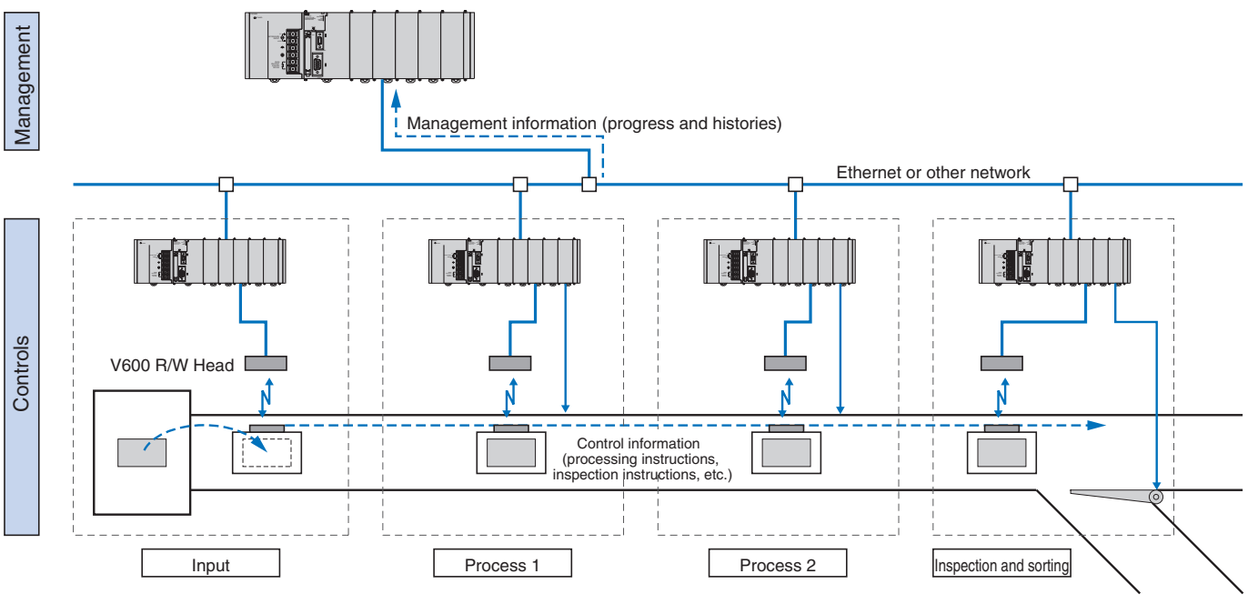
Process RFID tag data directly in the control system.

- 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).
- 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 provide debugging information (communications TAT and error codes) for easier maintenance.

Function

The ID Sensor Unit interfaces to the V600-series RFID System's Amplifiers and Read/Write Heads and is used together with V600 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

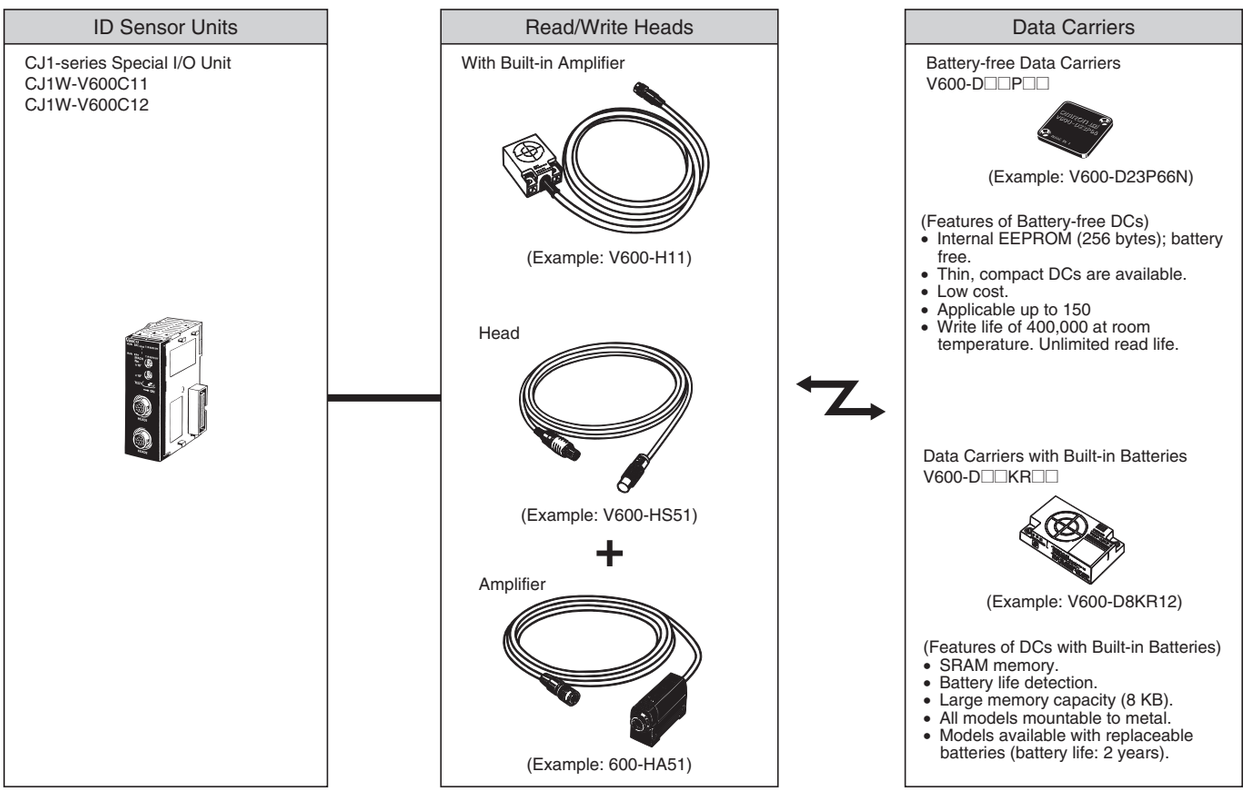
Item	CJ1W-V600C11	CJ1W-V600C12
Data transfer speed	160 bytes/scan (between CPU Unit and ID Sensor Unit)	
Applicable RFID system	V600 Series	
Number of connectable R/W Heads	1	2
Commands (The number of bytes that can be specified is given in brackets.)	Read/Write [1 to 2,048] Data Fill (Clear) [1 to 2,048 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]	
Communications processing time (See note.)	See table below	
Maintenance features	Communications test, processing results monitor data (communications TAT and error codes)	
Error detection	CPU errors, communications errors with Data Carriers, R/W Head power supply check	

Command	Data Carriers with built-in batteries	Battery-free Data Carriers in time priority mode
Read	1.8 × N + 48.4 ms	1.8 × N + 79.0 ms
Write with verify	4.2 × N + 86.5 ms	7.1 × N + 180.4 ms
Write without verify	2.2 × N + 72.8 ms	4.3 × N + 132 ms

N = The number of bytes being read or written.

