OMRON

Up to 4-axis Control with a Single Unit

SYSMAC CJ Series

Position Control Unit

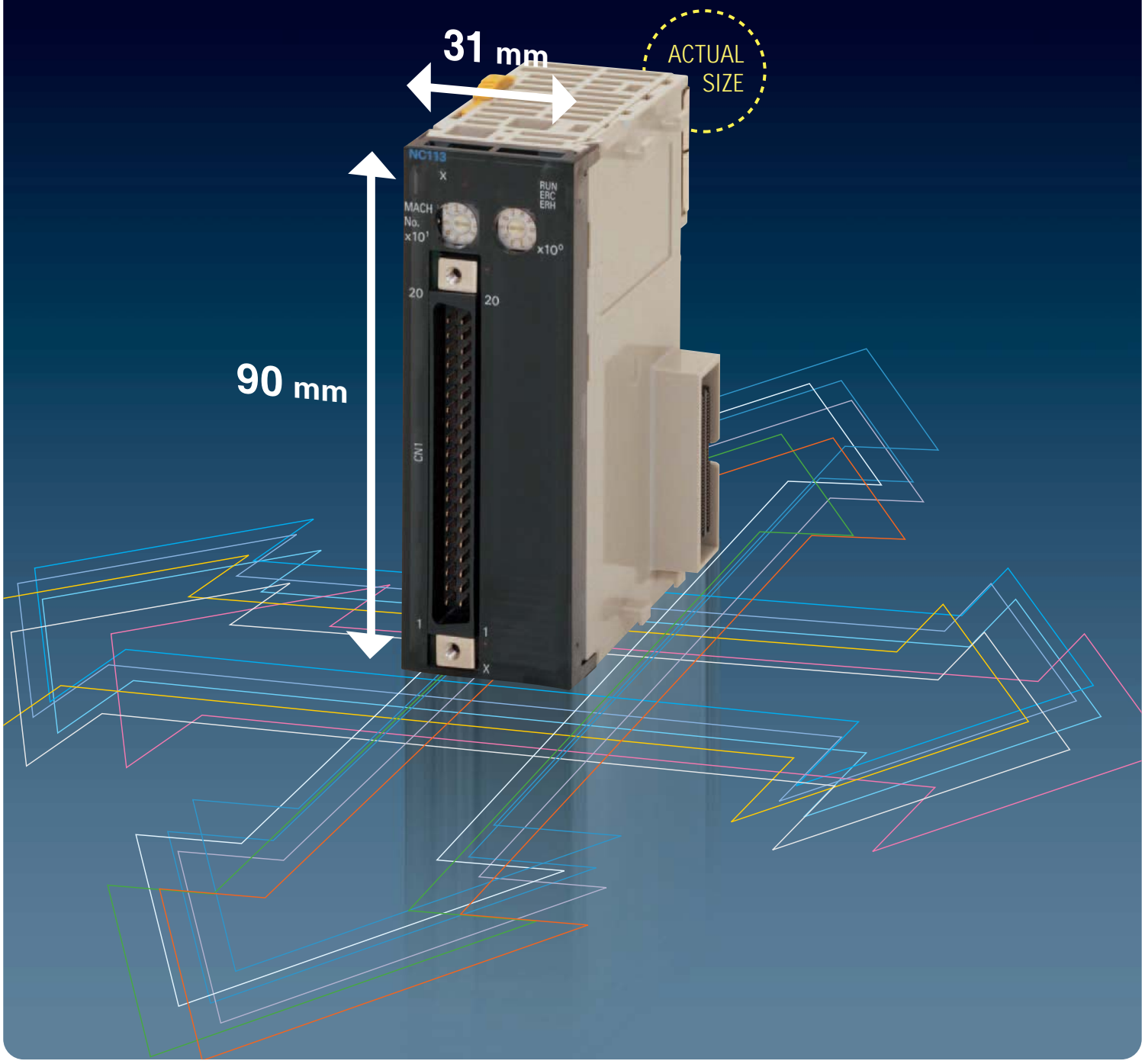
CJ1W-NC113, CJ1W-NC133, CJ1W-NC213, CJ1W-NC233, CJ1W-NC413, and CJ1W-NC433

