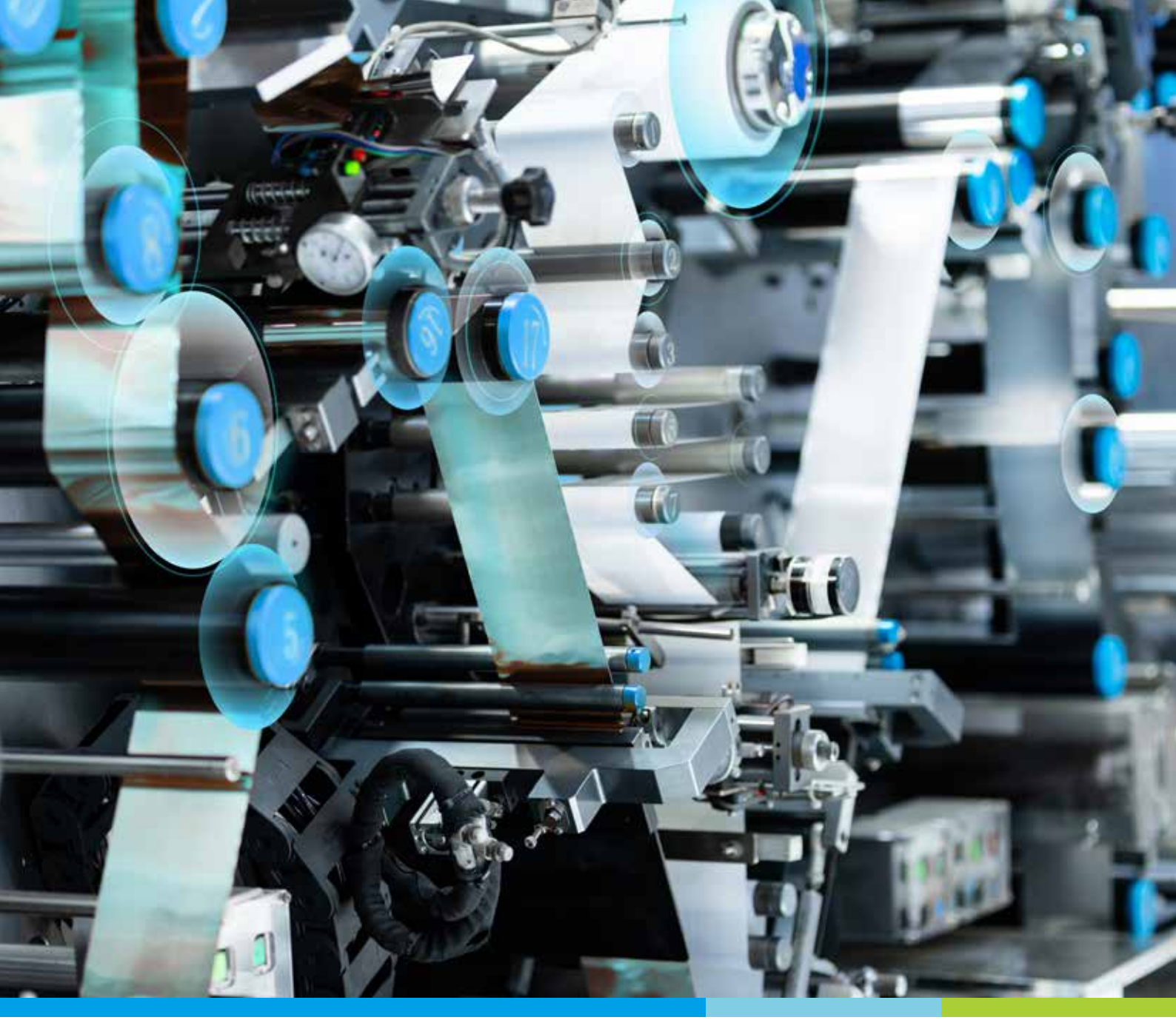


Digitized Automation for a Changing World

Delta Motion Control Solution
AX Series

www.deltaww.com

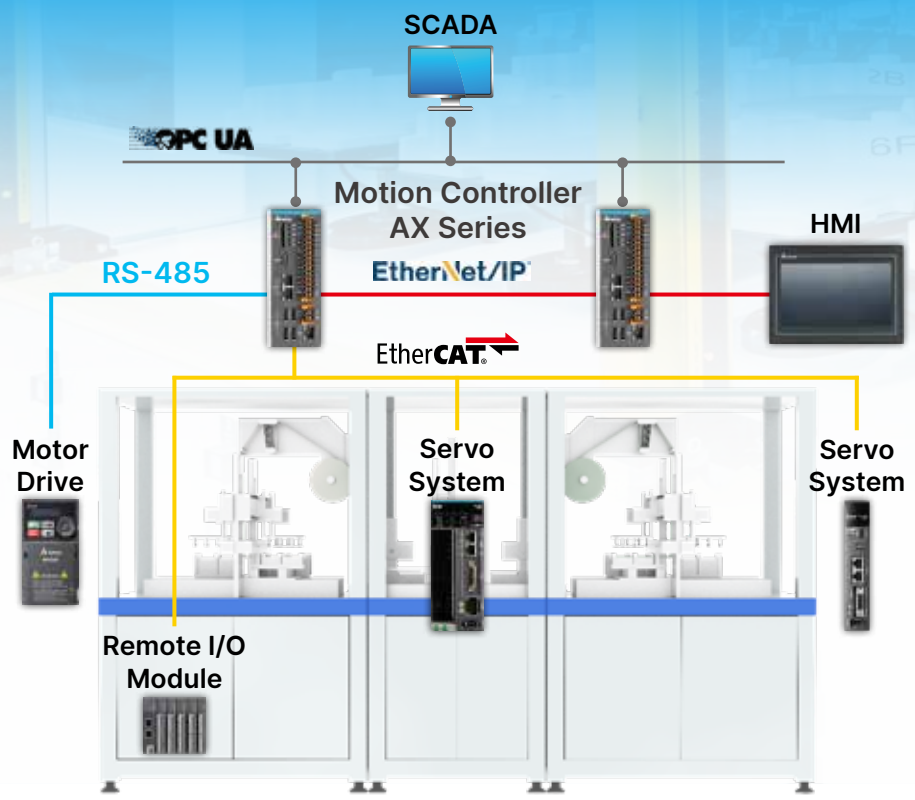
Delta Motion Control Solution AX Series

Automation and digitalization play important roles in smart manufacturing.
To enhance competitiveness, machine makers around the world are seeking solutions to facilitate quick expansion and save development time and labor.

Compliant with the IEC 61131-3 standard, the Delta Motion Control Solution AX Series offers a comprehensive development software platform to integrate PLCs, HMIs, servo drives, motor drives, and remote I/O modules for customized development, operation, and maintenance.

The AX Series supports EtherCAT communication for simultaneous control of various field devices, including Delta's AC Servo Drive ASDA-A3-E, ASDA-B3-E, ASDA-A2-E Series, High Performance Compact Drive MH300 Series, Compact Drive MS300 Series, and the General Vector Control Drive C2000 Plus Series. The solution also provides excellent remote I/O scalability with the Remote Module R1-EC and R2-EC Series, and DVP EtherCAT Remote I/O.

With its highly integrated offerings, Delta's versatile AX series can fulfill various application demands.



Standalone
Motion Controller

PLC-Based
Motion Controller

Table of Contents

Page

Delta Motion Control Solution
AX Series 4

Solution Introduction 6

Software 6

Solution Architecture 10

Hardware Specifications 12

Model Explanation 14

Ordering Information 15

Delta Motion Control Solution AX Series

Software

Motion Controllers

CODESYS

AX-C / AX-3 / AX-8 Series

Field Devices

Servo Drives

ASDA-A2-E

ASDA-A3-E

ASDA-B3-E

Remote I/O Modules

R1-EC

R2-EC

RTU-ECAT

Solution Features

- **Various programming languages:**
  Provides various programming languages that can be used simultaneously on projects, including
  - Structured Language (ST)
  - Ladder Diagram (LD)
  - Sequential Function Chart (SFC)
  - Function Block Diagram (FBD)
  - Continuous Function Chart (CFC)

- **Highly integrated software platform:**
  The integrated development platform optimizes project development efficiency and supports parameter reading, configuration, and PLCopen standard motion control language. Users can configure multiple projects and settings on the same platform and can quickly share tags with HMIs

- **Comprehensive system solution:**
  Supports a variety of communication protocols and connects easily with servo drives, motor drives, remote modules and robotic arms as well as MES, SCADA, HMIs, and cloud services to build comprehensive systems

