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-NC234   **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.
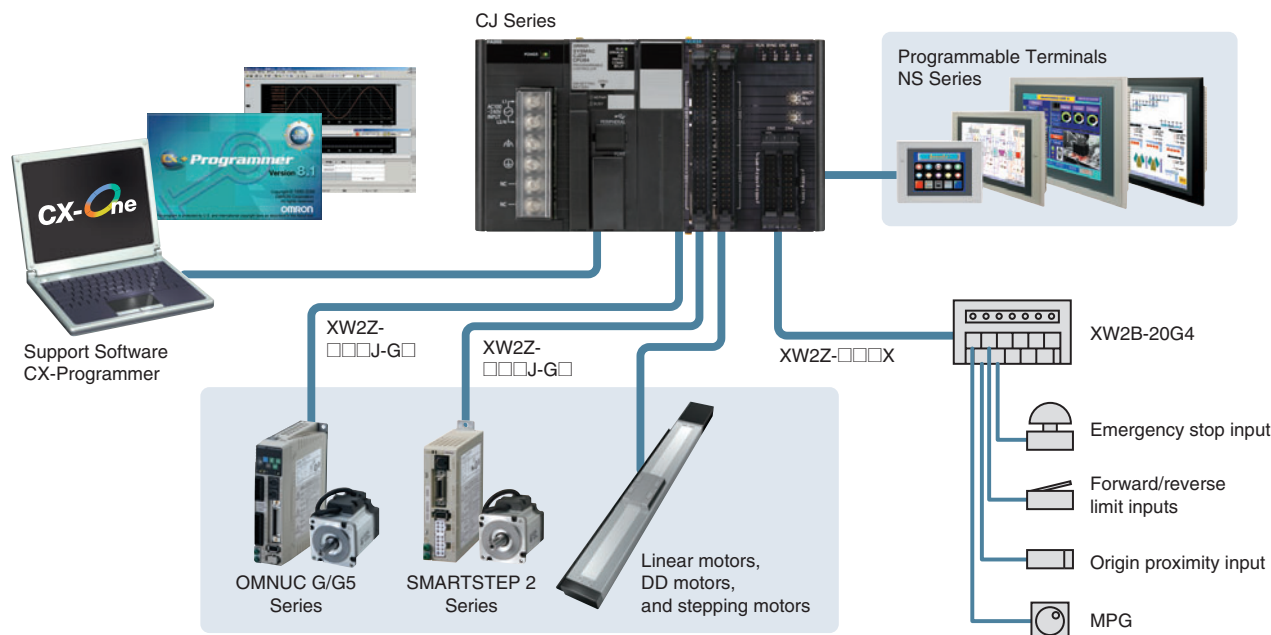
Increased Added Value with More Advanced Features
- Operation between the CPU Unit and the Position Control Unit can be synchronized using a high-speed bus. Synchronized control is possible between up to five Units, or 20 axes. A wide range of applications can be achieved by also using the electronic 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 OMNUC G-series, G5-series and W-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.

System Configuration

- CJ Series
- Programmable Terminals NS Series
- Support Software CX-Programmer
- XW2Z-□□□J-G□
- XW2Z-□□□J-G□
- XW2Z-□□□X
- XW2B-20G4
- OMNUC G/G5 Series
- SMARTSTEP 2 Series
- Linear motors, DD motors, and stepping motors
- Emergency stop input
- Forward/reverse limit inputs
- Origin proximity input
- MPG

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		No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Control method/Control output interface	Number of control axes		5 V system	24 V system		
CJ1 Special I/O Units	**Position Control Units (High-Speed type)**	Pulse-train open-collector output with Pulse Counter Function	2 axes	2	0.27	–	**CJ1W-NC214**	UC1, CE
			4 axes		0.31	–	**CJ1W-NC414**	
		Pulse-train line-driver output with Pulse Counter Function	2 axes	2	0.27	–	**CJ1W-NC234**	
			4 axes		0.31	–	**CJ1W-NC434**	

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

Support Software

Product name	Specifications			Model	Standards
		Number of licenses	Media		
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), Vista, or 7 **Note:** Except for Windows XP 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 *1	DVD *2	**CXONE-AL01D-V4**	–

*1. Multi licenses are available for the CX-One (3, 10, 30, or 50 licenses).
*2. The CX-One is also available on CD (CXONE-AL□□C-V4).