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.

OMRON

Communications Networks

Overview

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
	PROFIBUS-DP		HIgh-capacity remote I/O on open network (fixed or user allocations)	PROFIBUS-DP Unit and Configurator

Specifications

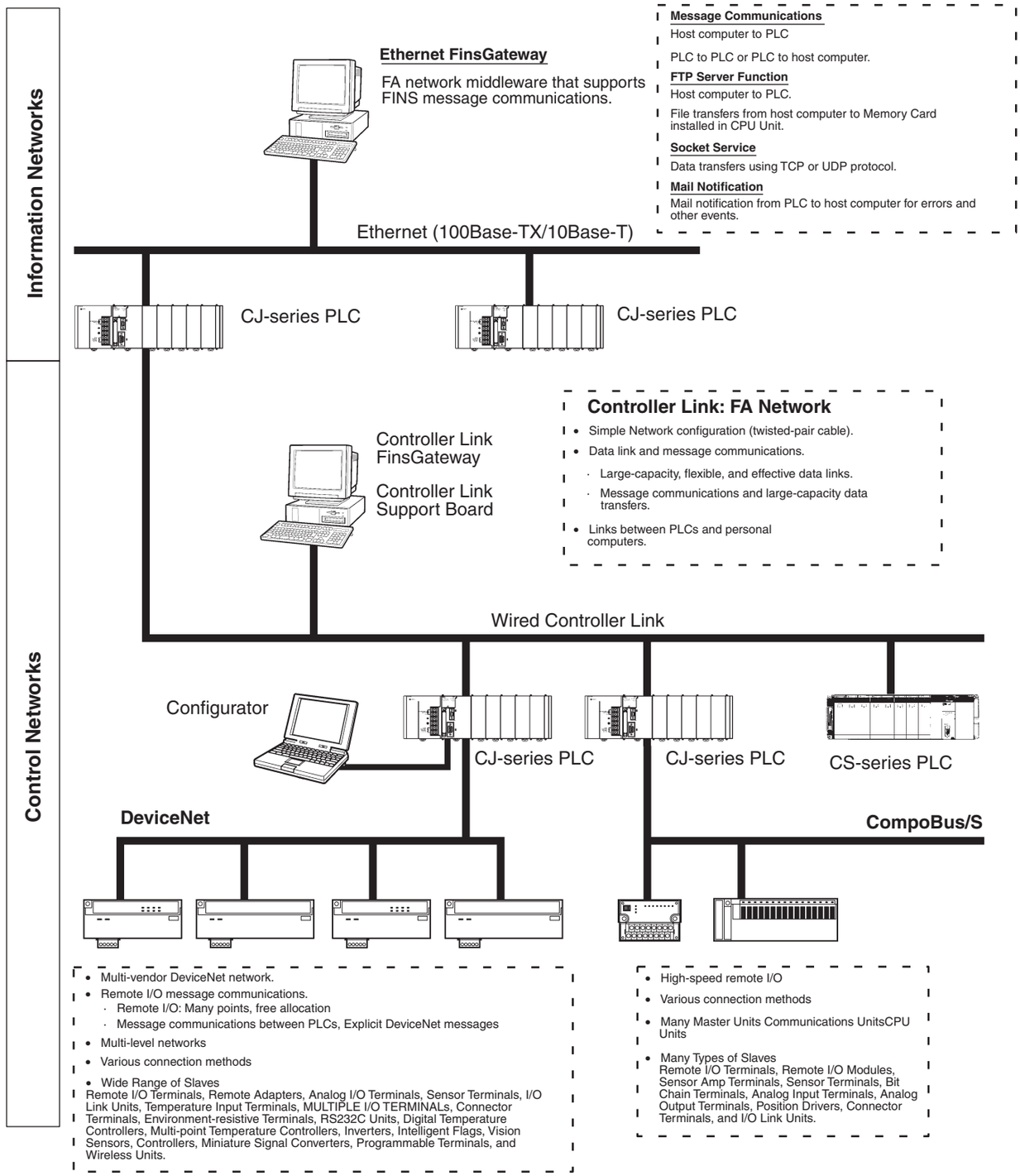
Network	Ethernet	Controller Link	PROFIBUS-DP	DeviceNet	CompoBus/S
Messages	Yes	Yes	Limited (DPV1 devices)	Yes	---
Data links	---	Yes	Manually configurable	---	---
Remote I/O	---	---	Yes	Yes	Yes
Maximum speed	10/100 Mbps	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	12 Mbps, Comm. cycle from 1 ms.	500 Kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	750 Kbps (See note 1.) Comm cycle: Approx. 1 ms (128 inputs and 128 outputs)
Total distance	---	Twisted-pair cable: 1 km (at 500 bps) Optical cable: 20 km	1200 m up to 93.75 kbps, 100 m at 12 Mpbs, extension by optical links i possible	500 m (at 125 kbps)	Trunk line: 500 m (For the long-distance communications mode) (Total wiring length is 200 m when using the 4-conductor VCTF cable or special flat cable.) Communications cycle: 6 ms max.
Maximum nodes	---	32/62	126	63	32
Communications media	---	Special twisted-pair cable or optical cable	PROFIBUS cable	DeviceNet cable	2-conductor VCTF cable 4-conductor VCTF cable Special flat cable (Different cables cannot be used together.)
Network data link capacity	---	32,000 or 62,000 words	---	---	---
Remote I/O capacity	---	---	7000 words (112000 points), Configurator always required	32,000 pts (with Configurator) 2,048 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, C200 HX/HG/HE, C200HS, CQM1H, CPM1A/2A	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE, C200HS, CQM1/CQM1H (with I/O Link), CPM1A/2A (I/O Link)	CJ Series, CS Series, C200HX/HG/HE, C200HS, CQM1/CQM1H, CPM2C-S1□0c(-DRT), CPM1A/2A (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)

Communications Networks



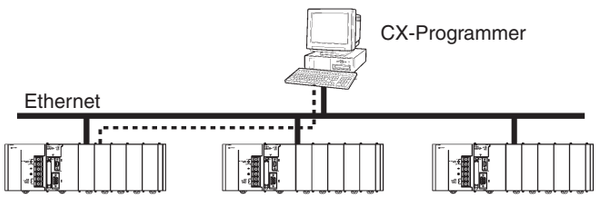
OMRON

Ethernet: Information Network

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

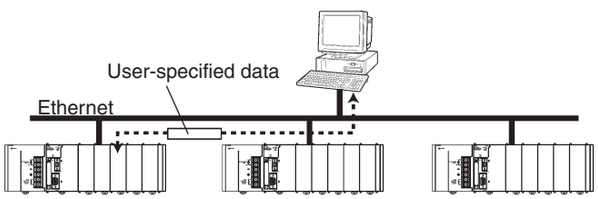
Remote Programming and Monitoring

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.



