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### **CJ-series Position Control Units (High-Speed type)**

# CJ1W-NC□□4

CSM CJ1W-NC 4 DS F 8 3

### Motion Control Capabilities with Unit Synchronization and Even Higher Speed

 Models are available with 2 or 4 axes and open-collector or line-driver outputs.

The CJ1W-NC214/NC414 have open-collector outputs and the CJ1W-NC234/NC434 have line-driver outputs.

Control 2 or 4 Axes

High-speed, high-resolution position control is possible for servomotors and pulse motors, and even linear motors and direct drive motors.







CJ1W-NC434

#### **Features**

#### Improve Productivity with High-speed Control

- A faster pulse output startup time has been achieved. Pulse output will start as fast as 0.1 ms from when the CPU Unit sends the command. (Previous models started pulse output in 2 ms. Refer to the *Operation Manual* for conditions and other details.)
- Pulse output is possible at up to 4 Mpps for compatibility with linear motors and direct drive motors. This achieves both high resolution and high speed.

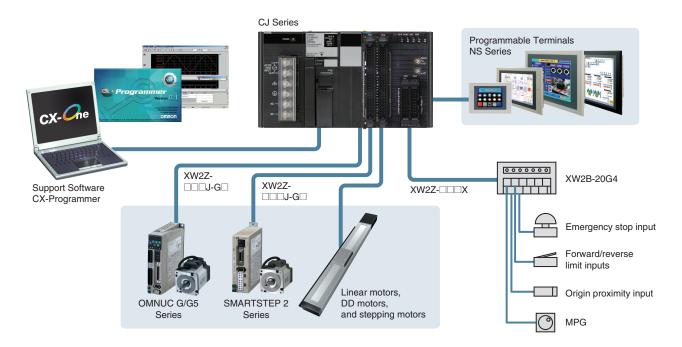
#### **Increased Added Value with More Advanced Features**

- Operation between the CPU Unit and the Position Control Unit can be synchronized using a high-speed bus. Synchronized control is possible between up to five Units, or 20 axes. A wide range of applications can be achieved by also using the electronic cam function.
- Built-in high-speed counters enable monitoring the present values of the motors while controlling positions, all with just a Position Control Unit.
   The absolute encoders of G-series and G5-series Servomotors are supported, enabling an absolute positioning system.\* This eliminates the need to redefine the origin after power interruptions, helping to provide extra added value.
- Select from direct operation or memory operation. Up to 500 positioning sequences can be saved as the data for memory operation for each axis. Any of three end patterns, independent, automatic, or consecutive, can be set for each sequence, and repeat instructions and jump instructions can be used to achieve complex motion control.
- Linear interpolation, circular interpolation, index table control, feeder control, and an MPG function can be used to achieve the functionality of a Motion Control Unit with these Position Control Units.
- A wide range of functions enables easily achieving position control, including teaching, overrides, backlash compensation, zone settings, and S-curve acceleration/deceleration.

#### **Reduce TCO**

- All Support Software functions have been integrated into the CX-Programmer. In combination with data tracing and other CX-Programmer functions, work efficiency is improved from design and debugging to system implementation and maintenance.
- The Position Control Units with line-driver outputs generate the 5-VDC power for the line driver internally. Control is possible by providing only a 24-VDC power supply, in the same way as for Units with open-collector outputs.
- A function block library is being prepared that provides function blocks for all Position Control Unit functions. This will reduce ladder programming work. Even sync applications that use an electronic cam will be easy to construct with the function block library.
- \* You cannot use an absolute encoder if you use a reduction gear.

### **System Configuration**



### **Ordering Information**

#### 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.
- Contact your OMRON representative for further details and applicable conditions for these standards.

#### **Position Control Units**

Unit type Name		Specifications			Current consumption (A)		Model	Standards
		Control method/Control output interface	Number of control axes	numbers allocated	5 V system	24 V system	wodel	Standards
		Pulse-train open-collector output with	2 axes	2	0.27	-	CJ1W-NC214	
CJ1 Special	CJ1 Position Control Special Units (High- Speed type)	Pulse Counter Function	4 axes	2	0.31	-	CJ1W-NC414	UC1. CE
•		Pulse-train line-driver output with	2 axes	2	0.27	-	CJ1W-NC234	001, 02
		Pulse Counter Function	4 axes	_	0.31	-	CJ1W-NC434	

Note: This unit cannot be used with the Machine Automation Controller NJ-series.

