

SYSMAC CJ Series

Position Control Units (High-Speed type)

CJ1W-NC214/NC414

Open-collector Outputs

CJ1W-NC234/NC434

Line-driver Outputs



Motion Control at higher Speeds and for Synchronous Systems

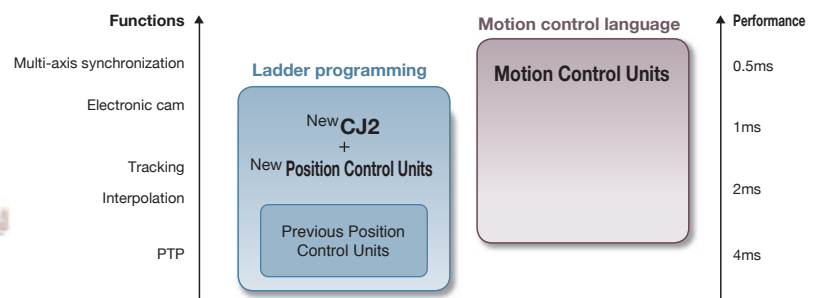
High-Speed Startup and Synchronous System Enable A Range of Applications from High-Speed Position Control to Synchronous Control.

NEW

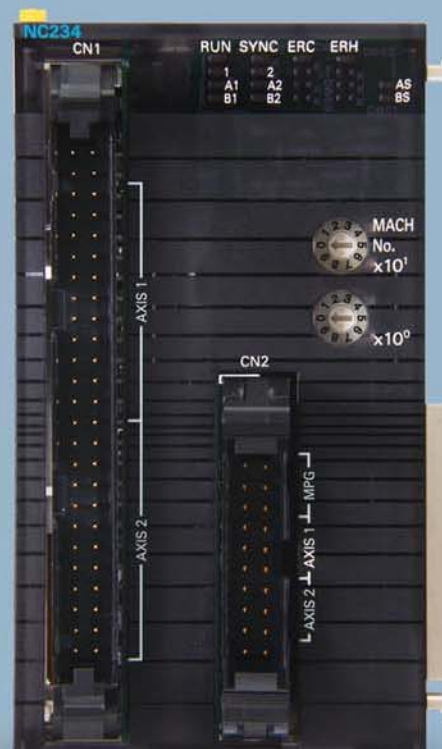
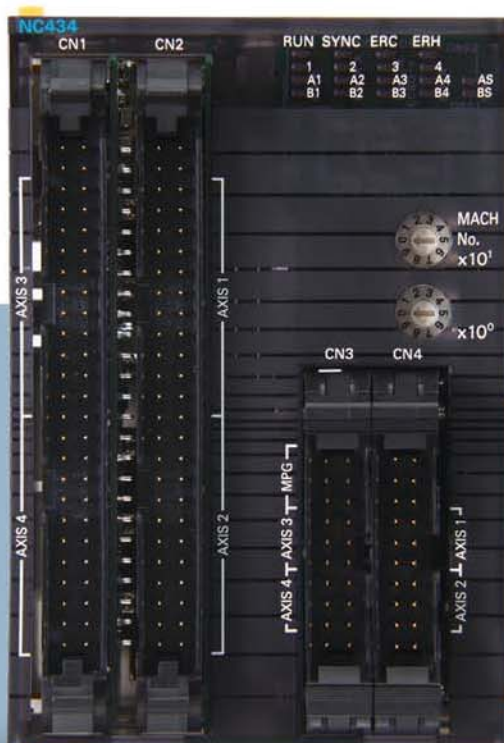
Support for Everything from Position Control to Synchronous Control

Controller Standardization for Motion Applications

Up to 20 axes



The CJ2 Position Control Units support advanced applications.