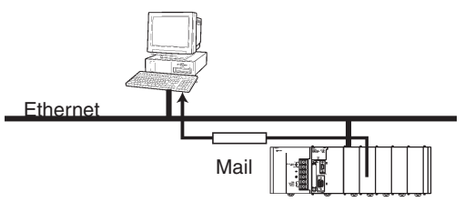
Socket Service

Transfer data using either UDP or TCP protocol.



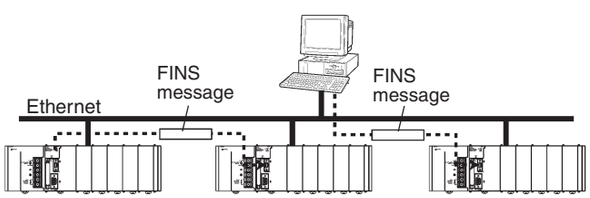
Mail Service

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



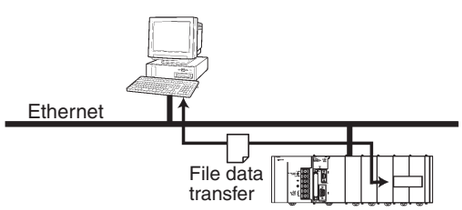
FINS Message Service

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

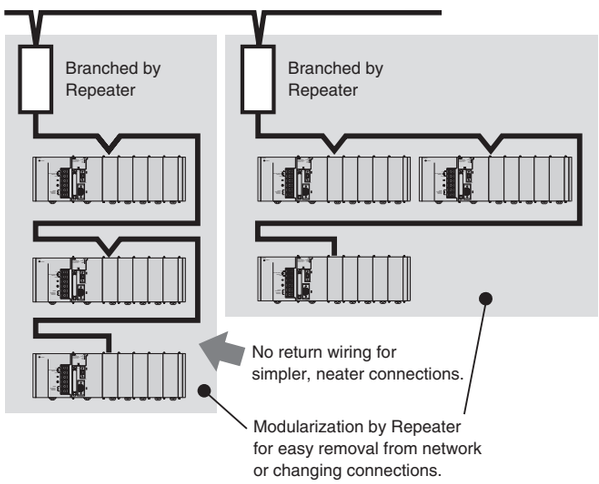
Controller Link can easily connect PLCs at the factory site in a fully functional FA network.

Easy Network Construction with Twisted-pair Cables

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

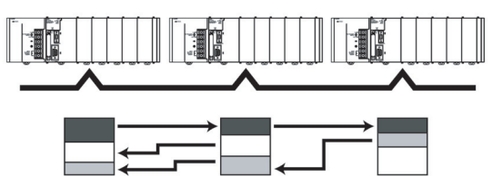
More Flexibility in Wiring for Layout, Construction, and Expansion Using T-branches

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



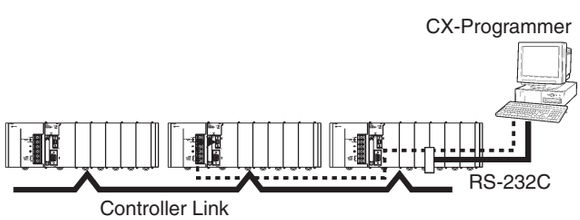
Data Links

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.



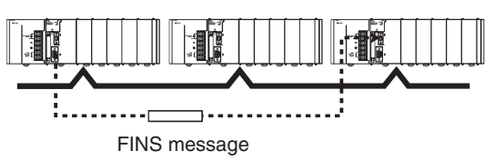
Remote Programming and Monitoring

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.

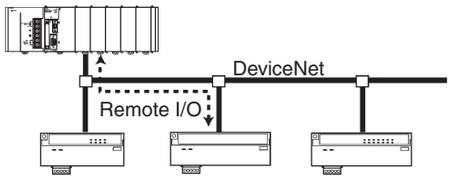


DeviceNet: Component Network

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.

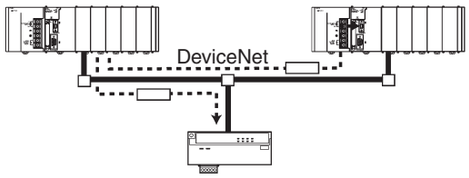


Select from a Wide Range of Slaves (Connection Possible to Data-intensive Devices)

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

Message Communications

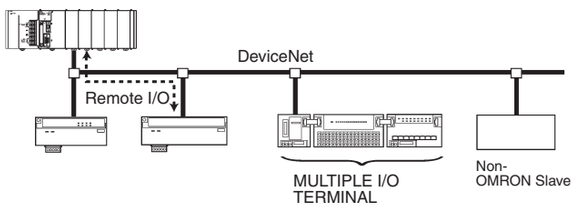
Send FINS messages between OMRON PLCs and Explicit message between OMRON PLCs and devices from other makers.



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

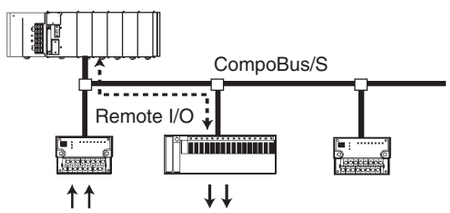


CompoBus/S: High-speed ON/OFF Bus

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.