Connecting Cables

Applicable Units		Applicable Servo Drive		Number of control axes	Cable Length	Model
Output Type	Model	Name	Model			
Open-collector output	CJ1W-NC☐14	OMNUC G/G5 Series	R88D-GT/-KT	1 axis	1m	**XW2Z-100J-G13**
					3m	**XW2Z-300J-G13**
		SMARTSTEP2	R7D-BP		1m	**XW2Z-100J-G16**
					3m	**XW2Z-300J-G16**
		OMNUC W Series	R88D-WT		1m	**XW2Z-100J-G14**
					3m	**XW2Z-300J-G14**
		OMNUC G/G5 Series	R88D-GT/-KT	2 axes	1m	**XW2Z-100J-G5**
					3m	**XW2Z-300J-G5**
		SMARTSTEP2	R7D-BP		1m	**XW2Z-100J-G8**
					3m	**XW2Z-300J-G8**
		OMNUC W Series	R88D-WT		1m	**XW2Z-100J-G6**
					3m	**XW2Z-300J-G6**
Line-driver output	CJ1W-NC☐34	OMNUC G/G5 Series	R88D-GT/-KT	1 axis	1m	**XW2Z-100J-G9**
					5m	**XW2Z-500J-G9**
					10m	**XW2Z-10MJ-G9**
		SMARTSTEP2	R7D-BP		1m	**XW2Z-100J-G12**
					5m	**XW2Z-500J-G12**
					10m	**XW2Z-10MJ-G12**
		OMNUC W Series	R88D-WT		1m	**XW2Z-100J-G10**
					5m	**XW2Z-500J-G10**
					10m	**XW2Z-10MJ-G10**
		OMNUC G/G5 Series	R88D-GT/-KT	2 axes	1m	**XW2Z-100J-G1**
					5m	**XW2Z-500J-G1**
					10m	**XW2Z-10MJ-G1**
		SMARTSTEP2	R7D-BP		1m	**XW2Z-100J-G4**
					5m	**XW2Z-500J-G4**
					10m	**XW2Z-10MJ-G4**
		OMNUC W Series	R88D-WT		1m	**XW2Z-100J-G2**
					5m	**XW2Z-500J-G2**
					10m	**XW2Z-10MJ-G2**

Devices for External Signal Connection

Devices for External Signal Connection

Name	Specifications	Model
Connecting Cables for Connector Terminal Block	Cable length: 0.5m	**XW2Z-C50X**
	Cable length: 1.0m	**XW2Z-100X**
	Cable length: 2.0m	**XW2Z-200X**
	Cable length: 3.0m	**XW2Z-300X**
	Cable length: 5.0m	**XW2Z-500X**
	Cable length: 10.0m	**XW2Z-010X**
Connector Terminal Block	20-points, M2.4 screw terminal	**XW2B-20G4**
	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.

C J 1 W - N C 2 1 4

CJ-series
  PCU

Number of axes
  2: 2-axis type
  4: 4-axis type

Output pattern
  1: Open collector output type
  3: Line driver output type

Development number
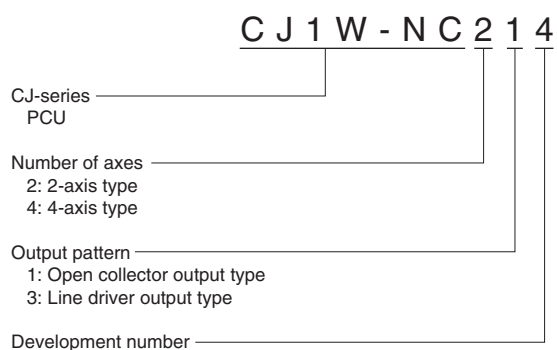
Mountable Racks

Model	NJ system		CJ system (CJ1, CJ2)		CP1H system	NSJ system	
	CPU Rack	Expansion Rack	CPU Rack	Expansion Backplane	CP1H PLC	NSJ Controller	Expansion Backplane
CJ1W-NC214/234/414/434	Not supported		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 × 2 + Number of other PCUs installed ≤ 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.