Applicable with SYSMAC CJ1 or CJ2

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Line-driver Outputs

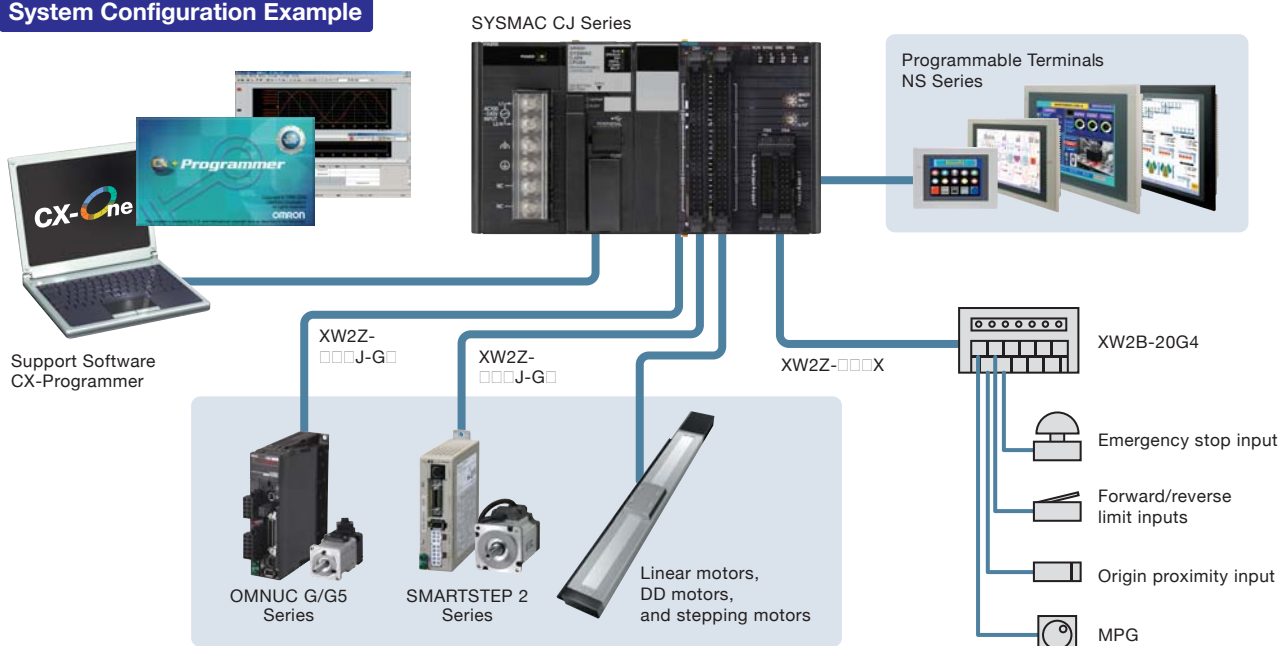
**High-P
Interfa
Com
A**

- Unit operati
- Direct ope
- Multi-poin
- 500points
- Interpolati
- Compatible

-SPEED, SYNCHRONIZE POSITION CONTROL

ms
speed

System Configuration Example



A New-generation Standard for High Speed and High Precision

- Faster startup.
- Higher speeds and higher precision with High-Speed pulse outputs.
- Built-in feedback counters.
- Compatible with absolute encoders.

New-generation Position Control Units Help to Improve Productivity

Performance I/O for Improved Compatibility with Applications

on synchronized with CPU Unit.
eration and memory operation.
t position control with
for each axis.
on and MPG functions.
with synchronous control systems.

Programming Environment and Hardware Configuration to Reduce TCO

- Integrated and enhanced NC Support Software.
- Integrated interface for standardization of programming.
- Support for function blocks expanded to all functions.
- Hardware configuration to reduce wiring work.

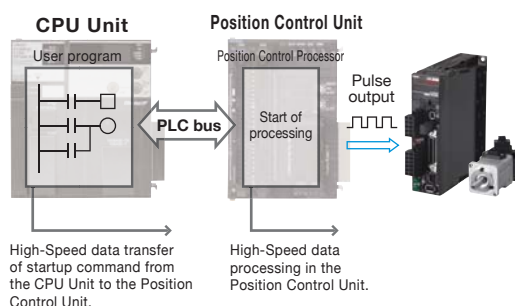
A New-generation
Standard for
High Speed
and High Precision

Improved Equipment Productivity with High-Speed Position Control

Faster Startups

Helps Reduce Equipment Tact Time

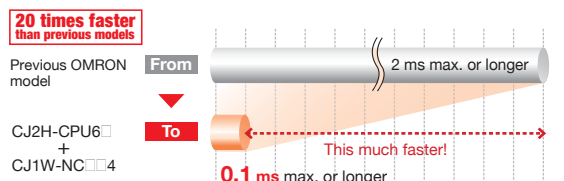
The Position Control Units have a High-Speed startup time of 0.1 ms max. (for 1-axis startup), which is approximately 20 times faster than previous models.



