

Encoder Input Unit CK3W-ECS300

CSM_CK3W-ECS300_DS_E_2_2

**Supports encoder protocols used for
high-precision stage control**



CK3W-ECS300

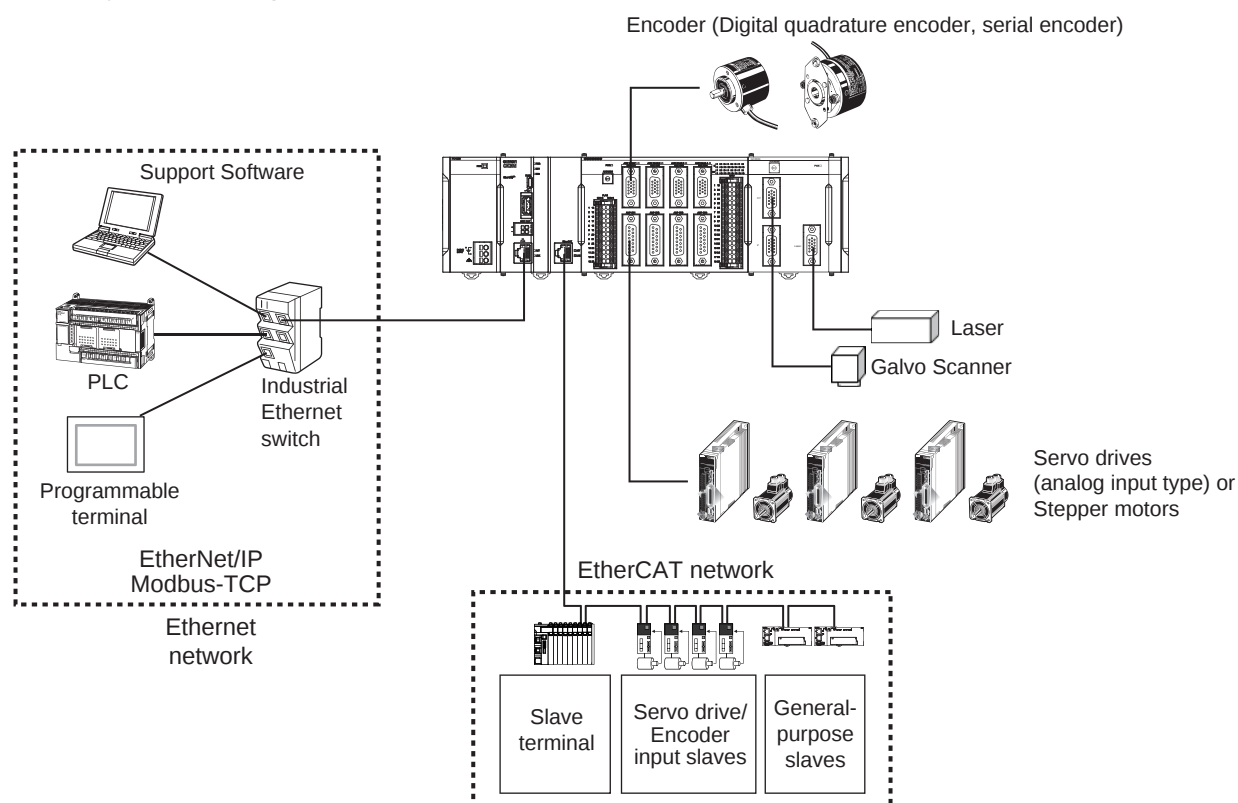
Features

- BiSS-C, Endat (2.2), and R88M-1L□/-1M□ Motor built-in encoder are supported
- Up to 4 channel inputs
- Protocol can be changed by software settings *

* 4 channels at a time

System Configurations

Basic System Configuration



*1. You will need this unit when you use the Galvo Scanner.

CK□W Unit Configuration (CPU Rack/Expansion Rack)

The following shows the configuration of CK□W Units.

