

# Programmable Multi-Axis Controller

# CK3E

CSM\_CK3E\_DS\_E\_9\_1

**A controller with a width of only 28.6 mm provides complete control**



## Features

### High-speed multi-axis control

- Up to 32 axes of control
- Motion control period: 250  $\mu$ s or more

### Flexibility

- CAD/CAM for easy motion control
- Flexible function development capability enables high-precision curve machining

### Saving space & wiring

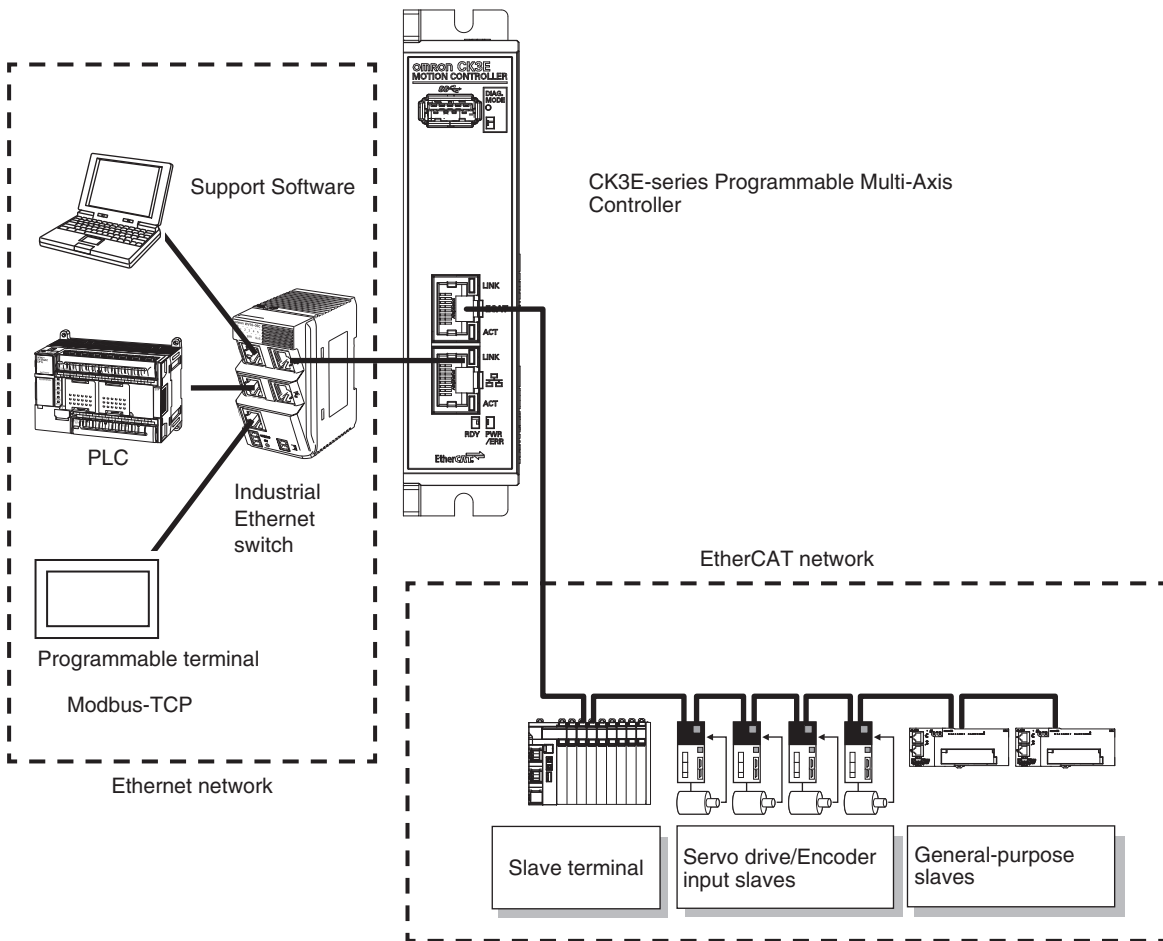
- Footprint reduced to 1/4 (Based on Omron investigation)
- EtherCAT for flexible system configurationAdvanced security function with 32 digit security password

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

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The product photographs and figures that are used in this catalog may vary somewhat from the actual products.