#### **Support Software**

	Specifications				
Product name		Number of licenses	Media	Model	Standards
FA Integrated Tool Package CX-One Ver.4.⊡	The CX-One is a comprehensive software package that integrates Support Software for OMRON PLCs and components. CX-One runs on the following OS.  OS: Windows XP (Service Pack 3 or higher, 32-bit version) / Windows Vista (32-bit/64-bit version) / Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1 (32-bit/64-bit version) / Windows 10 (32-bit/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 *	DVD	CXONE-AL01D-V4	-

<sup>\*</sup> Multi licenses (3, 10, 30, or 50 licenses) and DVD media without licenses are also available for the CX-One.

### **Connecting Cables**

Applio	able Units	Applicable 9	Applicable Servo Drive		Cable	
Output Type	Model	Name	Model	control axes	Length	Model
		OMNUIC C/CE Corios	DOOD CT/ KT		1m	XW2Z-100J-G13
		OMNUC G/G5 Series	R88D-GT/-KT	dt-	3m	XW2Z-300J-G13
		SMARTSTEP2	R7D-BP	1 axis	1m	XW2Z-100J-G16
Open-collector	CJ1W-NC□14	SWANTSTEF2	N/D-BF		3m	XW2Z-300J-G16
utput	CJ I W-NCL 14	OMNUC G/G5 Series	R88D-GT/-KT		1m	XW2Z-100J-G5
		Ownoc G/G5 Series	NooD-G1/-K1	2 0400	3m	XW2Z-300J-G5
		SMARTSTEP2	R7D-BP	2 axes	1m	XW2Z-100J-G8
		SWANTSTEF2	R/D-BP		3m	XW2Z-300J-G8
			R88D-GT/-KT	1 axis	1m	XW2Z-100J-G9
		OMNUC G/G5 Series			5m	XW2Z-500J-G9
					10m	XW2Z-10MJ-G9
			R7D-BP	1 axis	1m	XW2Z-100J-G12
		SMARTSTEP2			5m	XW2Z-500J-G12
ima duissau asstusst	CJ1W-NC□34				10m	XW2Z-10MJ-G12
ine-driver output	CJ I W-NCL34				1m	XW2Z-100J-G1
		OMNUC G/G5 Series	R88D-GT/-KT		5m	XW2Z-500J-G1
				2 2422	10m	XW2Z-10MJ-G1
				2 axes	1m	XW2Z-100J-G4
		SMARTSTEP2	R7D-BP		5m	XW2Z-500J-G4
					10m	XW2Z-10MJ-G4

### **Devices for External Signal Connection**

#### **Devices for External Signal Connection**

Name	Specifications	Model
	Cable length: 0.5m	XW2Z-C50X
	Cable length: 1.0m	XW2Z-100X
Connecting Cables for	Cable length: 2.0m	XW2Z-200X
Connector Terminal Block	Cable length: 3.0m	XW2Z-300X
	Cable length: 5.0m	XW2Z-500X
	Cable length: 10.0m	XW2Z-010X
	20-points, M2.4 screw terminal	XW2B-20G4
<b>Connector Terminal Block</b>	20-points, M3.5 screw terminal	XW2B-20G5
	20-points, M3 screw terminal	XW2D-20G6

#### **Servo Drive Connector**

Name	Specifications	Model
Connector Socket	For a 50-pin MIL plug-crimp socket connector For AWG24	XG5M-5032-N
Connector Cover	For a 50-pin MIL plug-crimp socket connector	XG5S-5022

#### **Cables with Crimp Terminals (20 Poles)**

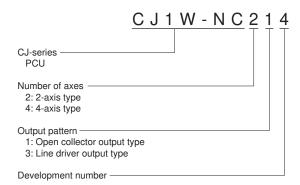
Cable Length	Model
1.0m	XW2Z-100F
1.5m	XW2Z-150F
2.0m	XW2Z-200F
3.0m	XW2Z-300F
5.0m	XW2Z-500F
10.0m	XW2Z-010F
15.0m	XW2Z-15MF
20.0m	XW2Z-20MF

#### **Accessories**

MIL Connectors are not included. Use one of the applicable connector or a dedicated cable with connectors listed above.

### **Model of PCUs**

You can identify the number of axes and output pattern from the model number.