High-performance, Multi-functional Position Control in an Ultra-compact Size

Versatile Functions and Superb Performance En
High-Performance Machines

1-, 2-, or 4-axis Control in an Ultra-compact Size

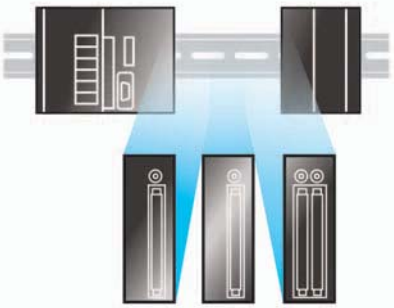
With its ultra-compact size of 31 x 90 mm (WxH), this highly space-efficient PCU enables up to 4 axes of motor control.



able the Construction of Compact,

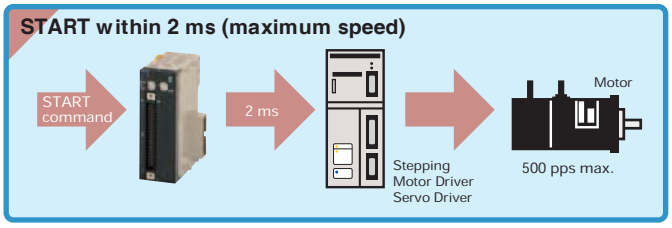
Versatile Models

- Two types to choose from: open collector output and line driver.
- Because both open collector output and line driver types feature 1-, 2-, and 4-axis models, the most appropriate model can be selected for the application at hand. All 1-, 2-, and 4-axis models are 31 mm wide.



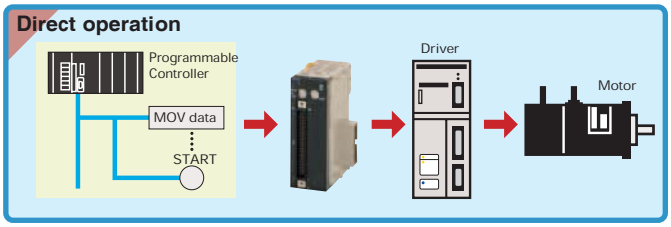
High Performance

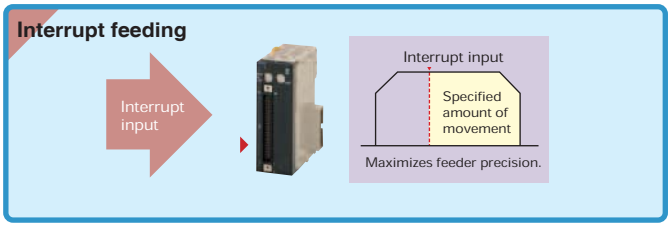
- Positioning START occurs within 2 ms (maximum speed) after receiving a command from the Programmable Controller. (Refer to the Operation Manual for conditions.)
- Fine control from low to high speed (500 kpps max.) is possible in 1-pps units.

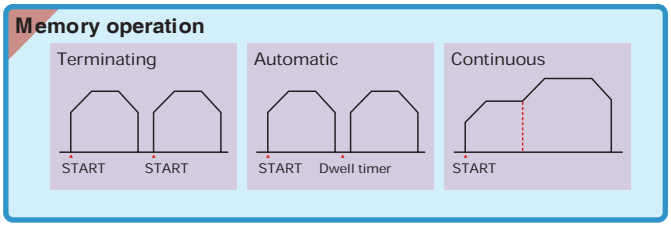


Versatile Functions

- Positioning (direct operation) can be done by direct PLC ladder commands for position data, speed data, and acceleration data. This simplifies control in situations when the target position and speed cannot be decided until immediately before operation begins, or when the target position and speed change due to other circumstances. The target position and speed can also be changed during operation.
- Positioning can be done from memory, by writing an operating pattern into the PCU memory in advance. Three position patterns — Terminating, Automatic, and Continuous — can be set with completion codes to respond to a wide range of operations.
- Interrupt feeding moves the axis a specified amount, then stops it, in accordance with an interrupt input. High-speed (0.1 ms max.) processing of the interrupt input signal ensures high-precision interrupt positioning. This helps to maximize feeder precision.