OMRON

CJ1W-ETN21

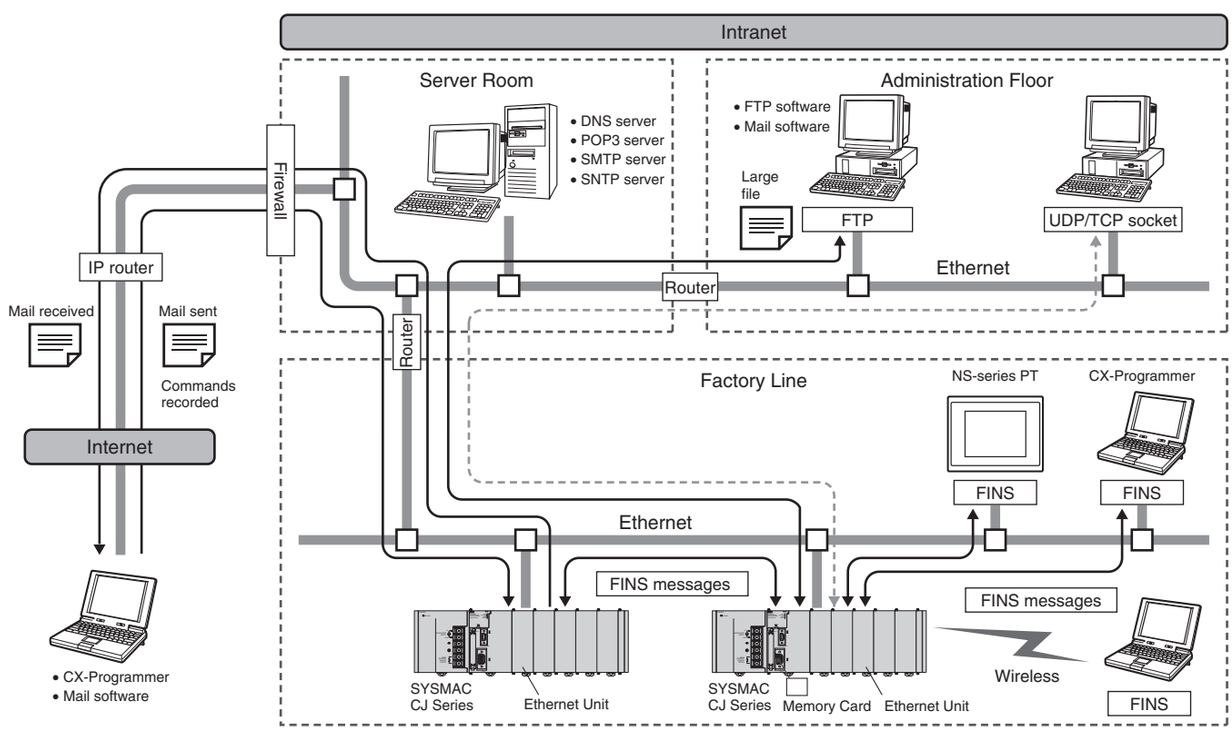
Ethernet Unit

Enables fast data transfer within Factory Automation systems, and easily links FA systems to plant management systems

- Use the standard Ethernet protocools, TCP/IP and UDP/IP, and OMRON's standard FINS message communications.
- FINS routing provides seamless communication with Controller Link, DeviceNet and other networks.
- Access data files in PLC memory or on Compact-Flash cards using the Unit's FTP server function.
- Freely configurable communications using socket services
- Send e-mails automatically upon preset conditions, including embedded data in the e-mail body, or with data file attachments.
- Receive e-mails (POP3), including commands to the PLC, with password protection.
- Automatic correction of the PLC clock using SNTP function.
- DNS Client function allows server access by host name.
- Set communications parameters with CX-One's setup menus or the HTML setup pages.

Function

Achieve a wide range of communications from PLCs connected to an Ethernet network: Transfer data with TCP/IP or UDP/IP socket services, executed OMRON's standard FINS commands, transfer files with FTP, or send mail with SMTP. Select the communications services that are required and flexibly connect PLCs on an information level Ethernet network.



Specifications

Classification	Communications services	Unit numbers	Connector	Model
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.	0 to F (4 Units max.)	100Base-TX (10Base-T)	CJ1W-ETN21

OMRON

CJ1W-CLK21-V1

Controller Link Units

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

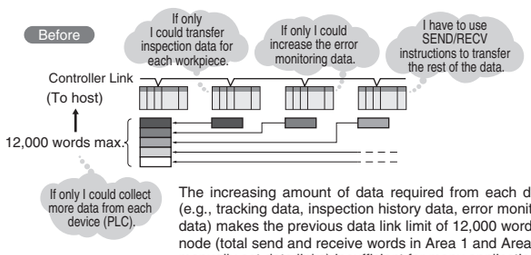
Function

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)

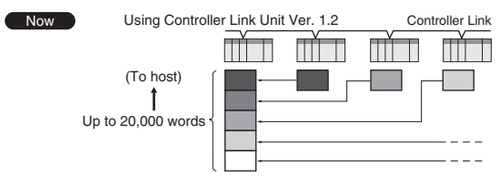
Using Wired Controller Link Units together with Repeater Units allows network configurations for essentially any application, including T-branching, long-distance applications, applications with up to 62 nodes, or applications with optical sections in a wired network. Models are also available that enable 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.

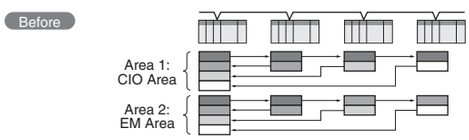


The increasing amount of data required from each device (e.g., tracking data, inspection history data, error monitoring data) makes the previous data link limit of 12,000 words per node (total send and receive words in Area 1 and Area 2 for manually set data links) insufficient for many applications.

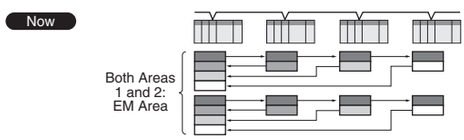


New CS/CJ-series Controller Link Units (Wired/Optical Ring) can handle up to 20,000 send/receive data link words (total of Area 1 and Area 2) for a single node. This enables more data to be collected from each device.

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.



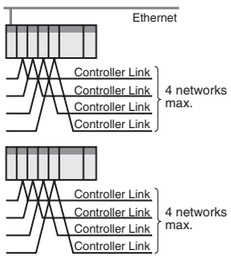
Area 1 and Area 2 had to be allocated in separate Memory Areas for user-set data links. Therefore, allocating all data links in the EM Area was not possible.



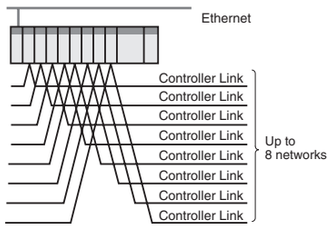
New CS/CJ-series Controller Link Units (Wired/Optical Ring Units) enable both Areas 1 and 2 to be allocated in the same Memory Area when using user-set data links. Provided addresses do not overlap, the same Memory Area can be used, making area control easier.

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.