CPU Rack

The CK3W Unit configuration in the CPU Rack consists of a Power Supply Unit, CPU Unit, CK3W-AX Unit, CK3W-MD Unit, CK3W-AD Unit, CK3W-ECS Unit, CK3W-GC Unit, and End Cover.

Up to four CK3W Units (or up to two CK3W-AX Units) can be connected to the CPU Unit.

Expansion Rack

Up to one Expansion Rack can be added for the CK3M CPU Unit, and up to three Expansion Racks can be added for the CK5M CPU Unit.

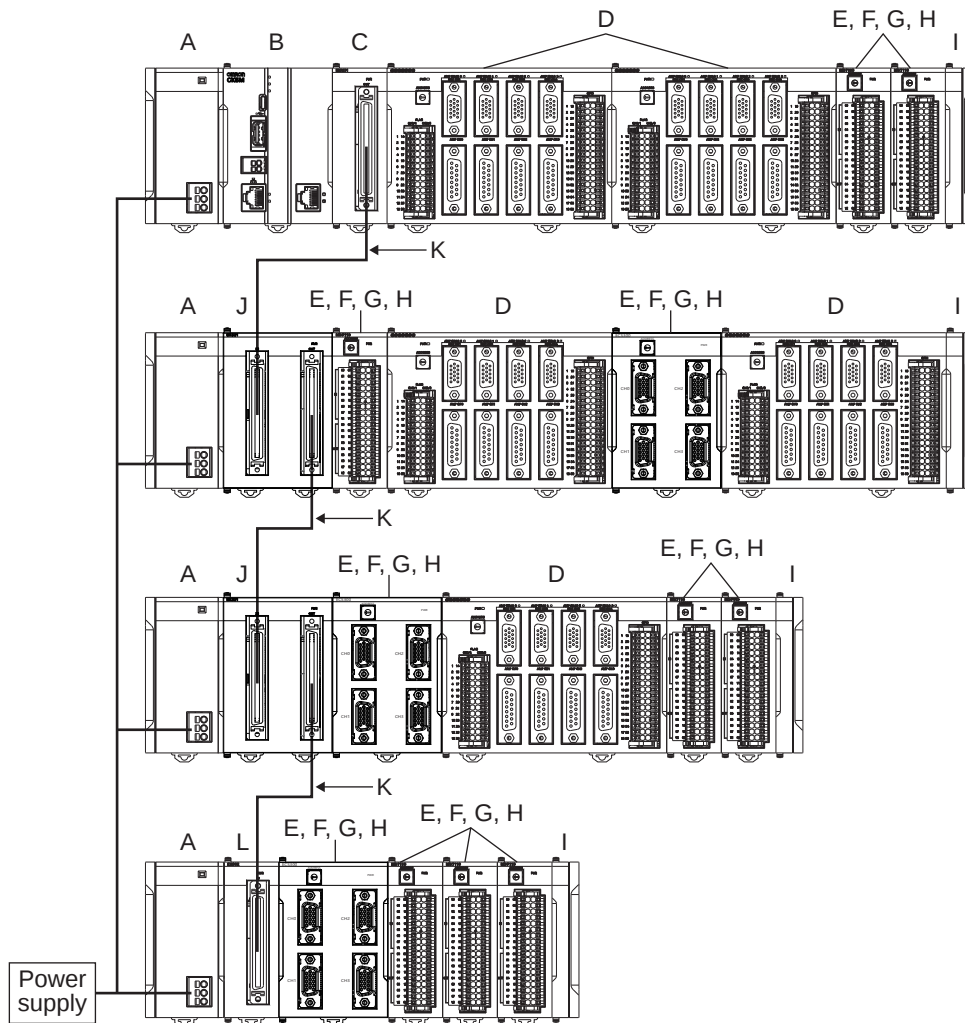
To connect an Expansion Rack, use the Expansion Master Unit (CK3W-EXM01) and Expansion Slave Unit (CK5W-EXS01, CK3W-EXS02).

Up to four CK3W Units (or up to two CK3W-AX Units) can be installed to the Expansion Rack.