### **Mountable Racks**

	NJ sy	stem	CJ system	(CJ1, CJ2)	CP1H system	NSJ s	ystem
Model	CPU Rack	Expansion Rack	CPU Rack	Expansion Backplane	CP1H PLC	NSJ Controller	Expansion Backplane
CJ1W-NC214/234/414/434	Not su	pported	5 Units	5 Units (per Expansion Backplane)	Not Supported	Not Supported	5 Units

Note: With this PCU counts 1 PCU as 2 Component Units.

Accordingly, design an appropriate configuration that meets the formula below: Number of this PCUs installed  $\times$  2 + Number of other PCUs installed  $\leq$  10 For example, if you install 5 PCUs in 1 rack, you cannot install other PCUs.

### **Unit Versions and Programming Devices**

The following tables show the relationship between unit versions and CX-Programmer versions.

		Required Programming Device					
CPU Unit	Functions	CX-Programmer			Programming		
		Ver. 7.1 or lower	Ver. 8.0	Ver. 8.02 or higher	Console *		
CJ1W-NC□□4 Unit Ver.1.0	Functions for unit version 1.0	Not supported	Not supported	Supported	Not supported		

<sup>\*</sup> Programming Console cannot be used for CJ1W-NC = 4

### **Function List of Function Block Library (FBL)**

### Functional Function Block Library (FBL)

1 Move Absolute 14 Manual Pulses Output 2 Unlimited Move Absolute 15 Read Status 3 Move Relative 16 Read Parameter 4 Speed Control 17 Read Error 5 Origin Search 18 Read Present Position 6 Origin Return 19 Present Position Latch 7 Deceleration Stop 20 Write Parameter 8 Operation Command 21 Save Parameter	
3         Move Relative         16         Read Parameter           4         Speed Control         17         Read Error           5         Origin Search         18         Read Present Position           6         Origin Return         19         Present Position Latch           7         Deceleration Stop         20         Write Parameter           8         Operation Command         21         Save Parameter	
4 Speed Control 17 Read Error 5 Origin Search 18 Read Present Position 6 Origin Return 19 Present Position Latch 7 Deceleration Stop 20 Write Parameter 8 Operation Command 21 Save Parameter	
5 Origin Search 18 Read Present Position 6 Origin Return 19 Present Position Latch 7 Deceleration Stop 20 Write Parameter 8 Operation Command 21 Save Parameter	
6 Origin Return 19 Present Position Latch 7 Deceleration Stop 20 Write Parameter 8 Operation Command 21 Save Parameter	
7 Deceleration Stop 20 Write Parameter 8 Operation Command 21 Save Parameter	
8 Operation Command 21 Save Parameter	
9 Error Reset 22 Teaching	
10 Deviation Counter Reset 23 Present Position Preset	
11 Run Program 24 Override Setting	
12 Interrupt Feeding 25 Torque Limits	
13 Jogging / Inching 26 Absolute Encoder's Origin Position Of	set Setting

#### **Application Function Block Library (FBL)**

1	Electronic Cam	4	Trailing Synchronization
2	Electronic Shaft	5	Link Operation
3	Virtual Pulse		

### **Specifications**

### **General Specifications**

Specification item	Model				
Specification item	CJ1W-NC214/234	CJ1W-NC414/434			
Dower cumply voltage	5 VDC (unit)				
Power supply voltage	24 VDC (external power supply)				
Allowable power supply voltage range	21.6 to 26.4 VDC (external power supply)				
Internal current consumption	5 VDC, 270 mA maximum	5 VDC, 310 mA maximum			
Current consumption of external power supply	24 VDC NC214 13 mA maximum NC234 44 mA maximum	24 VDC NC414 26 mA maximum NC434 90 mA maximum			
Dimensions	90 × 51 × 65 (H × W × D)	$90\times62\times65~(H\times W\times D)$			
Weight	170 g maximum	220 g maximum			
Ambient operating temperature	0 to 55°C				
Mounting position	CJ-series CPU Rack or CJ-series Expansion Rack				
Maximum number of units per rack	5 units				
Maximum number of units per CJ system	20 units (when up to 3 expansion racks are connected)				
Occupied unit	No. 2				
Applicable standards	cULus, EC directives				

Models other than above conform to the general specifications of the CJ series.