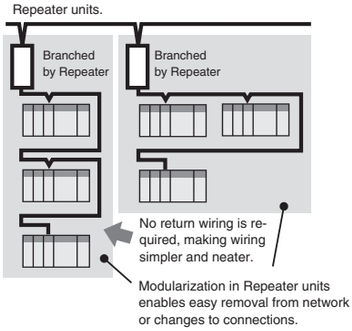


System Configuration

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 Unitl 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.

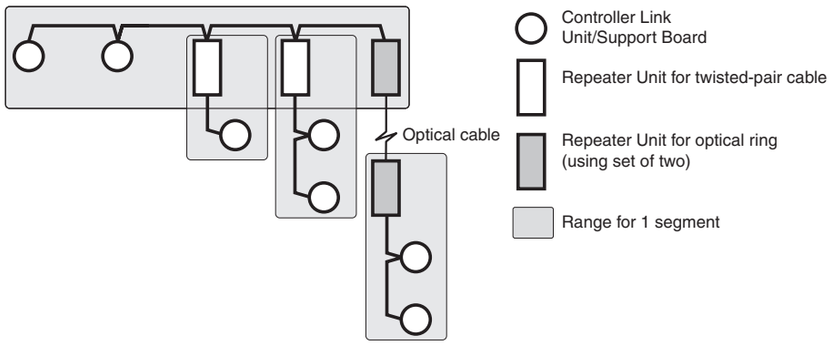
Specifications for Networks Using Repeaters

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.



CJ1W-DRM21

DeviceNet Unit

Multivendor, Multibit Network

- Control of up to 32,000 points (2,000 words) per master.
- Remote I/O communications can be allocated in any area using DM settings.
- 16 DeviceNet Units can be mounted for each CPU Unit (3 max. for fixed allocations).
- When using the Configurator (see note), remote I/O can be allocated in an order independent of node address.

Note: The Configurator is allocating a node-address if connected to DeviceNet using a DeviceNet communication card. It is not doing this if connected through the serial communications interface of the CPU.

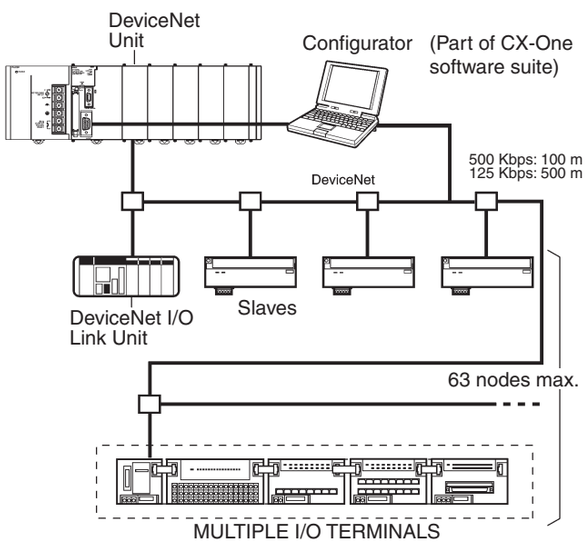
- DeviceNet Units can be used as a master and a slave, and this functionality can be used simultaneously.
- DeviceNet Units allow DeviceNet networks to be treated exactly like Controller Link, Ethernet, or other networks for message communications or remote programming and monitoring by CX-Programmer.

Function

OMRON supports the DeviceNet open field network, a multivendor 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. Explicit message communications. This can be programmed from the CPU unit (IOWR and CMND instructions) and read from/write to other DeviceNet units.
3. With explict message communication FINS commands can be send to other devices that support FINS messaging.

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, NT 4.0, or 2000)
	3G8E2-DRM21-EV1	PC card with software (Windows 95 or 98)

For all two products, refer to page 449 for more info.

CJ1W-CORT21

CAN Unit

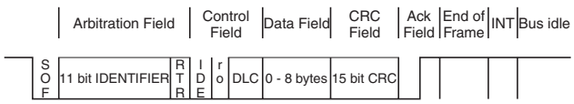
Sending and Receiving 11- or 29-bit CAN messages

The CAN communication protocol is widely used in all kinds of aplications. Benefits are its high reliabilty, low price and ease of implementation. But for two CAN devices to understand eachother they must speak the same protocol (language). Many implementers of CAN comunication have made their own protocol. The User Defined CAN Unit has the possibility to adapt to any protocol by configuration. This makes it possible to add a PLC and all its opennes, features and extensions to what was once a proprietary solution.

Function

The Unit can send and receive 11- or 29-bit CAN messages. The identifier, datalength and data of the CAN message and the way the CAN message is send (On time, trigger or change) are set buy FINS commands

11-bit identifier CAN frame



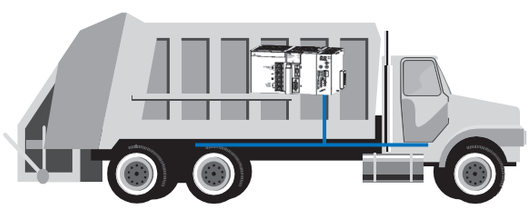
ISO/OSI Reference Model

CAN communication describes only layers 1 and 2, the Physical and the Datalink Layer. Layer 7, the Application Layer is normally described in protocol standards like CANopen and DeviceNet.

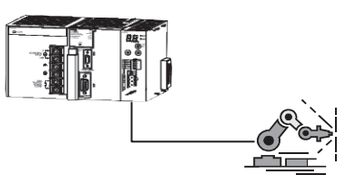
Layer 7	**Application Layer**
Layer 3-6	
Layer 2	**Data Link Layer**
	Logical Link Control: LLC Acceptance filtering, overload notification, recovery management Medium Access Control: MAC Data encapsulation and decapsulation frame coding, stuffing medium access management error detection error signalling acknowledgement serialization, deserialization
Layer 1	**Physical Layer**
	bit encoding / decoding bit timing synchronization

Applications

Monitoring of diesel-engines and drivetrains in trucks and bus



Robot Control



Specifications

Item	Classification: Special CPU Unit
	CJ1W-CORT21
Unit number	0 to 15
CAN communication	Any baud rate can be set Transmit and receive 11- or 29-bit CAN messages Transmit messages on time, trigger, or data change
Configuration	Status and control words provide straightforward operation. All configuration data can can be changed on-line by FINS commands. Up to 640 identifiers can be configured for message filtering. Up to 640 different identifiers can be configured for transmission.

OMRON

CJ1W-PRM21

PROFIBUS-DP Master unit

- PROFIBUS-DP master class one with support of DP-V1 data types.
- 7 kWord I/O
- Simple configuration through FDT/DTM based configurator
- Special CPU unit
- Handles data independent of the CPU unit, thus reducing CPU load

Function

The CJ1W-PRM21 is a PROFIBUS-DP Master Class1 device (DPM1).