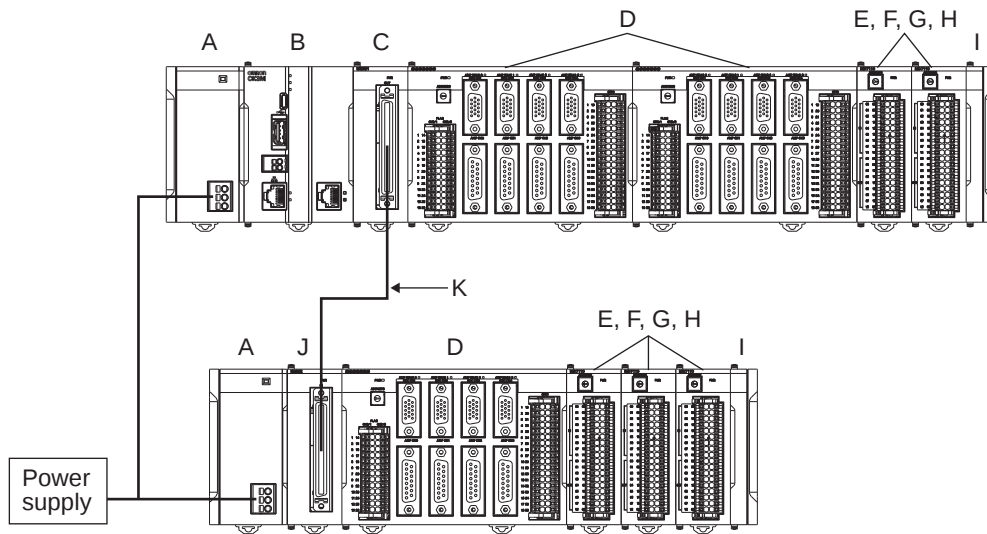
Connect the Expansion Master Unit (CK3W-EXM01) to the immediate right side of the CPU Unit. Connect the Expansion Slave Unit (CK5W-EXS01, CK3W-EXS02) to the immediate right side of the Power Supply Unit.

Unless the Expansion Master Unit (CK3W-EXM01) is connected adjacent to the right side of the CPU Unit, the Sys.Status register CK3WConfigErr becomes "5".

Use the CK3W-EXS02 for the Expansion Slave Unit farthest from the CPU Rack, and the CK5WEXS01 for the Expansion Slave Unit located in the middle. The CK5W-EXS01 can only be used with the CK5M CPU Unit. It can not be used with the CK3M CPU Unit.