# System Configuration



## Ordering Information

Product	Specifications			Model
	Memory	Ports	Max. no. of controlled axes at EtherCAT port	
Programmable Multi-Axis Controller	Main memory: 1 GB Flash memory: 1 GB	EtherNet/IP port: 1 EtherCAT port: 1	8	CK3E-1210
			16	CK3E-1310
			32	CK3E-1410

## Optional Hardware

Product name	Specifications	Model
USB Flash Drives	Capacity: 2 GB	FZ-MEM2G
Power supply	Output voltage: 24 VDC	S8FS-G□□□24□

## Recommended EtherCAT Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT. For EtherCAT, use a shielded twisted-pair cable (double shielding with aluminum tape and braiding) of Ethernet category 5 (100BASE-TX) or higher, and use straight wiring.





For Ethernet, required specification for the communications cables varies depending on the baud rate.

For 100BASE-TX/10BASE-T, use an STP (shielded twisted-pair) cable of Ethernet category 5 or higher. You can use either a straight or cross cable.

For 1000BASE-T, use an STP (double shielding with aluminum tape and braiding) cable of Ethernet category 5e or higher. You can use either a straight or cross cable.

In the table, materials indicated available for Ethernet 100BASE-TX are available for both of 100BASE-TX and 10BASE-T.

## Cable with Connectors

Item	Appearance	Recommended manufacturer	Cable length (m)	Model	
Products for EtherCAT	Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plugs type *1 Wire Gauge and Number of Pairs: AWG26, 4-pair Cable Cable Sheath material: PUR Cable color: Yellow *2 EtherCAT/ EtherNet/IP (10BASE/100BASE)		OMRON	0.3	XS6W-6PUR8SS30CM-YF
				0.5	XS6W-6PUR8SS50CM-YF
				1	XS6W-6PUR8SS100CM-YF
				2	XS6W-6PUR8SS200CM-YF
				3	XS6W-6PUR8SS300CM-YF
				5	XS6W-6PUR8SS500CM-YF
	Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plugs type *1 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Right blue EtherCAT/ EtherNet/IP (10BASE/100BASE)		OMRON	0.3	XS5W-T421-AMD-K
				0.5	XS5W-T421-BMD-K
				1	XS5W-T421-CMD-K
				2	XS5W-T421-DMD-K
				5	XS5W-T421-GMD-K
	Cable with Connectors on Both Ends (M12 Straight/ M12 Straight) Shield Strengthening Connector cable *3 M12/Smartclick Connectors Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black EtherCAT/ EtherNet/IP (10BASE/100BASE)		OMRON	0.5	XS5W-T421-BM2-SS
				1	XS5W-T421-CM2-SS
				2	XS5W-T421-DM2-SS
				3	XS5W-T421-EM2-SS
				5	XS5W-T421-GM2-SS
	Cable with Connectors on Both Ends (M12 Straight/ RJ45) Shield Strengthening Connector cable *3 M12/Smartclick Connectors Rugged RJ45 plugs type Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black EtherCAT/ EtherNet/IP (10BASE/100BASE)		OMRON	0.5	XS5W-T421-BMC-SS
				1	XS5W-T421-CMC-SS
				2	XS5W-T421-DMC-SS
				3	XS5W-T421-EMC-SS
5				XS5W-T421-GMC-SS	
10	XS5W-T421-JMC-SS				

\*1. Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20 m are available.


Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15 m are available.

For details, refer to Cat.No.G019.

\*2. Cables colors are available in blue, yellow, or Green.

\*3. For details, contact your OMRON representative.

## Cables / Connectors

Item		Recommended manufacturer	Model
Products for EtherCAT or Ethernet (1000BASE-T/100BASE-TX)	Wire Gauge and Number of Pairs: AWG24, 4-pair Cable	Cables	Kuramo Electric Co.
		RJ45 Connectors	Panduit Corporation
Products for EtherCAT or Ethernet (100BASE-TX)	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cables	Kuramo Electric Co.
		RJ45 Assembly Connector	JMACS Japan Co., Ltd.
			OMRON
			<b>KETH-SB *1</b>
			<b>MPS588-C *1</b>
			<b>KETH-PSB-OMR *2</b>
			<b>PNET/B *2</b>
			<b>XS6G-T421-1 *2</b>

\*1. We recommend you to use above cable for EtherCAT and Ethernet, and RJ45 Connector together.

\*2. We recommend you to use above cable for EtherCAT and Ethernet, and RJ45 Assembly Connector together.

**Note:** Connect both ends of cable shielded wires to the connector hoods.

## Support Software

The following table shows the Support Software used to configure, monitor, program, and debug the Programmable Multi-Axis Controller.