It exchanges I/O data and communication/status information with the CPU of the PLC and I/O data and diagnistics information with PROFIBUS-DP slave stations on the PROFIBUS network.

The CJ1W-PRM21 can be configured via any communication interface of the PLC system. Since the configuration software uses FINS communication, configuration data and diagnostic information can be routed over Controller Link, Ethernet or serial networks through up to 8 layers.

Specifications

Model			Remarks
CJ1W-PRM21	Main function	Basic PROFIBUS-DP master Class 1 functions plus: DPV1 data types support	
	Unit No.	0-15	Special CPU unit
	Maximum number of units mountable per PLC	16	Maximum depends on PLC CPU-type
	Configurator	CX-PROFIBUS, FTD/DTM based configurator	Incorporates a Generic DTM to use with GSD-file based slaves
	Supported baud rate(s)	All baud rates as specified by the standard EN50170 Volume 2, the PROFIBUS extensions to EN50170, as well as the standard IEC61158: 9.6 kBit/s, 19.2 kBit/s, 45.45 kBit/s. 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s, 12 MBit/s	The baud rate value to be used must be selected through the Configurator.
	Selectable PROFIBUS address	0-125	Set through the configurator
	Maximum number of PROFIBUS slaves	125	
	Maximum number of I/O points	7168 words	
	Maximum number of I/O points per PROFIBUS slave	244 bytes In / 244 bytes Out	
	Control and status ares size	25 words	
	Supported Global_Control services	- Sync - Unsync - Freeze - Unfreeze - Clear	Through Control Area
	Supported Master-Slave communication services	- Data_Exchange - Slave_Diag - Set_PRM - Chk_Cfg - Global_Control	
	Power consumption	400 mA at 5 V	
	Dimensions	90 x 65 x 31 mm	
	Weight	100 gr	
	Ambient temperature	Operating: 0 °C to 50 °C	

CJ1W-PRT21

PROFIBUS-DP slave unit

PROFIBUS-DP I/O link unit

- Data link to any PLC data area
- Simple configuration using max. data input 100 words and max. data output of 100 words. Max. total exchanged data 180 words.
- CJ1 special I/O unit
- Status information overview in host PLC, plus extensive diagnostics via PROFIBUS

Specifications

Installation	**Host PLC System**	CJ1
	Maximum number of Units per PLC system	40
	Current consumption	400 mA (maximum) at 5V DC from PLC power supply
	Weight	90 g (typical)
Environment	**Storage temperature**	-20°C to +70°C
	Operating temperature	0°C to +55°C
	Operating humidity	10 to 90% (non-condensing)
	Conformance to EMC- and environmental standards	EN50081-2 EN61131-2
User Interface	**Switch settings**	Special I/O Machine number (00-95) by 2 rotary switch PROFIBUS-DP node address (00-99) by 2 rotary switches
	LED Indicators	Unit status: RUN (green LED), ERC (red LED) Network status: COMM (green LED), BF (red LED) CPU status: ERH (red LED)
PLC Interface	**No. of CIO words allocated**	PLC →Unit: 1 word control data Unit →PLC: 1 word status data
	No. of DM words allocated	Unit →PLC: 8 words of Unit setup information
	Amount of I/O data per Unit	Fixed: 2 words CIO area (one in, one out) for Unit status + control bits. 2 words status information from the host PLC, containing operation status and error code (read from location A400). This information will be sent to the PROFIBUS master: - as extended diagnostics, only at a change of data content. - optionally, attached to the I/O data, each PROFIBUS cycle. Variable: 2 user-defined areas for PROFIBUS I/O data, with the following restrictions: - Up to 100 words input in one PLC area (CIO, H, D, EM). - Up to 100 words output in one PLC area (CIO, H, D, EM). - Inputs+outputs must be 180 words or less

OMRON

CJ1W-SRM21

CompoBus/S Master Unit

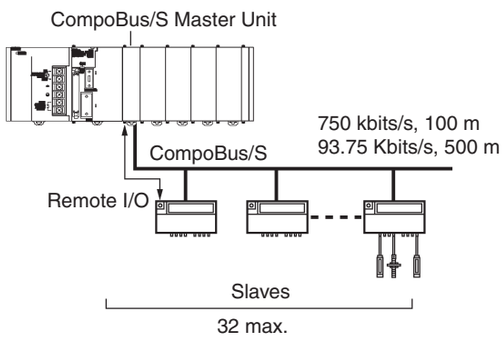
CompoBus/S is a high-speed I/O bus

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

Function

A high-speed ON/OFF bus that automatically transfers remote I/O status to the CPU Unit without any programming in the CPU Unit. High-speed remote I/O is supported by a communications cycle time of 1 ms maximum for 256 I/O points.

System Configuration



Specifications

Master

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).

Communiccations

<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 (requires termination)</td></tr>
<tr><td colspan="2">Baud rate</td><td>High-speed mode: 750 kbps
Long-distance mode: 93.75 kbps. Set via DIP switch. (Set via DM Area, Default: 750 kbps)</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 Cable
<table>
<tr><td>Mode</td><td>Main</td><td>Branch</td><td>Total branch</td></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 or Special Flat Cable
<table>
<tr><td>Mode</td><td>Main</td><td>Branch</td><td>Total branch</td></tr>
<tr><td>High-speed
(See note 1.)</td><td>30 m</td><td>3 m</td><td>30 m</td></tr>
<tr><td>Long-distance
(See note 2.)</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. For 16 Slaves or fewer: Main: 100 m, Total branch: 50 m.

2. No restrictions on branching method or individual line lengths. Connect terminating resistance to Slave farthest from Master.

Performance

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

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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 1 Division 2 Products for Hazardous Locations, C: CSA, UC: cULus, UC1: cULus Class 1 Division 2 Products for Hazardous Locations, CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
Ask you OMRON representative for the conditions under which the standards were met.