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

* 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
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 Offset 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	
	CJ1W-NC214/234	CJ1W-NC414/434
Power supply voltage	5 VDC (unit)	
	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 × 62 × 65 (H × W × 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

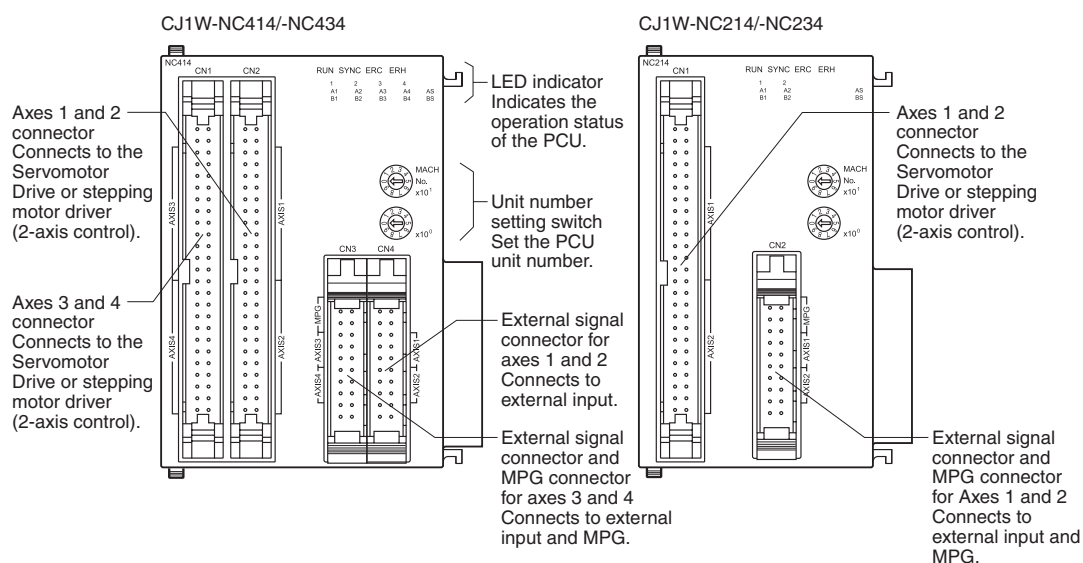| Specification item		Model	
		CJ1W-NC214/234	CJ1W-NC414/434
Applicable PLCs		CJ-series	
Number of occupied inputs/outputs	Number of words	18CH *	
Controlled drivers		Servo Drive of pulse train input type or stepping motor drivers 　NC214/414: Open collector output type 　NC234/434: Line driver output 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	
	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
Position command	Data	−2147483648 to +2147483647	
	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 time	Data	0 to 250000 ms	
	Number of data	500 per task	
Function	Override	0.01% to 500.00% (settable for each axis)	
	Software limits	−2147483647 to 2147483646 command unit (Settable for each axis)	
	Backlash Compensation	0 to 50000 command unit (settable for each axis)	
MPG and external encoder counter input	Number of input words	1 word (switchable for each controlled axis)	
	Input interface	Photocoupler input	
	Maximum response frequency	500 kHz	
Feedback pulse counter input	Number of input words	4 words (1 word per axis)	
	Input interface	Line receiver input	
	Maximum response frequency	NC234/434: 4 MHz (phase difference multiplication of 4 times: 1 MHz) NC214/414: 500 kHz (phase difference multiplication of 4 times: 125 kHz)	