■ Startup Time (for 1-axis Startup)

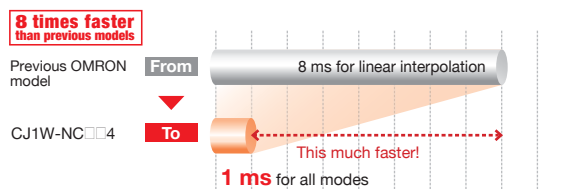
Pulse output starts 0.1 ms after the High-Speed startup command is executed.

Note: Using a CJ2H CPU Unit (unit version 1.1 or later).



■ Pulse Output Distribution Cycle

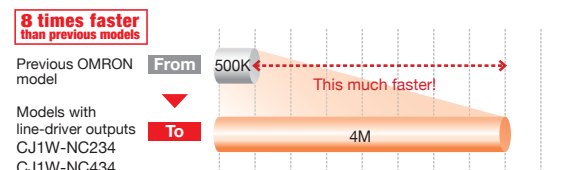
Smooth acceleration and deceleration and fast speed changes.



High-Speed, High-Precision Position Control

High-Speed pulse outputs, built-in feedback counters, and support for absolute encoders

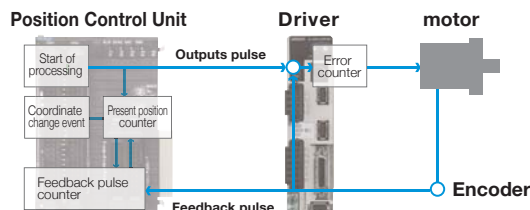
A pulse output of up to 4 Mpps for a line driver output enables performing High-Speed movements at High resolution with linear motors and DD motors equipped with a High-resolution scale encoders.



Built-in High-Speed Counters

Monitor the present motor positions and build absolute value systems

The High-Speed counters enable building position control systems using only a Position Control Unit. The High-Speed counters are compatible with pulse inputs with a maximum frequency of up to 4 MHz. Also, monitoring between axes enables multi-axis control for up to four axes to convey large workpieces.



Build Absolute Encoder Systems

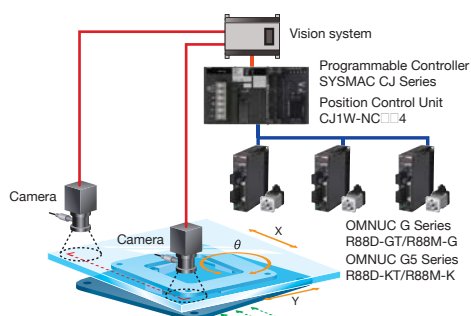
- Operating rates are improved because it is not necessary to search for the origin after the power is interrupted.
- OMNUC G/G5-series/W-series Absolute Servomotors are available.

Application Examples

High-Speed, High-Precision Position Control

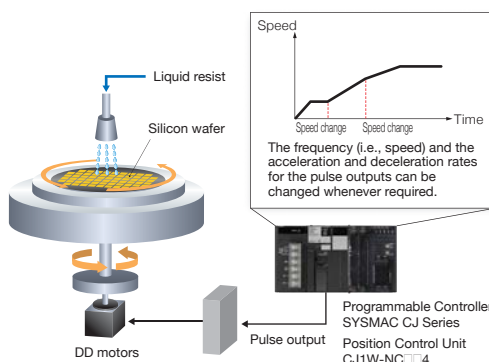
- High-Speed, High-Precision Position Control Using Camera Compensation
- The pulse output startup time of 0.1 ms enables High-Speed camera compensation.

Note: Using a CJ2 CPU Unit (unit version 1.1 or later).



High-Speed Response Control

- Versatile pulse outputs enable flexible speed control.
- A pulse distribution cycle of 1 ms enables High-frequency speed changes.