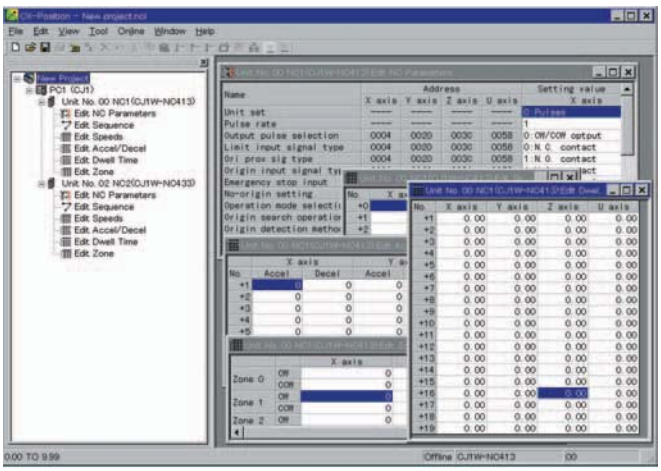




CX-Position Support Software

Various Tools for Easy Data Setup

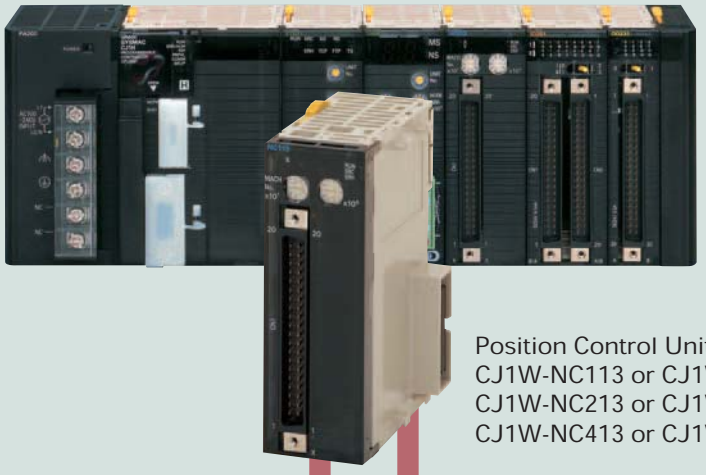
- The CX-Position runs on a personal computer to enable easy data input, editing, transfer, saving, and printing, as well as status monitoring.
- The efficiency of data setting, referencing, and copying is even further increased by using projects to manage the data for more than one Position Control Unit. Projects can be created automatically and Position Control Unit data can be updated automatically to greatly reduce setup time and maintenance time.



Note: The CX-Position transfers data in online communications with Position Control Units via FinsGateway. Either FinsGateway Version 2 or Version 3 Embedded Edition must be installed on the same computer as the CX-Position to enable online communications. (FinsGateway Version 3 Embedded Edition is provided on the same disk as CX-Position.) The communications method (i.e., the network type) depends on the FinsGateway driver that is used.

System Configuration Example

A high-precision positioning system can be constructed to meet a broad range of applications by combining the Position Control Unit with a high-speed, high-precision OMRON Servomotor and Servo Driver.

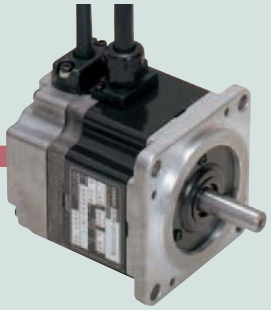


SYSMAC CJ-series
Programmable Controller

Position Control Unit
CJ1W-NC113 or CJ1W-NC133 (for 1-axis control)
CJ1W-NC213 or CJ1W-NC233 (for 2-axis control)
CJ1W-NC413 or CJ1W-NC433 (for 4-axis control)

External input
(1 to 4 axes)
CCW limit input
CW limit input
Origin proximity input
Emergency stop input

SMARTSTEP Series
R7D-APA□
Servo Driver



SMARTSTEP Series
R7M-AP□
Servomotor

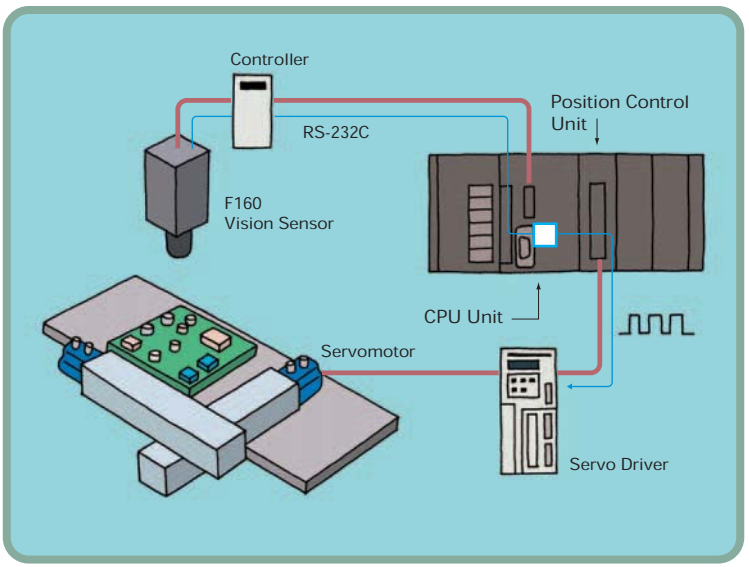
In addition to the SMARTSTEP-series Servomotor and Servo Driver shown above, the Position Control Unit can be connected to the following models.