* 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	Single axis control	Absolute movement	Specify the absolute/relative target position and target speed directly in the ladder program to perform positioning.
		Relative movement	
		Speed control	Specify the target speed directly in the ladder program to perform speed feed.
		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 control	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 to 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.
Manual operation function	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.
	Present Position Present		It changes the present position to the specified data and establishes the origin.
	Deceleration stop		The operating axis decelerates to a stop.
	JOG Operation		This function feeds the axis in the forward/reverse direction at a constant speed.
	Inching operation		The axis inches in the forward/reverse direction.
	MPG operation		Connect a manual pulsar and perform manual feed.
Auxiliary control function	Command unit setting		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 select 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 are settable for each axis.
	Feedback pulse counter		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.
	Absolute encoder		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 W-series, G-series and G5-series Servomotors with absolute encoder.
	Teaching		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.
	Torque limit output		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.
	Monitor function	Software limits	You can set forward/reverse direction software limits of axis operation. If the positioning target exceeds software limit, it is detectable at the start through a command value check.
		Position or speed error monitor	The PCU can monitor the position or speed error between the present command position and present feedback position to generate an error and stop the axis operation upon detection of an excessive error.
		Error between axes monitor	It can also monitor the error between axes during linear interpolation to generate an error and stop the axes operation upon detection of an excessive error.

External Interface

Name of Each Part

CJ1W-NC414/-NC434

CJ1W-NC214/-NC234

Axes 1 and 2 connector
Connects to the Servomotor Drive or stepping motor driver (2-axis control).

Axes 3 and 4 connector
Connects to the Servomotor Drive or stepping motor driver (2-axis control).

LED indicator
Indicates the operation status of the PCU.

Unit number setting switch
Set the PCU unit number.

External signal connector for axes 1 and 2
Connects to external input.

External signal connector and MPG connector for axes 3 and 4
Connects to external input and MPG.

Axes 1 and 2 connector
Connects to the Servomotor Drive or stepping motor driver (2-axis control).

External signal connector and MPG connector for Axes 1 and 2
Connects to external input and MPG.

LED Display

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

Wiring of Servo Drive Connector

Connector type		Model
Flat-cable connector		XG4M-5030-T *1
IDC connector for discrete wires	Socket	XG5M-5032-N *2
		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
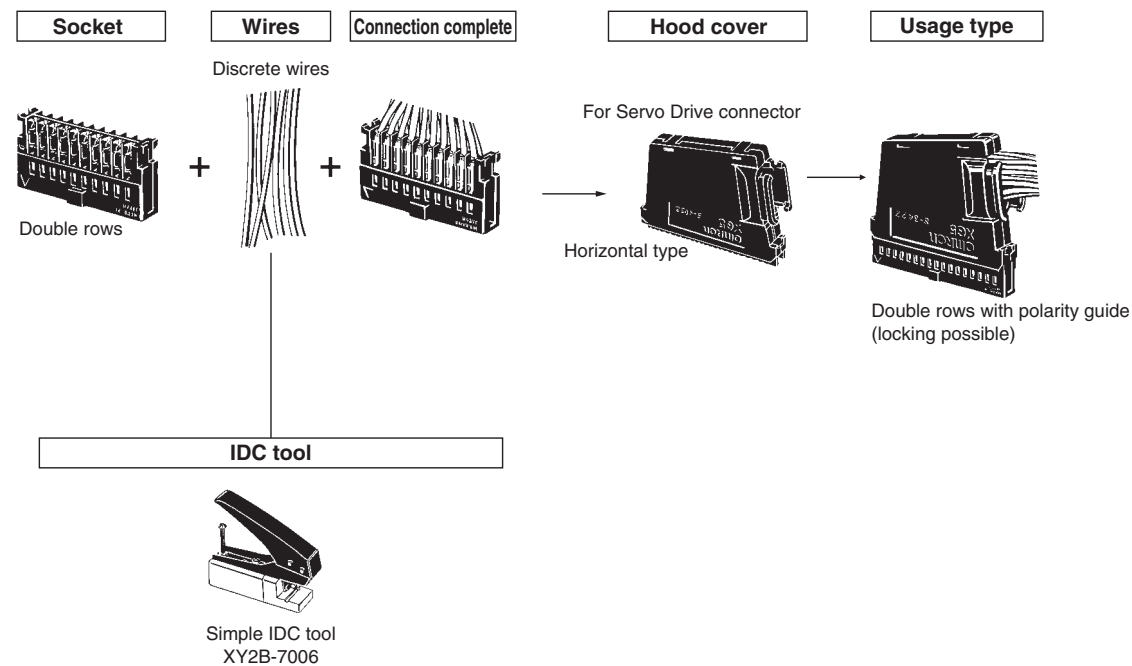
Dimensions