Flexibility in Building a Wide Variety of Position Control Applications Increases Added Value for Equipment.

High-Performance
I/O Interface for
Improved Compatibility
with Applications

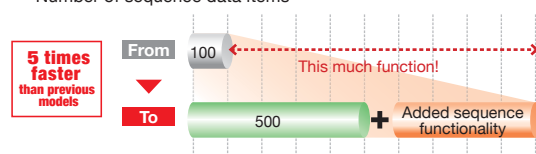
Direct operation and memory operation are supported.

Flexible Support for Ideal Position Control

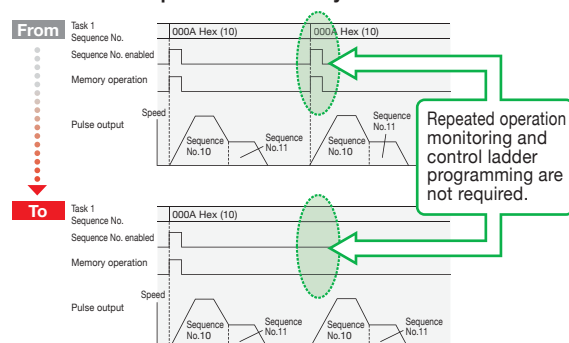
The CJ1W-NC□□4 supports both direct operation and memory operation. Direct operation performs position control by directly specifying position data, speed data, and acceleration/deceleration data in the PLC ladder programming. Memory operation performs position control by setting operation patterns in the Position Control Unit. The CJ1W-NC□□4 also supports complicated motion control, such as that using repeat commands and jump commands.

Enhanced Functionality for Memory Operation

Number of sequence data items



Enhanced Sequence Functionality



Pulse Rate Functionality

- Data setting is easy with functional units: pulse, mm, inch, and degree.

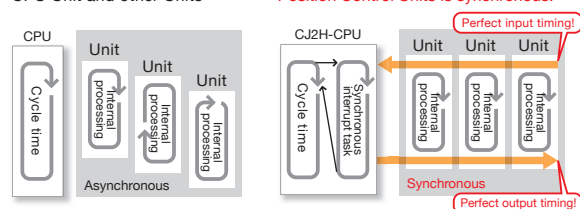
Synchronization of Position Control Unit Processing (See note.)

Note:
Using a CJ2H CPU Unit (unit version 1.1 or later).

Synchronize the CPU Unit and Position Control Units

A High-Speed bus between the CPU Unit and the Position Control Units enables synchronous systems. Synchronous unit operation can be performed for up to five Units (20 axes max.). Also, the electronic cams enable a wide variety of synchronous applications.

From Asynchronous operation between CPU Unit and other Units To Operation between the CJ2H CPU Unit and Position Control Units is synchronous.

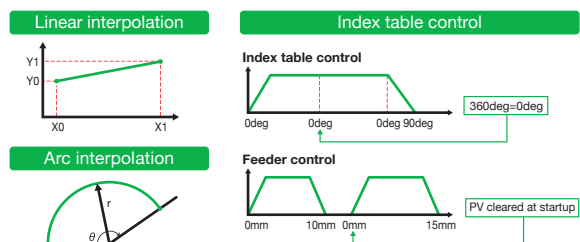


Synchronous unit operation can be performed with High precision in positions and speeds by limiting the fluctuation in the cycle time to 10 μ s max.

Equipped with Interpolation Control, MPG, and Infinite Axes

High-efficiency Control with a Wide Variety of Patterns

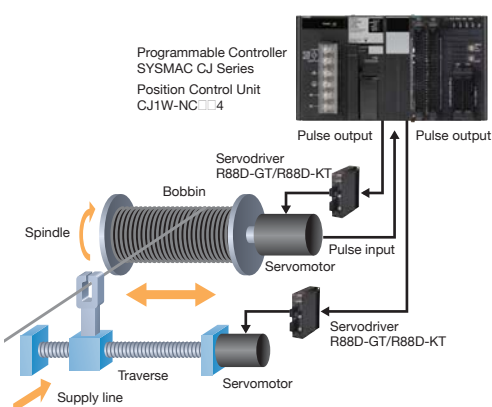
Functions performed with Motion Control Units can be performed with Position Control Units with the addition of arc interpolation, index table control, feeder control, and MPG (manual pulse generator), in addition to linear interpolation.



