СК3Е□

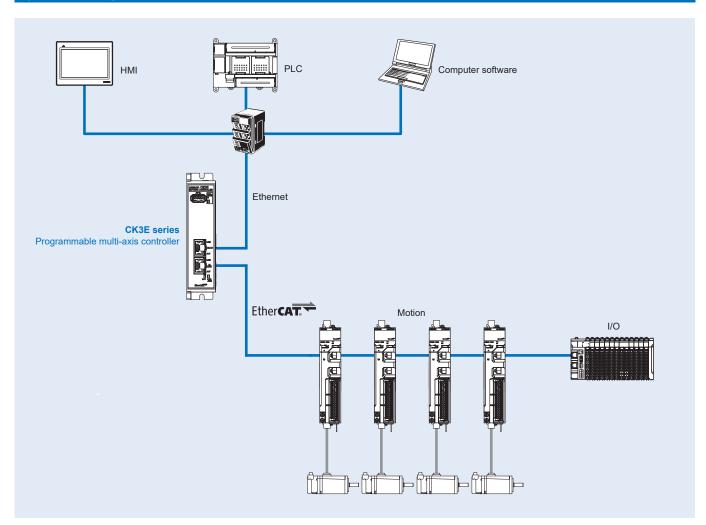
# Programmable multi-axis controller

# A powerful, flexible and cost-effective motion controller

- Up to 32 axes motion control
- 250 µs motion control period
- Flexible function development capability enables high-precision curve machining
- EtherCAT for flexible system configuration



# System configuration





# **Specifications**

# **General specifications**

Item		Specifications				
Enclosure		Mounted in a panel				
Grounding method		Ground to less than 100 $\Omega$				
Dimensions (H x W	x D)	130.4 mm x 28.6 mm x 170.9 mm				
Weight		540 g				
Unit power supply	rated voltage	24 VDC (20.4 to 26.4 VDC)				
Unit power supply	current consumption	660 mA or less				
Environmental specifications	Ambient operating temperature	0 to 45°C				
	Ambient operating humidity	10 to 95% RH (without condensation and icing)				
	Ambient storage temperature	-25 to 70°C (without condensation and icing)				
	Atmosphere	Must be free from corrosive gases				
	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				

# **Performance specifications**

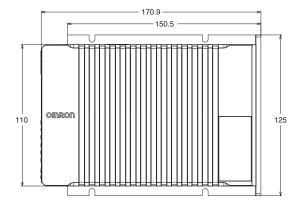
Model			CK3E-1210	CK3E-1310	CK3E-1410			
Motion control Number of controlled axes		olled axes	8 axes	16 axes	32 axes			
	Motion control period		250 μs min.					
	Control method		Issuing control commands using EtherCAT communications					
Memory			Main memory: 1 GB Flash memory: 1 GB					
External terminals			Communications connectors  • For EtherCAT communications, RJ45 x 1 (shield supported)  • For Ethernet communications, RJ45 x 1 (shield supported)					
			Power supply input ter • For unit power supp					
			USB port • For external memor	ry connection, USB 3.0 host x	1 Type A			
Communications	EtherCAT port	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 straight cable with aluminum tape and braiding)					
		Transmission distance	Distance between nodes: 100 m max.					
		Number of slaves	32 max.					
		Range of node ad- dresses that can be set	1 to 32					
	Ethernet port	Physical layer	1000BASE-T/100BASE-TX					
		Frame length	1,514 bytes max.					
		Media access method	I CSMA/CD					
		Modulation	Baseband					
		Topology	Star					
		Transmission media	Twisted-pair cable of category 5, 5e or higher (shielded cable)					
		Transmission distance	te 100 m max. (distance between Ethernet switch and node)					
		Cascade connections	There are no restrictions if an Ethernet switch is used					
	USB port	Physical layer	USB 3.0 compliant A-type connector Output voltage 5 V, 0.9 A max.					
		Transmission distance	3 m max.					