Position Control Unit (High-Speed type)

CJ1W-NC214/-NC234
(2-axis control)
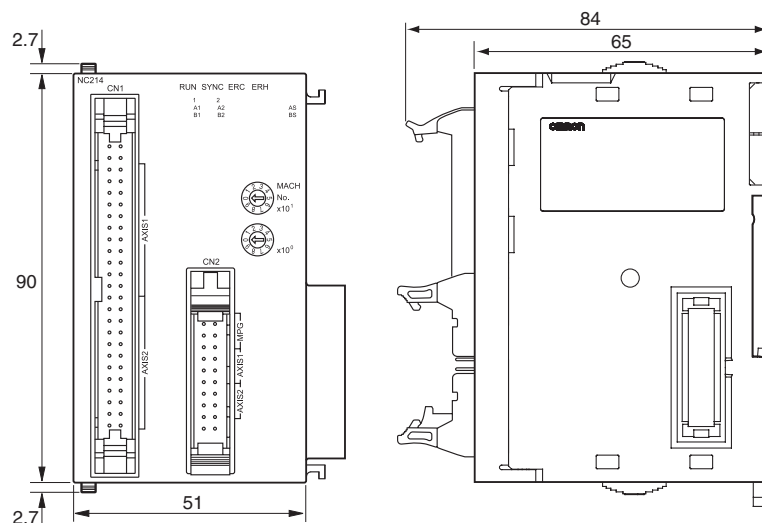
CJ1W-NC414/-NC434
(4-axis control)
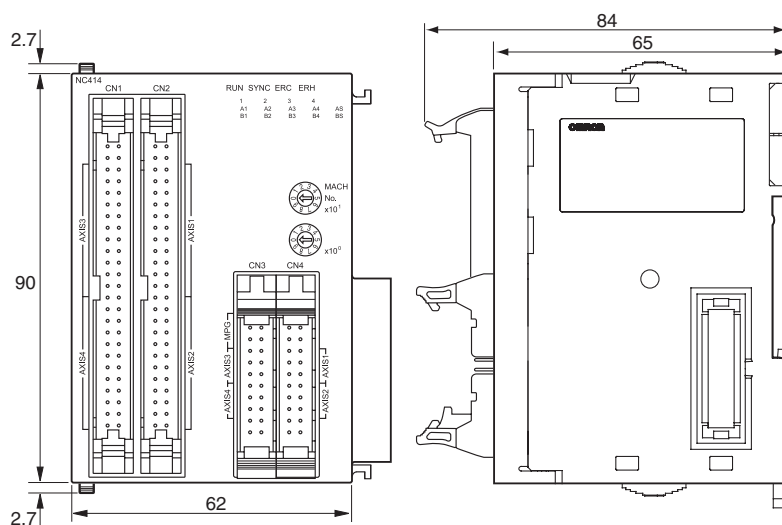
Related Manuals

Manual Number		Model	Name	Contents
English	**Japanese**			
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□□C-V□/ AL□□D-V□	CX-Programmer Operation Manual)	Describes operating procedures for the CX-Programmer. Also refer to the *Software User's Manual* (W473) and *Instructions Reference Manual* (W474) when you do programming.