For CK5M CPU Unit

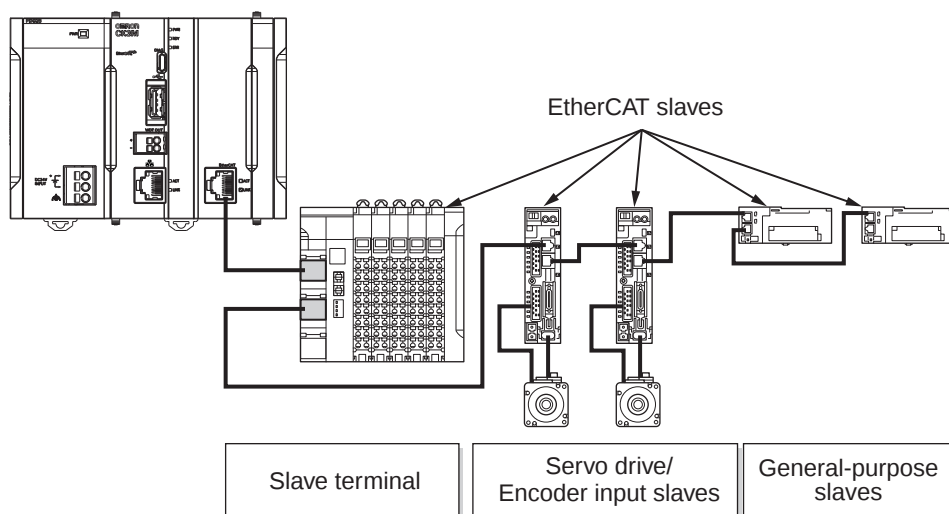
Letter	Configuration	Remarks
A	Power Supply Unit	Input the 24 V power source. Always wire the CPU Rack and Expansion Rack to the same power supply.
B	CK5M-series CPU Unit	This is the Unit at the center of the motion control, which executes the motion program.
C	CK3W-EXM01	Expansion Master Unit. Connect this Unit adjacent to the right side of the CPU Unit in the Expansion Rack.
D	CK3W-AX Unit	Axis Interface Unit. For axis control, connect this to a Servo Drive and encoder.
E	CK3W-MD Unit	Digital I/O Unit. You can add 16 digital inputs and 16 digital outputs.
F	CK3W-AD Unit	Analog Input Unit. You can add 4 or 8 voltage inputs.
G	CK3W-ECS Unit	Encoder Input Unit. You can connect four channels of the serial encoder.
H	CK3W-GC Unit	Laser Interface Unit. You can connect the Galvo Scanner compatible with the interface of XY2-100 or SL2-100.
I	End Cover	Must be connected to the right end of the CPU Rack and Expansion Rack. The CPU Unit and the Expansion Slave Unit are each provided with one End Cover.
J	CK5W-EXS01	Expansion Slave Unit. Use this in the Expansion Rack located in the middle. Connect this Unit to the immediate right side of the Power Supply Unit. This unit can only be used with the CK5M CPU Unit. It can not be used with the CK3M CPU Unit.
K	Expansion cable	Use this cable to connect the Expansion Master Unit and Expansion Slave Unit. The cable length is 30 cm. Be sure to use the CK3W-CAX03A (30 cm) cable.
L	CK3W-EXS02	Expansion Slave Unit. Use this for the Expansion Rack farthest from the CPU Rack. Connect this Unit to the immediate right side of the Power Supply Unit.

For CK3M CPU Unit

Letter	Configuration	Remarks
A	Power Supply Unit	Input the 24 V power source. Always wire the CPU Rack and Expansion Rack to the same power supply.
B	CK3M-series CPU Unit	This is the Unit at the center of the motion control, which executes the motion program.
C	CK3W-EXM01	Expansion Master Unit. Connect this Unit adjacent to the right side of the CPU Unit in the Expansion Rack.
D	CK3W-AX Unit	Axis Interface Unit. For axis control, connect this to a Servo Drive and encoder.
E	CK3W-MD Unit	Digital I/O Unit. You can add 16 digital inputs and 16 digital outputs.
F	CK3W-AD Unit	Analog Input Unit. You can add 4 or 8 voltage inputs.
G	CK3W-ECS Unit	Encoder Input Unit. You can connect four channels of the serial encoder.
H	CK3W-GC Unit	Laser Interface Unit. You can connect the Galvo Scanner compatible with the interface of XY2-100 or SL2-100.
I	End Cover	Must be connected to the right end of the CPU Rack and Expansion Rack. The CPU Unit and the Expansion Slave Unit are each provided with one End Cover.
J	CK3W-EXS02	Expansion Slave Unit. Use this in the Expansion Rack. Connect this Unit adjacent to the right side of the Power Supply Unit.
K	Expansion cable	Use this cable to connect the Expansion Master Unit and the Expansion Slave Unit. The cable length is 30 cm. Be sure to use the CK3W-CAX003A (30 cm) cable.

EtherCAT Network Configuration

The EtherCAT network configuration consists of a Power Supply Unit, CPU Unit, End Cover, and EtherCAT slaves. Use the built-in EtherCAT port on the CK□M-series CPU Unit to connect EtherCAT slaves.



EtherCAT is synchronized with the servo cycle of the CK□M-series CPU Unit. This enables acquisition of the I/O data of slave terminals that are synchronized with the servo cycle.

Refer to the *CK3M/CK5M-series Programmable Multi-Axis Controller User's Manual Hardware* (Cat.No.O036) for information on using the NX-series EtherCAT Coupler Unit.