- R88D-W□ and R88M-W□ OMNUC W-series AC Servomotor/Driver
- R88D-U□ and R88M-U□ (30 to 5,000 W) OMNUC U-series U-type AC Servomotor/Driver
- R88D-UEP□ and R88M-UE□ (100 to 750 W) OMNUC U-series UE-type AC Servomotor/Driver
- R88D-H□ and R88M-H□ (50 to 1,100 W) OMNUC H-series AC Servomotor/Driver
- R88D-MT□ and R88M-M□ (60 to 7,200 W) OMNUC M-series AC Servomotor/Driver
- Stepping Motor/Driver

Application Examples

Inspection systems

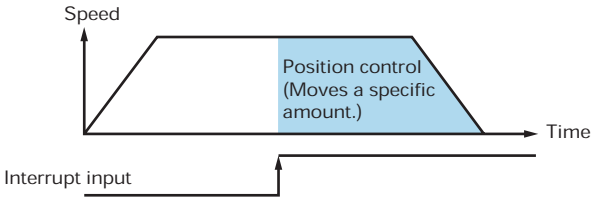
- Image data is captured by the Vision Sensor and input to the CJ1 CPU Unit, which sends positioning commands to the PCU.
- By using the direct operation function, positioning can be done without having to transfer data to the PCU, thus enabling a relatively simple inspection system.

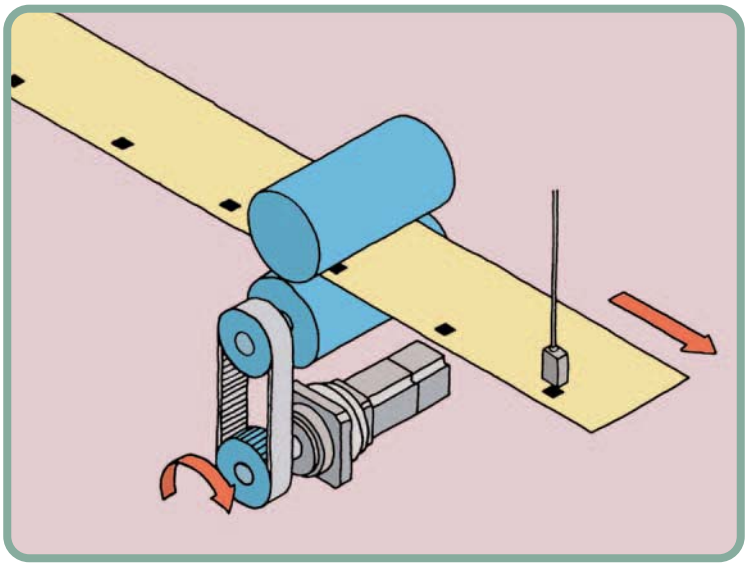


Feeders

- Using the interrupt feeding function,* the axis can be moved a specified amount once the mark position or workpiece end has been detected.
- S-curve acceleration/deceleration suppresses slipping between the workpiece and roller, to improve feeding precision.

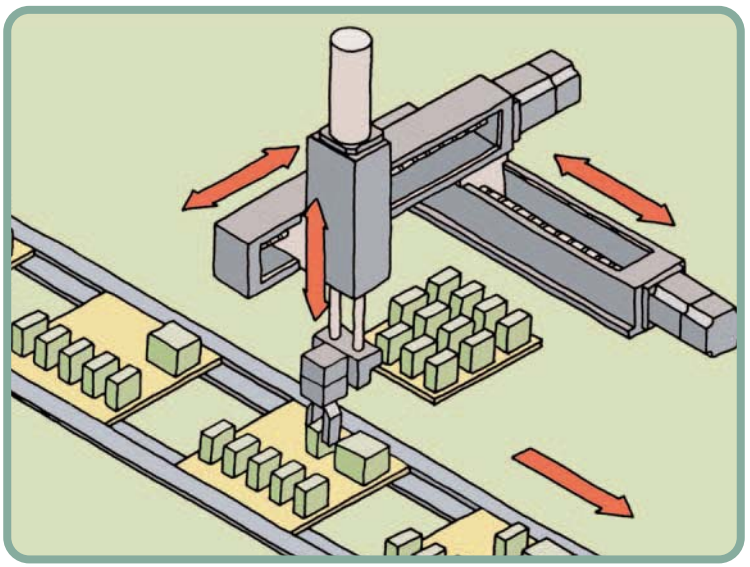
* The interrupt feeding function moves the axis a specified amount after an external input signal goes ON.