Application Examples

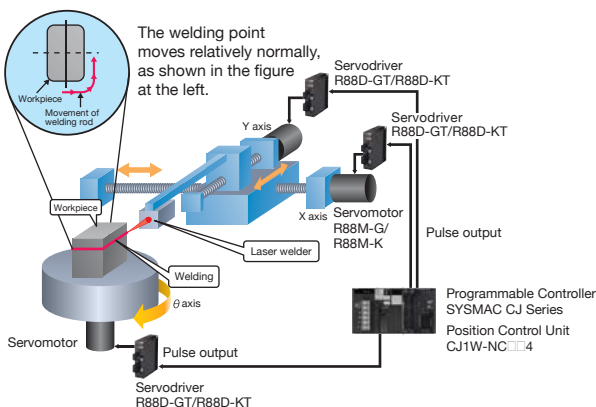
Electronic Cam Synchronous Control

Thread Winding at an Exact Pitch



Electronic Cam Synchronous Control

Electronic Cam Synchronous Control with Non-stop Processing



Programming
Environment and
Hardware Configuration
to Reduce TCO

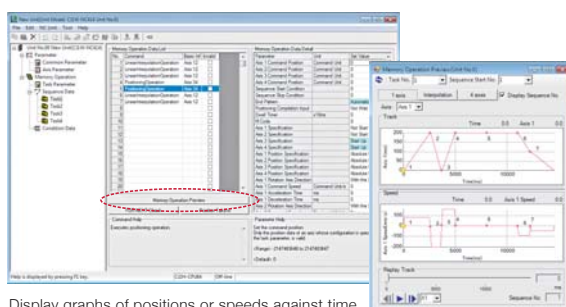
Greatly Reduced Work for Programming and Debugging, As Well As Wiring

Use Memory Operation Previews for Smoother Startup

Easier Preliminary Verification of Position Control Units

The memory operation data created on the CX-Programmer (see note.) can be examined before transferring. This enables smoother startup and reduces the work required for preliminary system examination.

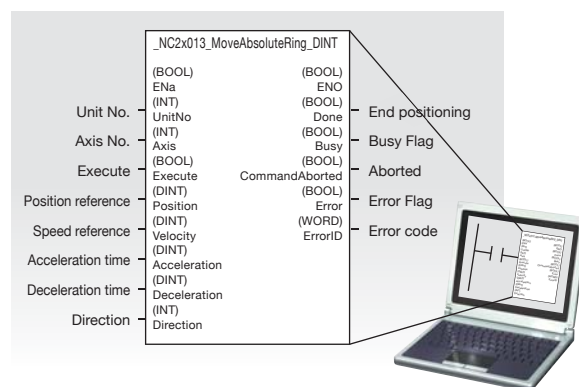
Note: Supported for CX-Programmer version 9.04 or higher.



Display graphs of positions or speeds against time. Easily compare results to data tables using sequence numbers displayed in the graph.

Function Blocks Add Required Functionality for Position and Speed Control And Enable Synchronous Applications

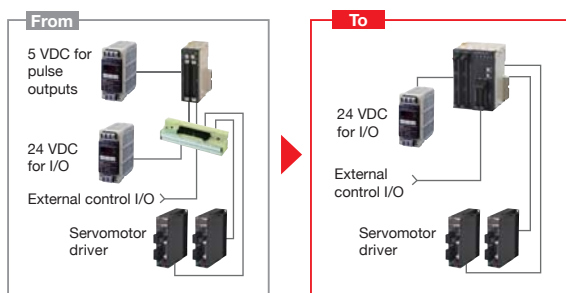
Reduce programming work simply by pasting programming elements from the library



External Power Supply is 24 VDC Only. Connector Placement for Easy Wiring

Reduced Wiring and Lower Costs for External Power Supply

The CJ1W-NC□34 with line-driver outputs generates 5 VDC internally, and so an external 5-VDC power supply is not required, reducing wiring work. Also, separating the connector section and driver section from connectors for other purposes makes wiring easier and prevents problems or redoing wiring due to incorrect connections.