Ordering Information

Encoder Input Unit

Product name	Encoder type	Number of channels	Protocol	Model
Encoder Input Unit	Serial encoder	4 channels	BiSS-C, Endat2.2, and R88M-1L□/-1M□ Motor built-in encoder	CK3W-ECS300

Dedicated Cable for Wiring to Serial encoder

The dedicated cables for wiring to the encoder connector are provided as an option.
The encoder connection side has discrete wires. Perform wiring to match the encoder specifications.

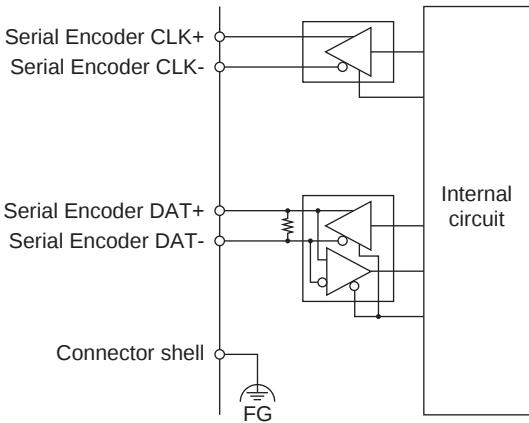
Type	Length	Model
For Serial Encoder	3 m	CK3W-CAES03A

You may use a self-made cable.
When you create a self-made cable, use a shielded twisted-pair cable to block the effects of noise.

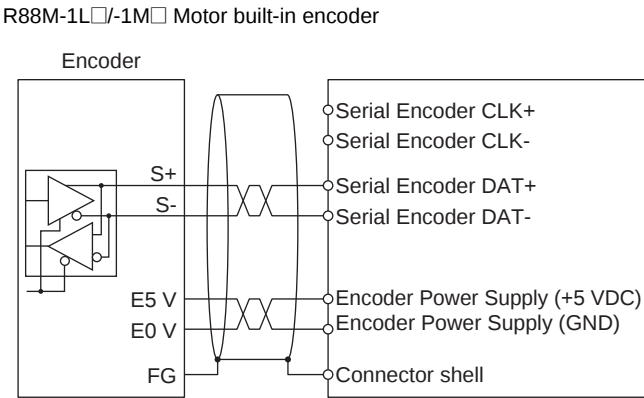
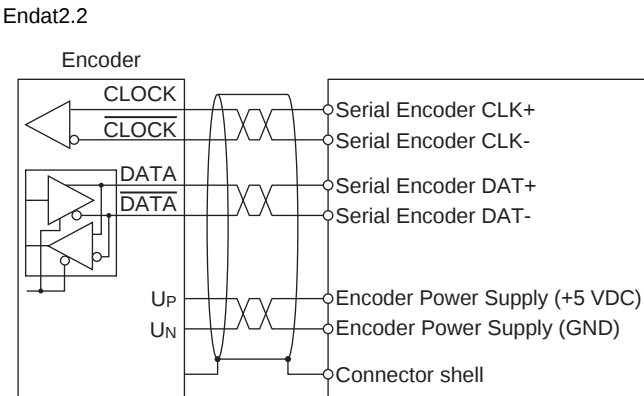
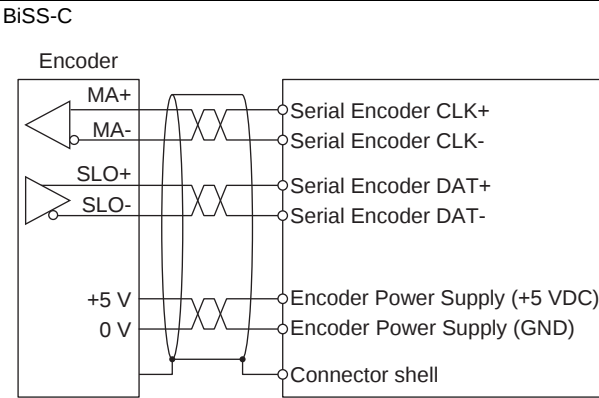
General Specifications