Basic Configuration Units

Name		Specifications					Model	Standards
CPU Units	CJ1 CPU Units	I/O bits	Program capacity	Data memory capacity	LD instruction execution time	Built-in Functions	---	---
		2,560 (3 Expansion Racks)	250 kSteps	448 kWords (DM: 32 kWords, EM: 32 kWords x 13 banks)	0.02 μs	None	CJ1W-CPU67H	UC1, CE, N, L
			120 kSteps	256 kWords (DM: 32 kWords, EM: 32 kWords × 7 banks)			CJ1H-CPU66H	
			60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords × 3 bank)			CJ1H-CPU65H	
		1,280 (3 Expansion Racks)			0.04 μs		CJ1G-CPU45H	
			30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 banks)			CJ1G-CPU44H	
		960 (2 Expansion Racks)	20 kSteps				CJ1G-CPU43H	
			10 kSteps				CJ1G-CPU42H	
	CJ1G Loop Control CPU Units	1,280 (3 Expansion Racks)	60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords x 3 bank)	0.04 μs	Loop Control Engine (300 blocks)	CJ1G-CPU45P	UC1, CE
			30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords x 1 banks)			CJ1G-CPU44P	
		960 (2 Expansion Racks)	20 kSteps				CJ1G-CPU43P	
			10 kSteps			Loop Control Engine (50 blocks)	CJ1G-CPU42P	
	CJ1M CPU Units	640 (1 Expansion Rack)	20 kSteps	32 kWords (DM only, no EM)	0.1 μs	10 inputs and 6 outputs, with fast pulse- and interrupt functions. (See note 1.)	CJ1M-CPU23	UC1, CE, N, L
		320 (no expansion)	10 kSteps				CJ1M-CPU22	
		160	5 kSteps				CJ1M-CPU21	
		640 (1 Expansion Rack)	20 kSteps			None	CJ1M-CPU13	
		320 (no expansion)	10 kSteps				CJ1M-CPU12	
		160	5 kSteps				CJ1M-CPU11	
	CJ1M Ethernet CPUs	640 (1 Expansion Rack)	20 kSteps	32 kWords (DM only, no EM)	0.1 μs	100 Base-TX Ethernet port	CJ1M-CPU13-ETN	
		320 (no expansion)	10 kSteps				CJ1M-CPU12-ETN	
		160	5 kSteps				CJ1M-CPU11-ETN	
Power Supply Units		100 to 240 V AC (with RUN output), Output capacity: 5 A, 5 V DC					CJ1W-PA205R	UC1, CE, N, L
		100 to 240 V AC, Output capacity: 2.8 A, 5 V DC					CJ1W-PA202	
		24 V DC, Output capacity: 5 A, 5 V DC					CJ1W-PD025	
		24 V DC, Output capacity: 2 A, 5 V DC					CJ1W-PD022	
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	L, CE
		Flash memory, 64 MB					HMC-EF672	
		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. TheHMC-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)

Name	Specifications		Model
Applicable Connector	MIL Flat Cable Connectors (Pressure-fitted Connectors)		XG4M-4030-T
Terminal Blocks	General-purpose 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 the Servo Drivers.

Programming Devices

Name	Specifications		Model	Standards
Programming Consoles	An English Keyboard Sheet (CS1W-KS001-E) is required. (Connects on peripheral port on CPU Unit only.)		CQM1H-PRO01-E	U, C, CE
				U, C, N, CE
Programming Console Key Sheet	For CQM1H-PRO01-E, CQM1-PRO01-E, and C200H-PRO27-E.		CS1W-KS001-E	CE
Programming Console Connecting Cables	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)		CS1W-CN114	
	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)		CS1W-CN624	
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	USB-toRS-232C conversion cable (0.5 m) and driver CD-ROM (WIN98, ME, 2000, XP), USB version 1.1, USB plug: A-type, male. RS-232C plus: 9-pin D-sub, male		CS1W-CIF31	CE
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.		CX-ONE-AL□□C-E*1	---

*1 □□ = Number of licences; 01, 03, 10

Optional Products, Maintenance Products and DIN rail

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
DIN rail	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 rail.	PFP-M	

Basic I/O Units

Name	Specifications	Connection type	Model	Standards
DC Input Units	12 to 24 V DC, 10 mA, 8 inputs	terminal block	CJ1W-ID201	UC1, CE, N, L
	24 V DC, 7 mA, 16 inputs	terminal block	CJ1W-ID211(SL)	
	24 V DC, 4.1 mA, 32 inputs	one 40-pin Fujitsu connector	CJ1W-ID231	
	24 V DC, 4.1 mA, 32 inputs	one 40-pin MIL connector	CJ1W-ID232	
	24 V DC, 4.1 mA, 64 inputs	two 40-pin Fujitsu connectors	CJ1W-ID261	
	24 V DC, 4.1 mA, 64 inputs	two 40-pin MIL connectors	CJ1W-ID262	
AC Input Units	100 to 120 V AC, 7 mA (100 V, 50 Hz), 16 inputs	terminal block	CJ1W-IA111	
	200 to 240 V AC, 10 mA (200 V, 50 Hz), 8 inputs	terminal block	CJ1W-IA201	
Interrupt Input Unit	24 V DC, 7 mA, 16 inputs	terminal block	CJ1W-INT01	
High-speed Input Unit	24 V DC, 7 mA, 16 inputs	terminal block	CJ1W-IDP01	
Relay Output Units	250 V AC/24 V DC, 2 A, independent contacts	8 outputs max.	CJ1W-OC201(SL)	UC1, CE, N, L
	250 V AC/24 V DC, 2 A, independent contacts	16 outputs max.	CJ1W-OC211(SL)	
Transistor Output Units	12 to 24 V DC, 2 A, 8 outputs, sinking	terminal block	CJ1W-OD201	
	24 V DC, 2 A, 8 outputs, sourcing, load short-circuit protection, alarm	terminal block	CJ1W-OD202	
	12 to 24 V DC, 0.5 A, 8 outputs, sinking	terminal block	CJ1W-OD203	
	24 V DC, 0.5 A, 8 outputs, sourcing, load short-circuit protection, alarm	terminal block	CJ1W-OD204	
	12 to 24 V DC, 0.5 A, 16 outputs, sinking	terminal block	CJ1W-OD211(SL)	
	24 V DC, 0.5 A, 16 outputs, sourcing, load short-circuit protection, disconnection detection, alarm	terminal block	CJ1W-OD212(SL)	
	12 to 24 V DC, 0.5 A, 32 outputs, sinking	one 40-pin Fujitsu connector	CJ1W-OD231	
	24 V DC, 0.5 A, 32 outputs, sourcing, load short-circuit protection, alarm	one 40-pin MIL connector	CJ1W-OD232	
	12 to 24 V DC, 0.5 A, 32 outputs, sinking	one 40-pin MIL connector	CJ1W-OD233	
	12 to 24 V DC, 0.3 A, 64 outputs, sinking	two 40-pin Fujitsu connectors	CJ1W-OD261	
	12 to 24 V DC, 0.3 A, 64 outputs, sourcing	two 40-pin MIL connectors	CJ1W-OD262	
	12 to 24 V DC, 0.3 A, 64 outputs, sinking	two 40-pin MIL connectors	CJ1W-OD263	
Triac Output Unit	250 V AC, 0.6 A, 8 outputs	terminal block	CJ1W-OA201	
DC Input/Transistor Output Units	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs	two 24-pin Fujitsu connectors	CJ1W-MD231	UC1, CE, N
	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sourcing, load short circuit protection, alarm	two 20-pin MIL connectors	CJ1W-MD232	
	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs	two 20-pin MIL connectors	CJ1W-MD233	
	32 inputs, 24 V DC, 4.1 mA 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs	two 40-pin Fujitsu connectors	CJ1W-MD261	
	32 inputs, 24 V DC, 4.1 mA 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs	two 40-pin MIL connectors	CJ1W-MD263	
TTL I/O Unit	32 inputs, 5 V DC, 35 mA 32 outputs, 5 V DC, 35 mA/pt. 1.12 A/Unit	two 40-pin MIL connectors	CJ1W-MD563	
Temperature Input Units	6 thermocouples, J-type/K-type, no isolation between channels	terminal block	CJ1W-TS561(SL)	UC1, CE, L
	6 RTDs, Pt1000, no isolation between channels	terminal block	CJ1W-TS562(SL)	