Assembly systems

- Positioning of up to 100 points is possible for each axis.
- Direct operation and forced interrupt operation can be easily programmed as emergency responses.



Specifications and Ordering Information

Performance/Specifications

Specification item		Model		
		CJ1W-NC113/133	CJ1W-NC213/233	CJ1W-NC413/433
Applicable PC models		CJ1-series PCs		
Ambient operating temperature		0 to 55 C		0 to 50 C
External power supply voltage		24 VDC±10% 5 VDC±5% (line driver output)		24 VDC±5% 5 VDC±5% (line driver output)
I/O requirements	Words	5 words	10 words	20 words
Controlled driver		Pulse-train input-type servomotor driver or stepping motor driver. NC113/213/413 models have open-collector output. NC133/233/433 models have line-driver output.		
Control	Control system	Open-loop control by pulse train output		
	Number of control axes	1 axis	2 axis	4 axis
Control unit		Pulse		
Positioning functions		Two modes: memory operation and direct operation		
	Independent	1 axis	2 independent axes	4 independent axes
	Linear interpolation	None	2 axes max.	4 axes max.
	Speed control	1 axis	2 independent axes	4 independent axes
	Interrupt feeding	1 axis	2 independent axes	4 independent axes
Positions	Range	–1,073,741,823 to 1,073,741,823 pulses		
	Data items	100/axis		
Speeds	Range	1 pps to 500 kpps		
	Data items	100/axis		
Acceleration and deceleration times	Range	0 to 250 s, until maximum speed is reached.		
	Data items	9/axis for acceleration and deceleration each.		
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: –1,073,741,823 to 1,073,741,823 pulses Origin search speed: High-speed or proximity-speed can be set. Origin detection method: 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.		
	Dwell times	19/axis can be set from 0 to 9.99 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 present position is within a specified zone. Three zones can be set for each axis.		
	Software limits	Can be set within a range of –1,073,741,823 to 1,073,741,823 pulses.		
	Backlash compensation	0 to 9,999 pulses. Compensation speed can also be set.		
	Teaching	With a command from the PLC, the present position can be taken as the position data.		
	Deceleration stop	The STOP command causes positioning to decelerate to a stop according to the specified deceleration time.		
	Emergency stop	Pulse outputs are stopped by an external emergency stop command.		
	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 1% to 999% (in increments of 1%).		
	Data saving	1) Saving to flash memory. (Can be written 100,000 times.) 2) Reading to PLC area by data reading instruction. 3) Reading by Support Software and saving to personal computer hard disk or floppy disk.		
External I/O	Inputs	Prepare the following inputs for each axis: CW and CCW limit input signals, origin proximity input signal, origin input signal, emergency stop input signal, positioning completed signal, interrupt input signal		
	Outputs	Prepare the following outputs for each axis: Pulse outputs, CW/CCW pulses, pulse outputs and direction outputs can be switched. Either error counter reset or origin-adjustment command outputs can be selected depending on the mode.		
Pulse output distribution period		4 to 8 ms		
START time		2 ms min. (Refer to the *Operation Manual* for conditions.)		
Self-diagnostic function		Flash memory check, memory loss check, CPU bus check		
Error detection function		Overtravel, CPU error, software limit over, emergency stop		

Models

Position Control Units

Model No.	Specifications
CJ1W-NC113	1-axis, open-collector output type
CJ1W-NC213	2-axis, open-collector output type
CJ1W-NC413	4-axis, open-collector output type
CJ1W-NC133	1-axis, line-driver output type
CJ1W-NC233	2-axis, line-driver output type
CJ1W-NC433	4-axis, line-driver output type

NC Support Software

Name	Specifications	Model No.
CX-Position (English)	OS: Windows 95/98/2000/NT4.0, CPU: Pentium 100 MHz or faster, RAM: 32 MB or more, Hard disk space: 50 MB or more	WS02-NCTC1-E