Item		Specification
Enclosure		Mounted in a panel
Grounding Method		Ground to less than 100 Ω.
Operating Environment	Ambient Operating Temperature	0 to 55°C
	Ambient Operating Humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free of corrosive gases.
	Ambient Storage Temperature	-25 to 70°C (with no condensation or icing)
	Vibration Resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s ² 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock Resistance	Conforms to IEC 60068-2-27. 147 m/s ² , 3 times each in X, Y, and Z directions
Insulation Resistance		20 MΩ min. between isolated circuits (at 100 VDC)
Dielectric Strength		510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max.
Applicable Standards		cULus, EU: EN 61326, RCM, KC

Encoder Input Unit Specifications

Encoder power supply output	Rated output voltage	5 VDC
	Output voltage range	4.9 to 5.25 VDC (5 VDC +5%/-2%) However, the total output current of each Unit is 1 A or less.
	Maximum output current	500 mA/channel or less
Serial encoder input	Supported protocol	BiSS-C, Endat2.2, and R88M-1L□/-1M□ Motor built-in encoder
	Clock output *1	EIA standard RS-422A line driver level
	Data I/O	EIA standard RS-485 line driver/receiver level
	Maximum baud rate *2	BiSS-C: 2 MHz Endat2.2: 2 MHz
	Maximum transmission distance *3	BiSS-C (Baud rate: Transmission distance) 250 kHz: 95 m 1 MHz: 20 m 2 MHz: 8 m
		Endat2.2 (Baud rate: Transmission distance) 500 kHz: 100 m 1 MHz: 45 m 2 MHz: 10 m
		R88M-1L□/-1M□ Motor built-in encoder: 50 m
	Isolation method	Not isolated (between internal circuit and encoder circuit)
	Circuit configuration	

Serial encoder input Terminal connection diagram



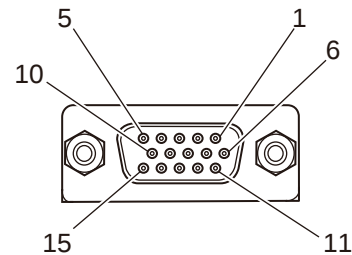
Power consumption	5 VDC 0.6 W max. 24 VDC 6.8 W max.
Dimensions (height × depth × width)	90(H)/80(D)/63.2(W)
Weight	200 g max.

*1. When you use a reset command (\$\$\$) to reset the Unit, the clock output will stop.
*2. For the R88M-1L□/-1M□ Motor built-in encoder, you cannot set a baud rate.
*3. The function of propagation delay compensation for Endat and BiSS-C is not available with the CK3W-ECS Units.

Dedicated Cable for Wiring to Encoder

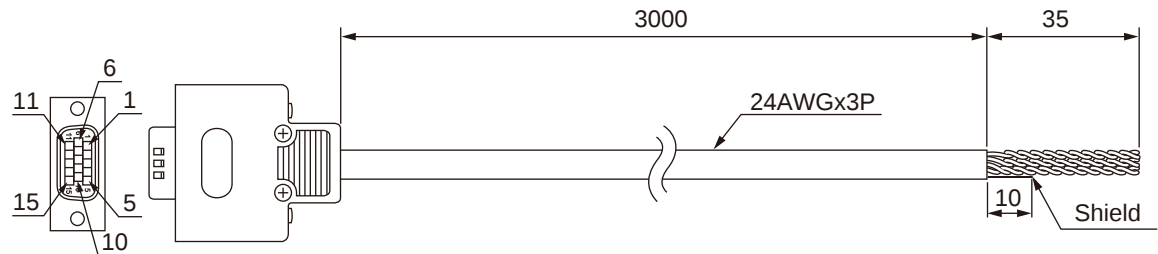
Encoder Connector Wiring

The Unit side connector is a high-density D-sub 15-pin female connector (MIL-C-24308 compliant, lock screw #4-40 UNC).