Note: 1. Units with terminal blocks are generally available with screw connection, or with screwless clamp connection. For M3 screw connection, omit the "(SL)" from the model code.

2. Units with MIL/Fujitsu connectors are not provided with a plug counterpart. Either purchase the matching connector from the list below, or use OMRON XW2Z or G79 cables to connect I/O terminal blocks to the Unit (see „Wiring Systems“, page 384).

Connectors for I/O Units

Applicable Units	Name	Connection	Model	Remarks	Standards
I/O Units with terminal blocks	18-point screwless terminal block	Screwless Clamp/ card edge	CJ-WM01-18P-5	Replacement terminal blocks for I/O Units, pack of 5 pcs.	---
I/O Units with Fujitsu connectors	40-pin Connector	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	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	Pressure welded	XG4M-4030-T	FRC5-A040-3TOS	
	20-pin Connector		XG4M-2030-T	FRC5-A020-3TOS	

Note: * Connectors according to MIL-C-83503 , also compatible with commercially available connectors according to DIN 41651 or IEC 60603-1 specifications

Special I/O Units

Name	Specifications	Model	Standards
Analog Input Units	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: 0.25 ms/point	CJ1W-AD081-V1(SL)	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: 0.25 ms/point	CJ1W-AD041-V1(SL)	UC1, CE, N, L
Analog Output Units	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(SL)	UC1, CE, N, L
	8 outputs (4 to 20 mA) Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000, 250 μs/point)	CJ1W-DA08C(SL)	UC1, CE, N, L
	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(SL)	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(SL)	UC1, CE, N, L
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(SL)	UC1, CE, N, L
Process Input Units	2 isolated DC inputs, 16-bit resolution, conversion speed 10 ms/2 pts	CJ1W-PDC15	UC1, CE
	2 isolated thermocouple inputs, 16-bit resolution, conversion speed 10 ms/2pts	CJ1W-PTS15	
	2 isolated Pt100 inputs, 16-bit resolution, conversion speed 10 ms/2pts	CJ1W-PTS16	
	4 isolated inputs, thermocouple type R, S, K, J, T, L, B. Conversion speed 250 ms/4 pts	CJ1W-PTS51	
	4 isolated Pt100 inputs (JIS, IEC). Conversion speed 250 ms/4 pts	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, L
4-Channel Counter Unit	4 inputs, max. input frequency: 100 kpps	CJ1W-CTL41-E	UC1, CE, L
	Screwless Terminal Block for CJ1W-CTL41-E	XW2G-40G7-E	CE
2-SSI Encoder Input Unit	2 Synchronous Serial Interface channels	CJ1W-CTS21-E	CE, L
PROFIBUS-DP I/O Link Unit	Exchanges up to 180 words in any memory area with a PROFIBUS-DP Master Unit	CJ1W-PRT21	UC1, CE
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	
	Spacer Unit (See note 1.)	CJ1W-SP001	
Servo Relay Units (See note 2.)	For 1-Axis Position Control Unit (without communications support) (CS1W-NC113/133, CJ1W-CN113/133, C200HW-NC113, C200H-NC112)	XW2B-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)	XW2B-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)	XW2B-40J6-4A	
Position Control Unit Cables (See note 2.)	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 Unit (See note 3.)	For V600 Series, 1 R/W Head	CJ1W-V600C11	---
	For V600 Series, 2 R/W Heads	CJ1W-V600C12	

1. The ambient operating temperature for 4-Axis Position Control Units is 0 to 50 °C; mount a Spacer Unit to the Position Control Unit in case the ambient temperature may reach 55 °C. The allowable voltage fluctuation on the external 24- V DC power supply is 22.8 to 25.2 V DC (24 V ±5%).
2. Two Servo Relay Units and two cables for the Position Control Unit are required for a 4-Axis Position Control Unit.
3. 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)	CJ1W-CLK21-V1	UC, CE, N, L
Controller Link Relay Terminal	Wired Set of 5 Terminals	CJ1W-TB101	---
Controller Link Support Board	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)	CS1W-RPT02	
	Optical Ring (GI cable)	CS1W-RPT03	
Serial Communications Units	1 RS-232C port and 1 RS-422/485 port	CJ1W-SCU41-V1	UC, CE, N, L
	2 RS-232C ports	CJ1W-SCU21-V1	
Ethernet Unit	100Base-Tx	CJ1W-ETN21	UC, CE, N, L
DeviceNet Unit	Functions as master and/or slave; allows control of 32,000 points max. per master	CJ1W-DRM21	
CAN Unit	Freely configurable reception and transmission of CAN messages	CJ1W-CORT21	UC1, CE
PROFIBUS-DP Master Unit	Controls up to 7000 words of remote I/O data over PROFIBUS-DP	CJ1W-PRM21	UC, CE
CX-PROFIBUS, PROFIBUS-DP Configurator	Software only (Windows 2000, XP)	CX-Profi-V1	---
Motion Control Unit	Real axes: 30, Virual Axes: 2, Communication by Mechatrolink-II	CJ1W-MCH71	CE
Position Control Unit	Mechatrolink-II connection to max. 16 axes	CJ1W-NCF71	UC1, CE

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P04E-EN-03A In the interest of product improvement, specifications are subject to change without notice.

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