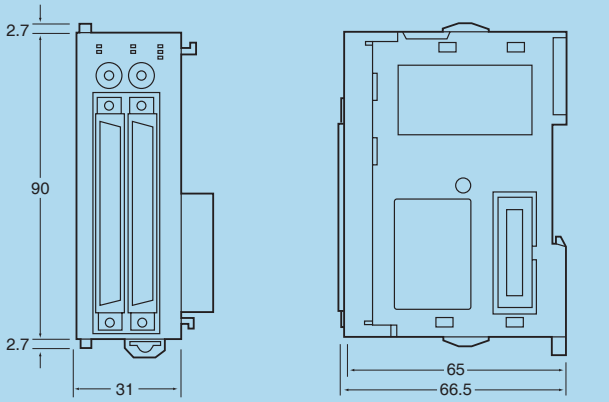
Cables for Servo Relay Units and Position Control Units

Name	Connection	Model No.
Servo Relay Unit Cable	1-axis Position Control Units (communications function not supported) (CS1W-NC113, CS1W-NC133, CJ1-NC113, CJ1-NC133, C200HW-NC113, C200H-NC112)	XW2B-20J6-1B
	2-axis/4-axis Position Control Units (communications function not supported) (CS1W-NC213, CS1W-NC233, CS1W-NC413, CS1W-NC433, CJ1-NC213, CJ1-NC233, CJ1-NC413, CJ1-NC433, C200HW-NC213, C200HW-NC413, C500-NC113, C500-NC211, C200H-NC211)	XW2B-40J6-2B
	2-axis/4-axis Position Control Units (communications function supported) (CS1W-NC213, CS1W-NC233, CS1W-NC413, CS1W-NC433, CJ1-NC213, CJ1-NC233, CJ1-NC413, CJ1-NC433, C200HW-NC213, C200HW-NC413)	XW2B-40J6-4A
Position Control Unit Cable	CJ1W-NC113 to W Series, 0.5-m cable length	XW2Z-050J-A14
	CJ1W-NC113 to W Series, 1-m cable length	XW2Z-100J-A14
	CJ1W-NC213/CJ1W-NC413 to W Series, 0.5-m cable length	XW2Z-050J-A15
	CJ1W-NC213/CJ1W-NC413 to W Series, 1-m cable length	XW2Z-100J-A15
	CJ1W-NC113 to SMARTSTEP, 0.5-m cable length	XW2Z-050J-A16
	CJ1W-NC113 to SMARTSTEP, 1-m cable length	XW2Z-100J-A16
	J1W-NC213/CJ1W-NC413 to SMARTSTEP, 0.5-m cable length	XW2Z-050J-A17
	CJ1W-NC213/CJ1W-NC413 to SMARTSTEP, 1-m cable length	XW2Z-100J-A17
	CJ1W-NC133 to W Series, 0.5-m cable length	XW2Z-050J-A18
	CJ1W-NC133 to W Series, 1-m cable length	XW2Z-100J-A18
	CJ1W-NC233/CJ1W-NC433 to W Series, 0.5-m cable length	XW2Z-050J-A19
	CJ1W-NC233/CJ1W-NC433 to W Series, 1-m cable length	XW2Z-100J-A19
	CJ1W-NC133 to SMARTSTEP, 0.5-m cable length	XW2Z-050J-A20
	CJ1W-NC133 to SMARTSTEP, 1-m cable length	XW2Z-100J-A20
	CJ1W-NC233/CJ1W-NC433 to SMARTSTEP, 0.5-m cable length	XW2Z-050J-A21
	CJ1W-NC233/CJ1W-NC433 to SMARTSTEP, 1-m cable length	XW2Z-100J-A21

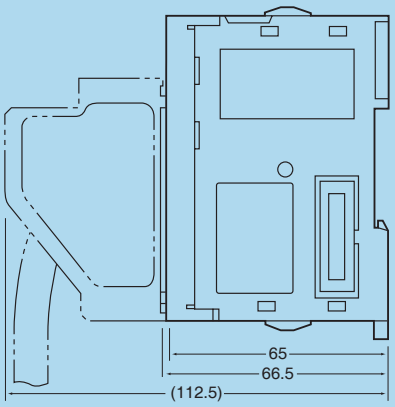
Note: When using a 4-axis Position Control Unit, two cables are necessary: one for the Servo Relay Unit and one for the Position Control Unit.
For details of the Servo Driver cable, refer to the Servo Driver Catalog or Operation Manual.

Dimensions

● CJ1W-NC113, CJ1W-NC133, CJ1W-NC213,
CJ1W-NC233, CJ1W-NC413, CJ1W-NC433



● Mounted Dimensions



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

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Cat. No. R094-E1-02
Printed in Japan
0802-0.4M