Software Name		Application	How to Procure
Power PMAC IDE *		This computer software is used to configure the Controller, create user programs, and debug the programs.	This is free software. Contact your OMRON representative for information on how to procure.
Power PMAC NC	Power PMAC-NC SDK	This computer software is used to control working machines and other CNC machines with the Controller. Use this software when you want to customize the HMI screen. The product contains extension source codes used for customization.	This is non-free software. Contact your OMRON representative for information on how to procure.
	Power PMAC-NC Runtime	This computer software is used to control working machines and other CNC machines with the Controller. Use this software when you do not customize the HMI screen.	This is non-free software. Contact your OMRON representative for information on how to procure.
EC Engineer		This computer software is used to configure and monitor the EtherCAT network by using the Controller as the EtherCAT master.	This is free software. Contact your OMRON representative for information on how to procure.

**Note:** PMAC is an abbreviation for Programmable Multi Axis Controller.

\* For CK3E version 2.3 or earlier, use Power PMAC IDE version 2.2 or later. For CK3E version 2.4 or later, use Power PMAC IDE version 4.1 or later.

## General Specifications

Item	Specification		
	CK3E-1210	CK3E-1310	CK3E-1410
Enclosure	Mounted in a panel		
Grounding method	Ground to 100 Ω or less		
Dimensions (height × width × depth)	130.4(H) × 28.6(D) × 170.9(W) mm		
Weight	540 g or less		
Unit power supply rated voltage	24 VDC (20.4 to 26.4 VDC)		
Unit power supply current consumption	660 mA or less		
Operating environment	Ambient operating temperature	0 to 45°C	
	Ambient operating humidity	10 to 95% RH (without condensation and icing)	
	Atmosphere	Must be free from corrosive gases.	
	Ambient storage temperature	-25 to +70°C (without condensation and icing)	
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with amplitude of 3.5 mm, 8.4 to 150 Hz, acceleration of 9.8 m/s <sup>2</sup> 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 <sup>2</sup> , 3 times each in X, Y, and Z directions	
Applicable standards *	EU: EN 61326, RCM, KC Registration, UL		

\* For the latest applicable standards for each model, visit the OMRON website ([www.ia.omron.com](http://www.ia.omron.com)), or contact your OMRON representative.

## Performance/Function Specifications

Item		Specification		
		CK3E-1210	CK3E-1310	CK3E-1410
Memory		Main memory: 1 GB Flash memory: 1 GB		
External terminals		Communications Connector For EtherCAT communications. • RJ45 × 1 (Shield supported) For Ethernet communications. • RJ45 × 1 (Shield supported)		
		Power supply input terminal For Unit power supply × 1		
		USB port For external memory connection, USB 3.0 host × 1 Type A		
Motion control	Maximum Number of Controlled Axes	8 axes	16 axes	32 axes
	Motion control period	250 μs or more		
	Control method	Issuing control commands using EtherCAT communications		
EtherCAT communications specifications	Communications protocol	EtherCAT protocol		
	Baud rate	100 Mbps		
	Physical layer	100BASE-TX (IEEE 802.3)		
	Topology	Line, daisy chain, and branching		
	Transmission media	Twisted-pair cable of category 5 or higher (double-shielded cable with aluminum tape and braiding)		
	Transmission distance	Distance between nodes: 100 m or less		
	Maximum number of slaves	32		
	Range of node addresses that can be set	1 to 32		
Ethernet Port	Baud rate	1 Gbps/100 Mbps		
	Physical layer	1000BASE-T/100BASE-TX		
	Frame length	1,514 bytes max.		
	Media access method	CSMA/CD		
	Modulation	Baseband		
	Topology	Star		
	Transmission media	Twisted-pair cable of category 5, 5e, or higher (shielded cable) *1		
	Maximum transmission distance between Ethernet switch and node	100 m		
	Maximum number of cascade connections	There are no restrictions if an Ethernet switch is used.		
	EtherNet/IP tag data link (cyclic communications) *2	Number of connections	32	
		Requested packet interval (RPI)	1 to 1,000 ms (0.5 ms units)	
		Allowed communications bandwidth per Unit	3,200 pps *3	
		IO connection size	Input: 504 bytes max. Output: 504 bytes max.	
EtherNet/IP CIP message service *2	UCMM (unconnected message)	Number of servers that can perform communications simultaneously: 32		
EtherNet/IP conformance test		CT17 compliant		
USB port	Physical layer	USB 3.0-compliant A-type connector, Output voltage 5 V, 0.9 A max.		
	Transmission distance	3 m max.		

\*1. Always use shielded cables for EtherNet/IP communications.

\*2. EtherNet/IP is available only for targets and not available for originators. EtherNet/IP is available only for PMAC firmware revision version 2.6.0 or later whose date of production is September 25th, 2020 or later (Lot number 25920 and later). Use Power PMAC IDE Ver.4.4.1 or a later version.