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# **Dimensions**

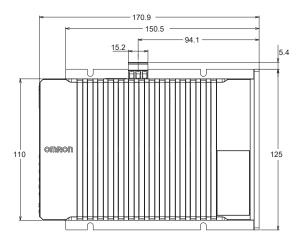
#### Main body



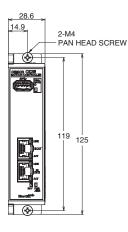


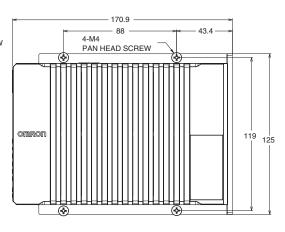
#### With power connector





#### **Mounting dimensions**







# **Ordering information**

#### Programmable multi-axis controller

Item/Appearance	Memory	Communication ports	Number of axes	Model
Programmable multi-axis controller		EtherCAT port: 1	8	CK3E-1210
- 40	Flash memory: 1 GB	Ethernet port: 1		
			16	CK3E-1310
			32	CK3E-1410

#### **Accessories**

Item	Specifications	Model
USB memory	2 GB	FZ-MEM2G
	8 GB	FZ-MEM8G
Power supply	Output voltage: 24 VDC	S8JX-□□□□24□□

# Recommended EtherCAT and EtherNet/IP communication cables

Cable   M12/Smartclick connectors   Improved shield for EtherCAT   Communications   Cable with connectors on both ends   (M12 straight/M12 straight)   S	Item			Manufacturer	Colour	Cable length (m)	Model
Improved shield for EtherCAT communications	EtherCAT	Cat 5e, AWG22, 2-pair cable			Black	0.5	XS5W-T421-BM2-SS
Communications   Rugged type   Cable with connectors on both ends   Rugged type   Cable sheath material: LSZH   Cable with connectors on both ends   Rugged type						1	XS5W-T421-CM2-SS
Rugged type   Cable with connectors on both ends (M12 straight/RJ45)   Black   0.5   X55W-1421   10   X55W-1421   2   X55W-1421   5   X55W-1421   6   X55W-1421   6   X55W-1421   7   X55W-1612   7   X56W-61.52   7   X56W-			(M12 straight/M12 straight)			2	XS5W-T421-DM2-SS
Rugged type   Cable with connectors on both ends (M12 straight/RJ45)   Black   0.5   X55W-7421   2   X55W-7421   3   X55W-7421   5   X55W-74		communications				3	XS5W-T421-EM2-SS
Rugged type   Cable with connectors on both ends (M12 straight/RJ45)   Black   0.5   X55W-T421   1   X55W-T421   2   X55W-T421   3   X55W-T421   3   X55W-T421   5   X55W-T4			-0			5	XS5W-T421-GM2-SS
Cable with connectors on both ends (M12 straight/RJ45)						10	XS5W-T421-JM2-SS
M12 straight/RJ45    Cat 6a, AWG27, 4-pair cable   Cable sheath material: LSZH   To AS6W-6LSZ			Rugged type		Black	0.5	XS5W-T421-BMCSS
Eithernet/ EitherCAT patch cable EitherCAT patch cable  EitherCAT patch cable  Cable sheath material: LSZH <sup>-1</sup> Note: This cable is available in yellow, green and blue colours.  Note: This cable is available in yellow, green and blue colours.  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Green  Green						1	XS5W-T421-CMC-SS
Eithernet/   Cat 6a, AWG27, 4-pair cable   EtherCAT patch cable   Cable sheath material: LSZH   Tour   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Cable sheath material: LSZH   Tour   Cable with connectors on both ends (RJ45/RJ45)   Tour   Cable sheath material: PUR   Cable with connectors on both ends (RJ45/RJ45)   Tour   Cable with connectors on			(M12 straight/RJ45)			2	XS5W-T421-DMC-SS
Ethernet/   Cat 6a, AWG27, 4-pair cable   Cable sheath material: LSZH   Total						3	XS5W-T421-EMC-SS
Ethernet/ EtherCAT   EtherCAT   EtherCAT   Cable sheath material: LSZH**   Note: This cable is available in yellow, green and blue colours.   Standard type   Cable with connectors on both ends   RJ45/RJ45			~0			5	XS5W-T421-GMC-SS
Cable sheath material: LSZH   Note: This cable is available in yellow, green and blue colours.   Cable with connectors on both ends (RJ45/RJ45)   Cable with connectors on both ends (						10	XS5W-T421-JMC-SS
Note: This cable is available in yellow, green and blue colours.   RJ45/RJ45	Ethernet/	Cat 6a, AWG27, 4-pair cable	Standard type		Yellow	0.2	XS6W-6LSZH8SS20CM-Y