Functional Function Block Library (FBL)

- | | |
|---------------------------------------|--|
| 1 Absolute movement command | 15 Manual pulse output |
| 2 Ring mode absolute movement command | 16 Status read |
| 3 Relative movement command | 17 Parameter read |
| 4 Speed control | 18 Axis error read |
| 5 Origin return | 19 Present position read |
| 6 High-Speed origin return | 20 External input capture |
| 7 Decelerate to stop | 21 Parameter write |
| 8 Run command | 22 Parameter save |
| 9 Error reset | 23 Teaching |
| 10 Error counter reset | 24 Present position preset |
| 11 Program operation | 25 Override setting |
| 12 Program stop | 26 Torque limit |
| 13 Interrupt feed | 27 Absolute value encoder Offset setting |
| 14 Jogging/inching | |

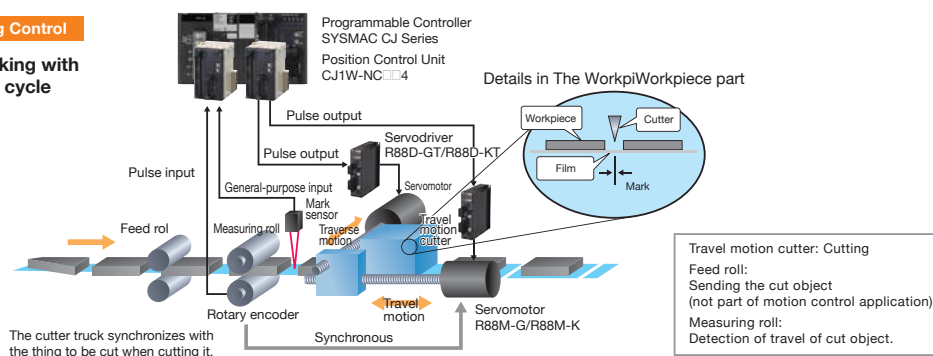
Application Function Block Library (FBL)

- | | |
|--------------------|----------------------------|
| 1 Electronic cam | 4 Trailing Synchronization |
| 2 Electronic shaft | 5 Link Operation |
| 3 Virtual Pulse | |