Pin No.	Symbol	Serial Encoder	
1	NC	Not wired	-
2	NC	Not wired	-
3	NC	Not wired	-
4	CLK+	Serial Encoder CLK+	Output
5	DATA+	Serial Encoder DAT+	Input/Output
6	NC	Not wired	-
7	NC	Not wired	-
8	NC	Not wired	-
9	CLK-	Serial Encoder CLK-	Output
10	DATA-	Serial Encoder DAT-	Input/Output
11	ENCPWR	Encoder Power Supply (+5 VDC)	Output
12	ENCPWR	Encoder Power Supply (+5 VDC)	Output
13	GND	Encoder Power Supply (GND)	Output
14	GND	Encoder Power Supply (GND)	Output
15	NC	Not wired	-
Shell	SHELL	Shield	

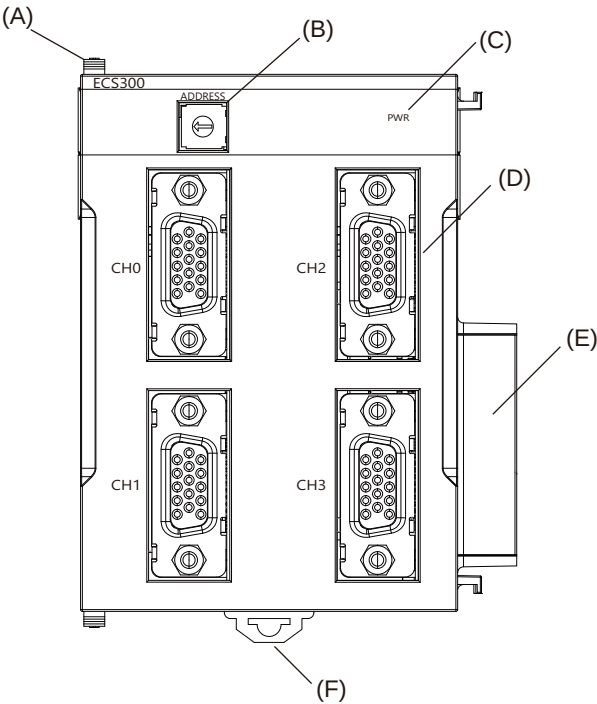
For Serial Encoder CK3W-CAES03A



Type	Pin No.	Cable color	Mark	Signal
Pair 1	11	Blue	Black	Encoder Power Supply (+5 VDC)
	13	Blue	Red	Encoder Power Supply (GND)
Pair 2	4	Pink	Black	Encoder CLK+
	9	Pink	Red	Encoder CLK-
Pair 3	5	Green	Black	Serial Encoder DAT+
	10	Green	Red	Serial Encoder DAT-

Note: The cable shield is connected to the connector shell of the encoder connector.

Part Names and Functions



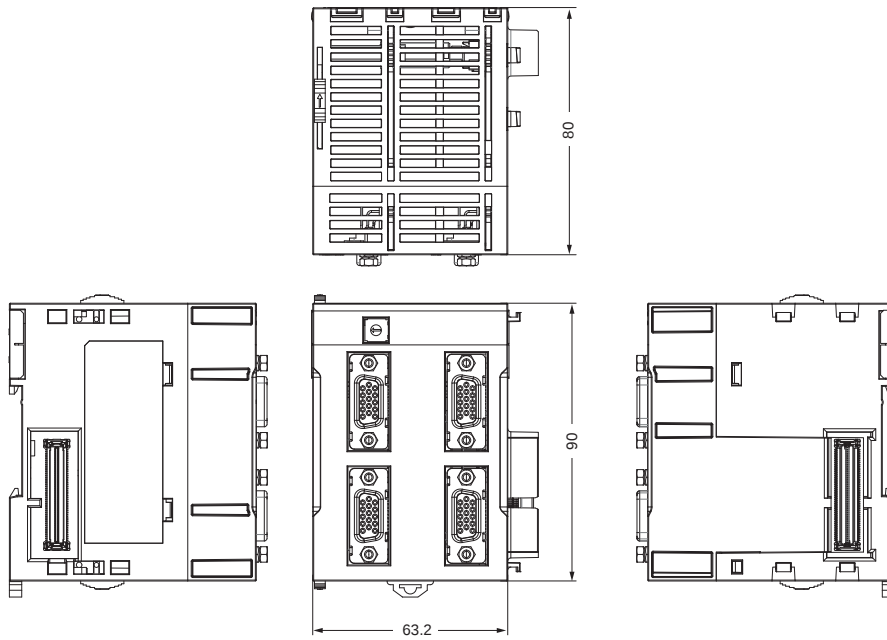
Letter	Name	Function
A	Slider	Holds the Units together.
B	Address switch	Sets the Gate3 Index.
C	Power supply status indicator	Shows the power supply status.
D	Encoder connector	Connects the encoder.
E	Unit connector	Connector that connects to the Unit.
F	DIN Track mounting hook	Used to mount the Unit to a DIN Track.