### **Performance Specifications**

Specification item		Model				
Specific	ation item	CJ1W-NC214/234	CJ1W-NC414/434			
Applicable PLCs		CJ-series				
Number of occupied inputs/ outputs	Number of words	18CH *				
Controlled drivers		Servo Drive of pulse train input type or stepping motor drivers 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				
Controls	Number of controlled axes	2 axes	4 axes			
Units of control		Pulse, mm, inch, degree				
Positioning functions		Memory operation, direct operation				
	Independent operation	Independent, 2 axes	Independent, 4 axes			
	Linear interpolation	2 axes maximum	4 axes maximum			
	Circular 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			
Desition commend	Data	-2147483648 to +2147483647				
Position command	Number of data	500 per task (4 tasks per unit)				
Speed command	Data	Position control: 1 to 2147483647 Speed control: –2147483648 to 2147483647 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				
Acceleration/deceleration	Data	0 to 250000 ms				
time	Number of data	500 per task				
	Override	0.01% to 500.00% (settable for each axis)				
Function	Software limits	-2147483647 to 2147483646 command unit (Settable for each axis)				
	Backlash Compensation	0 to 50000 command unit (settable for each axis	s)			
	Number of input words	1 word (switchable for each controlled axis)				
MPG and external encoder	Input interface	Photocoupler input				
counter input	Maximum response frequency	500 kHz				
	Number of input words	4 words (1 word per axis)				
Feedback pulse counter	Input interface	Line receiver input				
input	Maximum response frequency	NC234/434: 4 MHz (phase difference multiplica NC214/414: 500 kHz (phase difference multiplica				

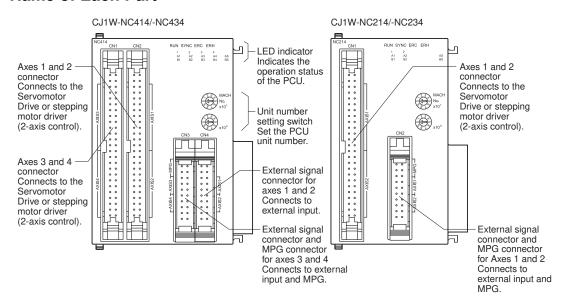
<sup>\*</sup> This indicates the number of occupied words of special I/O Unit area. In addition, this occupies areas that correspond to up to 144 words according to the number of axes and functions which you use.