Note: This cable is available in yellow, green and blue colours.    1	EtherCAT	Cable sheath material: LSZH*1				0.3	XS6W-6LSZH8SS30CM-Y
Yellow, green and blue colours.     1			(RJ45/RJ45)			0.5	XS6W-6LSZH8SS50CM-Y
1.5   XS6W-6LSZ   2   XS6W-6LSZ   3   XS6W-6LSZ   5   XS6W-6LSZ   5   XS6W-6LSZ   5   XS6W-6LSZ   5   XS6W-6LSZ   10   XS6W-6LSZ   10   XS6W-6LSZ   20   XS6W						1	XS6W-6LSZH8SS100CM-Y
2		yellow, green and blue colours.	e —			1.5	XS6W-6LSZH8SS150CM-Y
Standard type   Cable sheath material: PUR   Cable with connectors on both ends (RJ45/RJ45)   S (RS6W-6LSZ   1							XS6W-6LSZH8SS200CM-Y
Standard type   Cable sheath material: PUR   Standard type   Cable with connectors on both ends (RJ45/RJ45)   SS6W-6LSZ   1				1			XS6W-6LSZH8SS300CM-Y
T.5						5	XS6W-6LSZH8SS500CM-Y
To							XS6W-6LSZH8SS750CM-Y
15							XS6W-6LSZH8SS1000CM-Y
Cat 5e, AWG26, 4-pair cable Cable sheath material: PUR <sup>11</sup>   Standard type Cable with connectors on both ends (RJ45/RJ45)   Standard type Cable with conne						15	XS6W-6LSZH8SS1500CM-Y
0.3						-	XS6W-6LSZH8SS2000CM-Y
0.3					Green	0.2	XS6W-6LSZH8SS20CM-G
0.5							XS6W-6LSZH8SS30CM-G
1							XS6W-6LSZH8SS50CM-G
1.5						1	XS6W-6LSZH8SS100CM-G
Cat 5e, AWG26, 4-pair cable   Cable sheath material: PUR   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cable with connectors on bot						1.5	XS6W-6LSZH8SS150CM-G
Standard type   Cable sheath material: PUR   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type							XS6W-6LSZH8SS200CM-G
Cat 5e, AWG26, 4-pair cable   Cable sheath material: PUR   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connecto						3	XS6W-6LSZH8SS300CM-G
Cat 5e, AWG26, 4-pair cable Cable sheath material: PUR 1 Standard type Cable sheath material: PUR 1 Cable with connectors on both ends (RJ45/RJ45) Green 7.5 XS6W-5PUF 2 XS6W-5PUF 2 XS6W-5PUF 3 XS6W-5PUF 5 XS6W-5PUF 7.5 XS6W-5P						5	XS6W-6LSZH8SS500CM-G
Cat 5e, AWG26, 4-pair cable   Cable sheath material: PUR   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cable with connectors on both ends (RJ45/RJ45)   Cat 5e, AWG26, 4-pair cable   Cat 5e, AWG26, 4-pair cabl						7.5	XS6W-6LSZH8SS750CM-G
Cat 5e, AWG26, 4-pair cable Cable sheath material: PUR <sup>-1</sup> Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Green  0.5  XS6W-5PUF  1.5  XS6W-5PUF  2  XS6W-5PUF  5  XS6W-5PUF  7.5  XS6W-5PUF  7.5							XS6W-6LSZH8SS1000CM-G
Cat 5e, AWG26, 4-pair cable   Cable sheath material: PUR   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Standard type   Cable with connectors on both ends (RJ45/RJ45)   Cable with connectors on both ends (RJ45/R						15	XS6W-6LSZH8SS1500CM-G
Cat 5e, AWG26, 4-pair cable Cable sheath material: PUR <sup>11</sup> Standard type Cable with connectors on both ends (RJ45/RJ45)  Standard type Cable with connectors on both ends (RJ45/RJ45)  Green  0.5  XS6W-5PUF  1.5  XS6W-5PUF  2  XS6W-5PUF  5  XS6W-5PUF  7.5  XS6W-5PUF  7.5				(			XS6W-6LSZH8SS2000CM-G
Cable sheath material: PUR*1  Cable with connectors on both ends (RJ45/RJ45)  1 XS6W-5PUF 1.5 XS6W-5PUF 2 XS6W-5PUF 3 XS6W-5PUF 5 XS6W-5PUF 7.5 XS6W-5PUF 7.	<u> </u>	Cat 5e, AWG26, 4-pair cable Cable sheath material: PUR*1	Standard type		Green		XS6W-5PUR8SS50CM-G
(RJ45/RJ45)  1.5 XS6W-5PUF 2 XS6W-5PUF 3 XS6W-5PUF 5 XS6W-5PUF 7.5 XS6W-5PUF					3.001		XS6W-5PUR8SS100CM-G
2 XS6W-5PUF 3 XS6W-5PUF 5 XS6W-5PUF 7.5 XS6W-5PUF			(RJ45/RJ45)			1.5	XS6W-5PUR8SS150CM-G
3 XS6W-5PUF 5 XS6W-5PUF 7.5 XS6W-5PUF							XS6W-5PUR8SS200CM-G
5 XS6W-5PUF 7.5 XS6W-5PUF			<i>~</i>				XS6W-5PUR8SS300CM-G
7.5 XS6W-5PUF							XS6W-5PUR8SS500CM-G
							XS6W-5PUR8SS750CM-G
							XS6W-5PUR8SS1000CM-G
							XS6W-5PUR8SS1500CM-G
							XS6W-5PUR8SS2000CM-G