Application Examples

High-Precision Tracking Control

- High-Precision tracking with High-Speed control cycle



Performance Specifications

Item		Position Control Unit (High-Speed type)	
		Model	
		CJ1W-NC214/234	CJ1W-NC414/434
Applicable PLC models		SYSMAC CJ1/CJ2	
Number of occupied inputs/outputs	Number of words	18CH*1	
Controlled drivers (or Control target actuator)		Servo Drive of pulse train input type, linear motor, DD motor, or stepping motor driver NC214/414 : Open collector output type NC234/434 : Line driver output type	
Pulse output method		Phase difference pulse output, forward/reverse direction pulse output, pulse + direction output	
Controls	Control method	Open-loop control by pulse train output	
	Absolute encoder	OMNUC W Series and G Series Servomotors with absolute encoder	
	Number of controlled axes	2 axes	4 axes
Units of control		Pulse, mm, inch, degree	
		Memory operation, direct operation	
Positioning functions	Independent operation	Independent, 2 axes	Independent, 4 axes
	Linear interpolation	2 axes maximum	4 axes maximum
	Arc interpolation	2 axes maximum	2 axes maximum
	Speed control	Independent, 2 axes	Independent, 4 axes
	Interrupt Constant-pitch Feed	Independent, 2 axes	Independent, 4 axes
	Synchronous operation between units	5 units maximum [20 axes maximum] (when CJ2-CPU Ver1.1 or later is used)	
Position command	Data	-2147483648 to 2147483647 command unit	
	Number of data	500 per task (4 tasks per unit)	
Speed command	Data	Position control : 1 to 2147483647 command unit/s Speed control : -2147483648 to 2147483647 command unit/s However, this limits the maximum output frequency based on whether the maximum speed is 4 Mpps (NC234/434) or 500 kpps (NC214/414)	
	Number of data	500 per task (4 tasks per unit)	
Memory operation sequence function		JUMP, FOR, NEXT (50 nests per task), PSET, and PRSET	
Acceleration/ deceleration time	Data	0 to 250000 ms	
	Number of data	500 per task	
Functions	Origin Search	Origin proximity input signal : selectable (absent, N.O. or N.C. contact) Origin input signal : selectable (N.O. or N.C. contact) Origin compensation : -2147483648 to 2147483647 command unit Origin search speed : Origin search speed or origin search approach speed can be set Origin search method : Origin fix performed by the combination of the origin proximity input, limit input and origin input. Origin fix performed by holding May be set to stop upon origin input signal after proximity input signal has turned ON, to stop upon origin input signal after proximity input signal has turned OFF, to stop upon origin input signal without using proximity input signal, or to stop upon origin input signal after limit input signal has turned OFF N.O. = Normally open N.C. = Normally closed	
		Jogging	Jogging can be executed at a specified speed
		Inching operation	Operation can be performed for the commanded travel amount by one operation
		Dwell times	500 per task can be set from 0 to 10.00 s (unit : 0.01 s)
		Acceleration/deceleration curves	Trapezoidal or S-curve (Can be set separately for each axis)
		Zones	Zone Flag turns ON when the present position is within a specified zone. Three zones can be set for each axis
		Software limits	-2147483647 to 2147483646 command unit (The travel motion range can be set with this value)
		Backlash Compensation	0 to 50000 command unit (The compensation speed can also be set)
		Teaching	With a command from the PLC, the present position can be taken in the specified position data (command/feedback)
		Deceleration stop	Deceleration stop is made according to the deceleration time by the deceleration stop command
		Emergency stop	Pulse outputs are stopped by the emergency stop input
		Present position preset	The PRESENT POSITION PRESET command can be used to change the present position to a specified value
		Override	When the override enabling command is executed during positioning, the target speed is changed by applying the override coefficient. Possible to set to a value from 0.01 to 500.00% (by an increment of 0.01%)
	Data saving	1) Saving to flash memory (Can be written 100,000 times.) 2) Reading from PLC area by data reading instruction 3) Reading by CX-Programmer and saving to personal computer hard disk or floppy disk.	
External I/O	Inputs	Prepare the following inputs for each axis : Forward/reverse direction limit input, origin proximity input, origin input, emergency stop input, positioning completed input, interrupt input, alarm input, general purpose input	
	Outputs	Prepare the following outputs for each axis: Pulse outputs Forward / reverse direction pulse, pulse outputs and direction outputs, and 90°phase difference output can be switched RUN output, error counter reset output, alarm reset output, torque limit output, general purpose output	
Pulse input		• One MPG input (phase difference input : 500kHz, quadruple : 2MHz) The following inputs are prepared for each axis • Encoder input phase A/B/Z NC214/414 Phase difference input : 125kHz (quadruple : 500kHz) NC234/434 Phase difference input : 1MHz (quadruple : 4MHz)	
Pulse output distribution period		Ordinary operation : 1ms Synchronous operation : In accordance with the CPU synchronous operation cycle	
Response time		High-Speed PTP startup : 0.1ms (1 axis) (when CJ2-CPU Ver1.1 or later is used) Ordinary startup : 2ms maximum (4 axes)	
Self-diagnostic function		Flash memory check, memory loss check, CPU bus check	
Error detection function		Overtravel, CPU error, software limit over, emergency stop	

*1. This indicates the number of occupied words of special I/O Unit area. In addition, this occupies areas that correspond to up to 144 words according to the number of axes and functions which you use.

Mountable Racks

Model	CJ1/CJ2 Systems		CP1H System	NSJ System	
	CPU Rack	Expansion Rack	CP1H PLC	NSJ Controller	Expansion Rack
CJ1W-NC214/234/414/434	5 Units	5 Units (per 1 Expansion Rack)	Not Supported	Not Supported	5 Units

Note : For this unit, 1 unit must be counted as 2 component unit.