## **Functional Specifications**

	Function item		Description		
Control function	Absolute				
		movement	Specify the absolute/relative target position and target speed directly in the ladder program to perform positioning.		
		Relative movement	positioning.		
		Speed control	Specify the target speed directly in the ladder program to perform speed feed.		
	Single axis control	Interrupt Feeding	Externally issue an interrupt input during absolute movement, relative movement or speed control to feed the machine by a constant amount to perform positioning.		
		Rotational axis	Rotational axes suitable for feeder and index table control are supported. In addition to forward/reverse direction positioning, you can also specify short-cut operation.		
		Target position and target speed change	Change the target position or target speed during absolute movement, relative movement or speed control		
	Multi-axis control	Linear interpolation	This control starts/ends the operations of multiple axes simultaneously and connects the start position target position of each axis by a straight line. Linear interpolation of up to 4 axes is possible.		
		Circular interpolation	You can combine 2 desired axes and control each axis in a manner which the axes draw a circular path. Three methods are available to specify a circular arc: "Specification of target position and center point", "specification of target position, radius and direction" and "target position and passing points".		
	Memory operation	Automatic operation and continuous operation	Set the target positions, target speeds and operation patterns in the PCU beforehand to perform a series of operations automatically. Continuous positioning and speed changes are also possible.		
		Sequence function	Memory operation data incorporates a sequence feature that allows for repetition of a given operation start/end of operation data via external inputs, and so on.  Accordingly, the PCU can perform various operation sequences without affecting the ladder program of PLC.		
	Origin Search		This function uses an external sensor, etc. to detect the mechanical origin of the system.  You can select a desired origin search operation for your system from 15 different origin search operation patterns.		
	Origin Return		This function performs the return operation to the established mechanical origin.		
Manual peration	Present Positio	n Present	It changes the present position to the specified data and establishes the origin.		
unction	Deceleration st	ор	The operating axis decelerates to a stop.		
	JOG Operation		This function feeds the axis in the forward/reverse direction at a constant speed.		
	Inching operati	on	The axis inches in the forward/reverse direction.		
	MPG operation		Connect a manual pulsar and perform manual feed.		
	Command unit		You can set a desired unit of control for each axis according to the machine.		
	Acceleration/ deceleration control	Auto acceleration/ deceleration control	This function automatically generates an acceleration/deceleration curve for axis operation. You can the trapezoidal curve or the S-curve based on a tertiary function.		
		Acceleration/ deceleration time change	You can change the acceleration/deceleration time during acceleration/deceleration.		
		Acceleration/ deceleration point switch	You can select one of three methods to connect speeds in different operation patterns during continuous pattern memory operation.		
	Override		This function changes the speed of the axis which is currently in positioning operation.		
	Backlash Compensation		This compensates for the mechanical plays to increase the positioning accuracy.		
	M code		You can output M codes to implement interlocking with external machines during memory operation.		
	Zone setting		You can set a desired zone and assess whether the present position is inside the zone. Up to 3 zones ar settable for each axis.		
	Zone setting				
	Feedback pulse	e counter			
			settable for each axis.  A feedback pulse counter input is available for each axis. You can connect encoder pulse outputs from a Servo Drive to monitor deviation from the command position, etc.		
	Feedback pulse		settable for each axis.  A feedback pulse counter input is available for each axis. You can connect encoder pulse outputs from a Servo Drive to monitor deviation from the command position, etc.  You can input encoder pulses from a Servo Drive to a feedback pulse counter to use a motor with absolute encoder. This function supports OMRON G-series and G5-series Servomotors with absolute encoder.  This function enables loading of the present position into memory operation position data.		
	Feedback pulse Absolute encod	der	settable for each axis.  A feedback pulse counter input is available for each axis. You can connect encoder pulse outputs from a Servo Drive to monitor deviation from the command position, etc.  You can input encoder pulses from a Servo Drive to a feedback pulse counter to use a motor with absolute encoder. This function supports OMRON G-series and G5-series Servomotors with absolute encoder.  This function enables loading of the present position into memory operation position data.  It supports not only the present command position, but also the present position from the feedback pulse		
Auxiliary control function	Feedback pulse Absolute encod Teaching	der	settable for each axis.  A feedback pulse counter input is available for each axis. You can connect encoder pulse outputs from a Servo Drive to monitor deviation from the command position, etc.  You can input encoder pulses from a Servo Drive to a feedback pulse counter to use a motor with absolute encoder. This function supports OMRON G-series and G5-series Servomotors with absolute encoder.  This function enables loading of the present position into memory operation position data. It supports not only the present command position, but also the present position from the feedback pulse counter.  An output signal is available for operating the torque limit switch input of a Servo Drive. You can turn this output signal ON/OFF directly in the ladder program. Also, Origin Search by holding		
	Feedback pulse Absolute encod Teaching	der	settable for each axis.  A feedback pulse counter input is available for each axis. You can connect encoder pulse outputs from a Servo Drive to monitor deviation from the command position, etc.  You can input encoder pulses from a Servo Drive to a feedback pulse counter to use a motor with absolute encoder. This function supports OMRON G-series and G5-series Servomotors with absolute encoder.  This function enables loading of the present position into memory operation position data. It supports not only the present command position, but also the present position from the feedback pulse counter.  An output signal is available for operating the torque limit switch input of a Servo Drive. You can turn this output signal ON/OFF directly in the ladder program. Also, Origin Search by holding supports automatic switching of torque limits.  You can set forward/reverse direction software limits of axis operation. If the positioning target exceeds		