\*3. Represents Packet Per Second and indicates the number of sent or received packets that can be processed in a second.

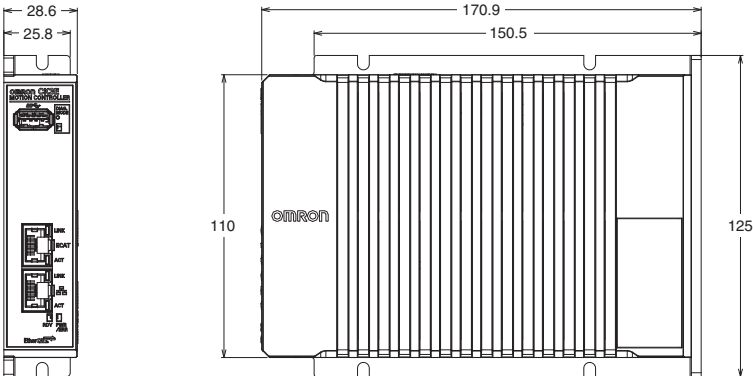
### Restrictions on using the OMRON NX-Series Ethercat Coupler Unit

When OMRON NX-series EtherCAT Coupler Units are used as slaves of the Programmable Multi-Axis Controller as the EtherCAT master, the following models and unit versions of EtherCAT Coupler Units can be connected.

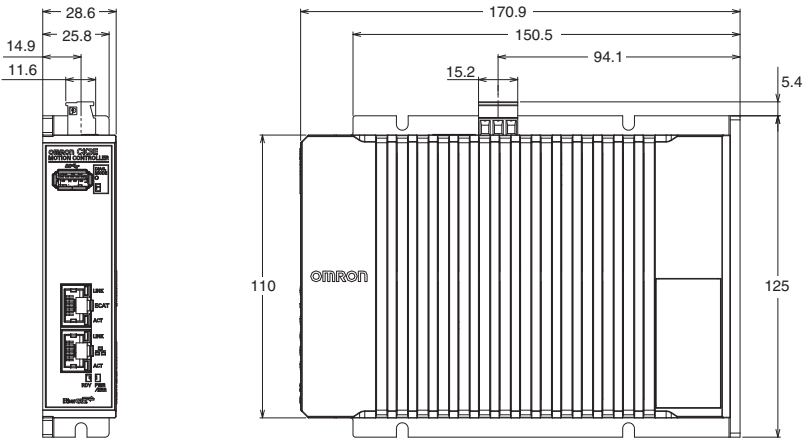
Model	Unit version	Connectable/Unconnectable
NX-ECC203	Ver. 1.4 or later	Connectable
	Ver. 1.3 or earlier	Unconnectable
NX-ECC202	All versions	
NX-ECC201	All versions	

# Dimensions

## Main Body Only



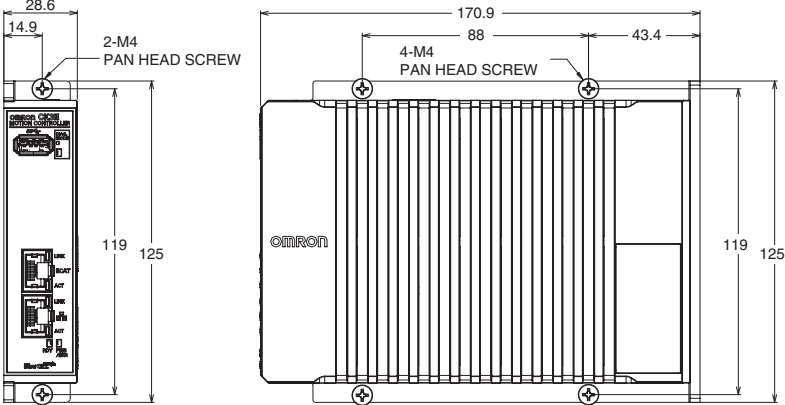
## With Power Connector



## Mounting Dimensions

Front mounting

Sideways mounting



## Related Manuals

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Contact your OMRON representative for details.

Man.No	Manual name	Application	Description
I610	CK3E-series Programmable Multi-Axis Controller Hardware User's Manual	Learning all basic information about the CK3E-series Programmable Multi-Axis Controller. This includes introductory information, installation, operating procedures and maintenance. Mainly hardware information is provided.	An introduction to the CK3E-series Programmable Multi-Axis Controller is provided along with the following information: <ul style="list-style-type: none"><li>• Overview</li><li>• System Configurations</li><li>• Specifications</li><li>• Installation</li><li>• Operating Procedures</li><li>• Maintenance</li></ul>



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