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Item			Manufacturer	Colour	Cable length (m)	Model
Ethernet/	Cat 5e, AWG22, 2-pair cable	Rugged type	OMRON	Grey	0.3	XS5W-T421-AMD-K
EtherCAT		Cable with connectors on both ends	İ		0.5	XS5W-T421-BMD-K
patch cable		(RJ45/RJ45)			1	XS5W-T421-CMD-K
		-			2	XS5W-T421-DMD-K
		mO)			3	XS5W-T421-EMD-K
					5	XS5W-T421-GMD-K
					10	XS5W-T421-JMD-K
					15	XS5W-T421-KMD-K
		Rugged type		Grey	0.3	XS5W-T421-AMC-K
		Cable with connectors on both ends			0.5	XS5W-T421-BMC-K
		(M12 straight/RJ45)			1	XS5W-T421-CMC-K
		-00			2	XS5W-T421-DMC-K
					3	XS5W-T421-EMC-K
					5	XS5W-T421-GMC-K
					10	XS5W-T421-JMC-K
					15	XS5W-T421-KMC-K
		Rugged type		Grey	0.3	XS5W-T422-AMC-K
		Cable with connectors on both ends			0.5	XS5W-T422-BMC-K
	(1	(M12 L right angle/RJ45)			1	XS5W-T422-CMC-K
					2	XS5W-T422-DMC-K
					3	XS5W-T422-EMC-K
					5	XS5W-T422-GMC-K
					10	XS5W-T422-JMC-K
					15	XS5W-T422-KMC-K

 $<sup>^{\</sup>star 1}$  The lineup features low smoke zero halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.

Note: Please be careful while cable processing, for EtherCAT, connectors on both ends should be shield connected and for EtherNet/IP, connectors on only one end should be shield connected.

# Support software

Item	Description
Power PMAC IDE*1	This computer software is used to configure the controller, create user programs and debug programs.  This is a free software, contact your OMRON representative for information on how to procure.
Power PMAC-NC16 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 a non-free software, contact your OMRON representative for information on how to procure.
Power PMAC-NC16 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 a 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 a free software, contact your OMRON representative for information on how to procure.

<sup>\*1</sup> Power PMAC IDE version 2.2 or higher is needed.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. I168E-EN-01

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

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