The LED indicator shows the unit operating status of the Encoder Input Unit.
The operating statuses corresponding to the colors and statuses of the indicators are shown below.

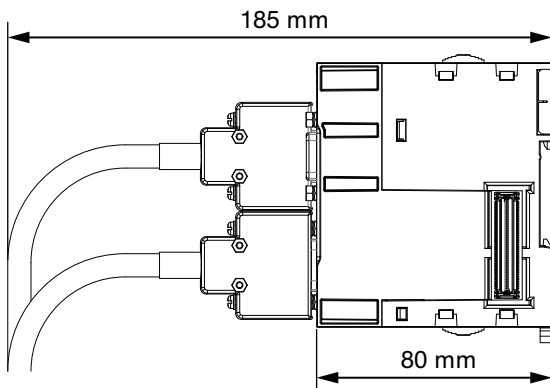
Indicator name	Color	Status	Description
PWR	Green	ON	Power is supplied.
		OFF	Power is not being supplied.

Dimensions

Encoder Input Unit



Installation Height



Version Information

This section provides version information that you need to know when connecting a CK3W Unit to a CPU Unit and PowerPMAC IDE. The table below specifies the correspondence between each CK3W Unit and the versions of CPU Unit and Power PMAC IDE.

CK3W Unit	Supported version	
	CPU Unit's PMAC firmware revision	Power PMAC IDE version
CK3W-ECS300	Ver.2.6.1 or later	Ver.4.5 or later

Related Manuals

Manual name	Cat. No.	Application	Description
CK3M/CK5M-series Programmable Multi-Axis Controller Hardware User's Manual	O036	Learning the basic specifications of the CK3M/CK5M-series Programmable Multi-Axis Controller, including introductory information, design, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire CK3M/CK5M-series system is provided along with the following information. • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and inspection
Power PMAC User's Manual	O014	Learning the features and usage examples of the Motion Controller.	The following information is provided on the Motion Controller. • Basic functions • Setup examples • Programming examples
Power PMAC Software Reference Manual	O015	Learning how to program Motion Controller.	The following information is provided on the Motion Controller. • Details of commands • Details of data structure
Power PMAC IDE User Manual	O016	Learning how to operate Power PMAC IDE, the integrated development environment of the Controller.	Describes the operating procedures of Power PMAC IDE, and examples of how to start the system.
Power PMAC-NC Quick Start Manual	O017	Briefly understanding the basic usage of Power PMAC-NC.	Describes the Quick setup procedure to run Power PMAC-NC on a desktop PC by showing some examples.
Power PMAC-NC .ini Configuration Manual	O018	Configuring an application for CNC devices by using Power PMAC-NC.	Describes how to set up <i>PowerPmacNC.ini</i> , the setup data file to be loaded when Power PMAC-NC starts.
Power PMAC-NC Software User Manual	O019	Learning about usage and features of Power PMAC-NC, Support Software required to use the Controller for CNC devices.	The following information is provided on Power PMAC-NC. • How to use the software • Features included in the software • Features that can be customized
Power PMAC-NC Mill G-Code Manual	O020	Creating programs for CNC devices by using Power PMAC-NC.	Describes the basic G-code set that can be used for Power PMAC-NC, and relevant instructions.

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PMAC is an abbreviation for Programmable Multi Axis Controller.

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