### **External Interface**

#### Name of Each Part



#### **LED Display**

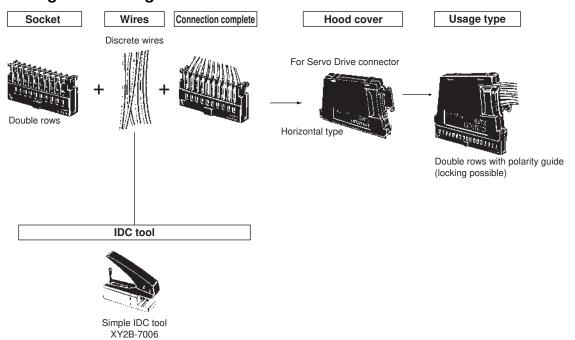
LED name	Display color	Status	Explanation		
RUN	Green	Lit	Normal operation		
	Green	Unlit	The power supply is OFF, a hardware error has occurred, or the PLC detects a PCU error.		
ERC	Pod	Lit	An error is occurring.		
	Red	Unlit	Other than the above		
ERH	Red	Lit	An error is occurring in the PLC.		
	neu	Unlit	Other than the above		
1		Lit	Pulse output to Axis 1 in progress (forward/reverse direction)		
	Orange	Flashing	An error related to a connection cable, data, etc. of axis 1 has occurred.		
		Unlit	Other than the above		
		Lit	Pulse output to Axis 2 in progress (forward/reverse direction)		
2	Orange	Flashing	An error related to a connection cable, data, etc. of axis 2 has occurred.		
		Unlit	Other than the above		
		Lit	Pulse output to Axis 3 in progress (forward/reverse direction)		
3	Orange	Flashing	An error related to a connection cable, data, etc. of axis 3 has occrred.		
		Unlit	Other than the above		
		Lit	Pulse output to Axis 4 in progress (forward/reverse direction)		
4	Orange	Flashing	An error related to a connection cable, data, etc. of axis 4 has occrred.		
		Unlit	Other than the above		
A1, B1	Orange	Lit	ON Phase A/B-input status of the Axis 1 feedback counter		
AI, DI		Unlit	OFF ON when lit, OFF when unlit		
A2, B2	Orango	Lit	ON Phase A/B-input status of the Axis 2 feedback counter		
A2, D2	Orange	Unlit	OFF ON when lit, OFF when unlit		
A3, B3	Orange	Lit	ON Phase A/B-input status of the Axis 3 feedback counter		
AJ, BJ		Unlit	OFF ON when lit, OFF when unlit		
A4, B4	Orange	Lit	ON Phase A/B-input status of the Axis 4 feedback counter		
		Unlit	OFF ON when lit, OFF when unlit		
AS, BS	Orange	Lit	ON Phase A/B-input status of the MPG input		
A0, D0		Unlit	OFF ON when lit, OFF when unlit		
SYNC	Green	Lit	In the SYNCHRONOUS OPERATION mode		
STING	Green	Unlit	Other than the above		

### Wiring of Servo Drive Connector

Con	nector type	Model
Flat-cable connector		XG4M-5030-T *1
	Socket	XG5M-5032-N *2
IDC connector for discrete wires		XG5M-5035-N *3
	Hood cover	XG5S-5022 (horizontal)

- \*1. This connector comes with a strain relief. To connect to the PCU, use a connector with strain relief.
- \*2. The applicable wire is AWG24 (UL-1061).
  \*3. The applicable wire is AWG28 to 26 (UL-1007).

### **Configuration Diagram for IDC Connector for Discrete Wires**

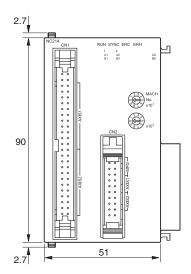


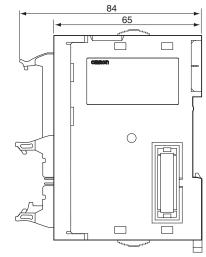
Dimensions (Unit: mm)

### **Position Control Unit (High-Speed type)**

CJ1W-NC214/-NC234 (2-axis control)

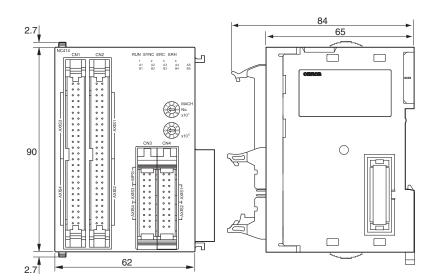






CJ1W-NC414/-NC434 (4-axis control)





### **Related Manuals**

Manual Number		Model	Name	Contents
English	Japanese	Wodei	ivame	Contents
W477	SBCE-354	CJ1W-NC214/234/414/434	Position Control Units Operation Manual	Provides information on operating and installing Position Control Units, including details. on basic settings, memory operation, direct operation from CPU and other functions.
W446	SBCA-337	CXONE-AL D-V	CX-Programmer Operation Manual)	Describes operating procedures for the CX-Programmer. Also refer to the <i>Software User's Manual</i> (W473) and <i>Instructions</i> Reference Manual (W474) when you do programming.

#### Terms and Conditions Agreement

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NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

#### Programmable Products.

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#### Performance Data.

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#### Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

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In the interest of product improvement, specifications are subject to change without notice.