Ordering Information

● CJ-series Units

Unit classification	Name	Specifications		No. of unit numbers allocated	Model	Standards
		Control output interface	No. of axes			
CJ1 Special I/O Units	Position Control Units High-speed type	Pulse-train open-collector output with Pulse Counter Function	2 axes	2	CJ1W-NC214	CE, UL
			4 axes		CJ1W-NC414	
		Pulse-train line-driver output with Pulse Counter Function	2 axes		CJ1W-NC234	
			4 axes		CJ1W-NC434	

Note: The connector is not bundled. Please arrange separately when a special cable is not bought.

● Software

Name	Specifications	Model Standards	Model
CX-One FA Integrated Tool Package Ver. 4.□	The CX-One is a package that integrates the Support Software for OMRON PLCs and components CX-One runs on the following OS: Windows 2000/Service Pack 4 or higher, XP, Vista or 7 Note: Except for 64-bit version. CX-One Ver. 4.□ includes CX-Programmer Ver. 9.□ For details, refer to the CX-One catalog (Cat. No. R134)	1 license * CD	CXONE -AL01C-V4
		1 license * DVD	CXONE -AL01D-V4

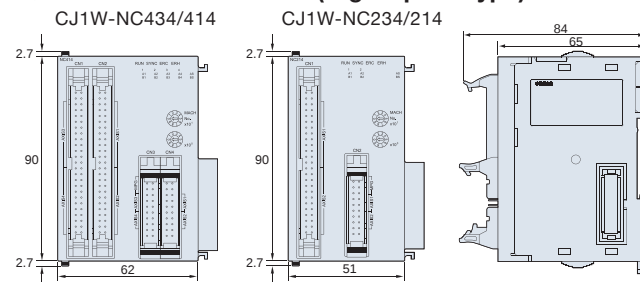
* Site licenses are available for the CX-One (3, 10, 30, or 50 licenses).
For details, refer to the CX-One catalog (Cat. No. R134)

International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Ask your OMRON representative for the conditions under which the standards were met.

Dimensions

● Position Control Units (High-Speed type)



Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

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OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

● Connecting Cables

Name	Applicable units	Applicable drivers	Number of control axes	Cable length	Model
NC214/414: Open collector output type	R88D-GT	R7D-BP	1 axes	1m	XW2Z-100J-G13
			2 axes		XW2Z-100J-G5
	R88D-GT	R7D-BP	1 axes		XW2Z-100J-G16
			2 axes		XW2Z-100J-G8
NC234/434: Line driver output type	R88D-GT	R7D-BP	1 axes		XW2Z-100J-G9
			2 axes		XW2Z-100J-G1
	R88D-GT	R7D-BP	1 axes		XW2Z-100J-G12
			2 axes		XW2Z-100J-G4

Note : Separate cables are also available with the following lengths:
3 m (for open-collector outputs), 5 m, 10 m (for line-driver outputs).

● Devices for External Signal Connection

Name	Specifications	Model
Connecting Cables for Connector Terminal Block	Cable length :2m	XW2Z-200X
Connector Terminal Block	20 Poles	XW2B-20G4
Connector Socket for Servo Drive	applicable wire: AWG 24	XG5M-5032-N
Connector Cover for Servo Drive		XG5S-5022
Cables with Crimp Terminals	20 Poles/2m	XW2Z-100F

Note : Connecting cables for connector terminal block of 0.5m, 1m, 2m, 3m, 5m and 10m are available.
Use the XG5M/XG5S when making cables on your own.
Do not use the connecting cables when the XG5M/XG5S are used.
The XW2B-20G5 and XW2D-20G6 can also be used as the connector terminal block.
Cables with crimp terminals of 1m, 1.5m, 2m, 3m, 5m, 10m, 15m and 20m are available.

■ Related product catalog

AC Servomotors/Servo Drives OMNUC G Cat. No. I814	AC Servomotors/Servo Drives OMNUC G5 Cat. No. I815	AC Servomotors/Servo Drives SMARTSTEP 2 Cat. No. I813	Programmable Controllers SYSMAC C2Z Cat. No. P059
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- The application examples provided in this catalog are for reference only. Check functions and safety of the equipment before use.
- Never use the products for any application requiring special safety requirements, such as nuclear energy control systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, or other application involving serious risk to life or property, without ensuring that the system as a whole has been designed to address the risks, and that the OMRON products are properly rated and installed for the intended use within the overall equipment or system.

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

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