HMI

DOP-100

Motor Drives

C2000 Plus

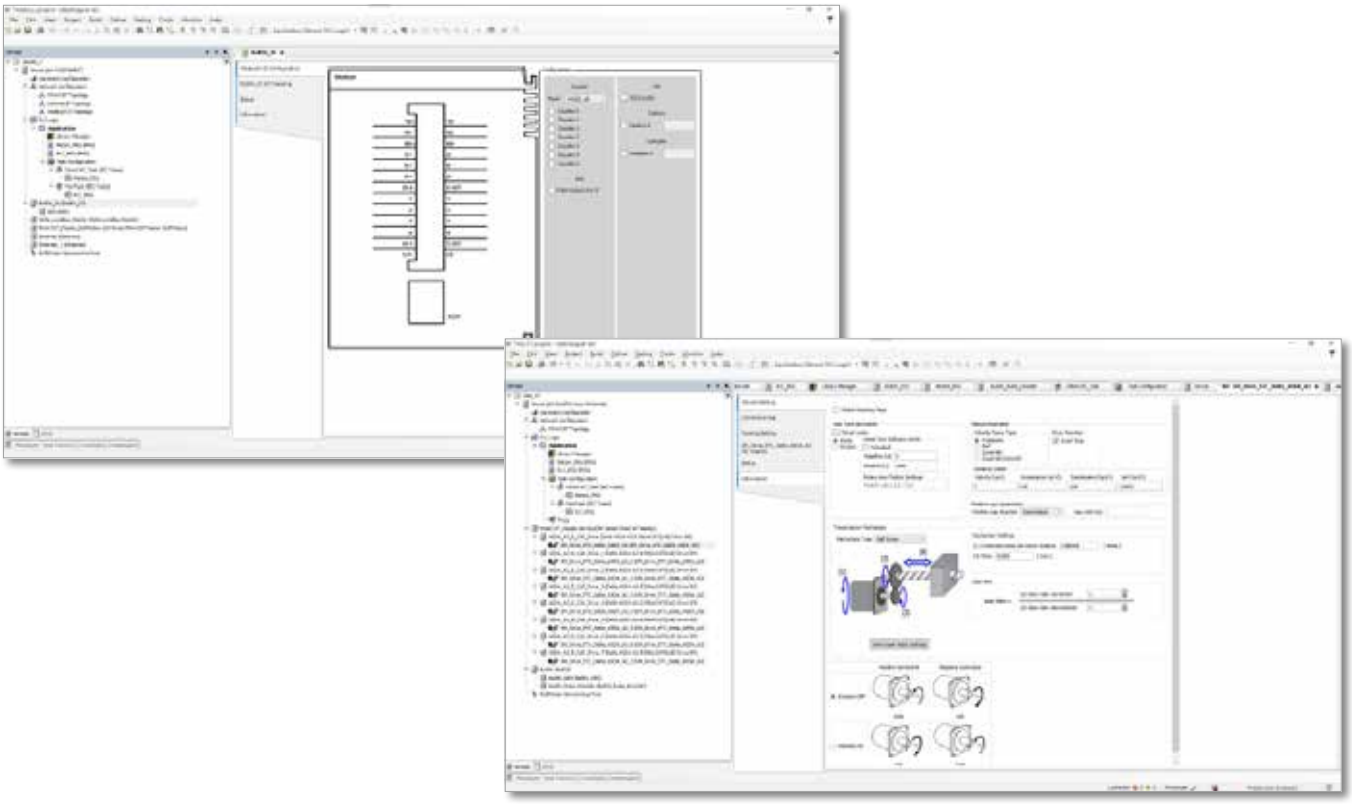
MH300

MS300

New Software Design Brings a More User-Friendly Interface

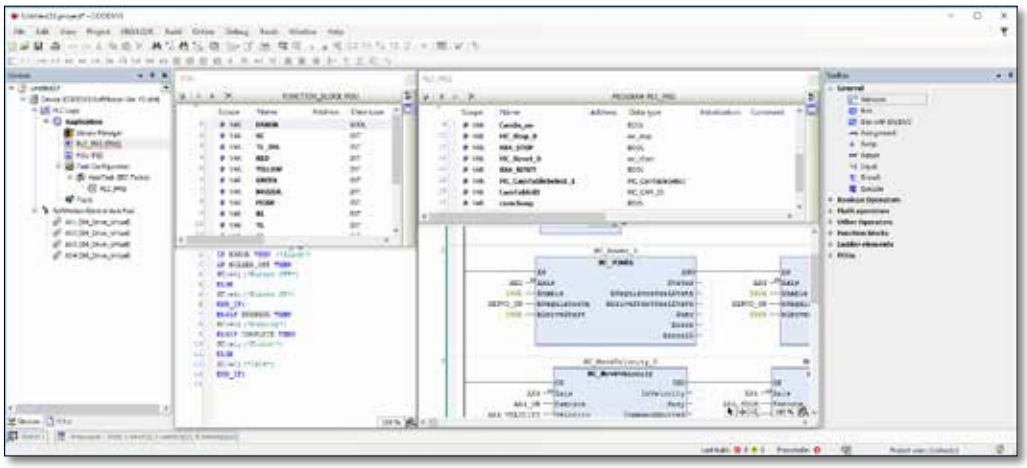
The new programming software DIADesigner-AX provides a friendly and versatile programming environment to reduce development time and costs

Software Interface of I/O Configuration & Axis Parameter Setting



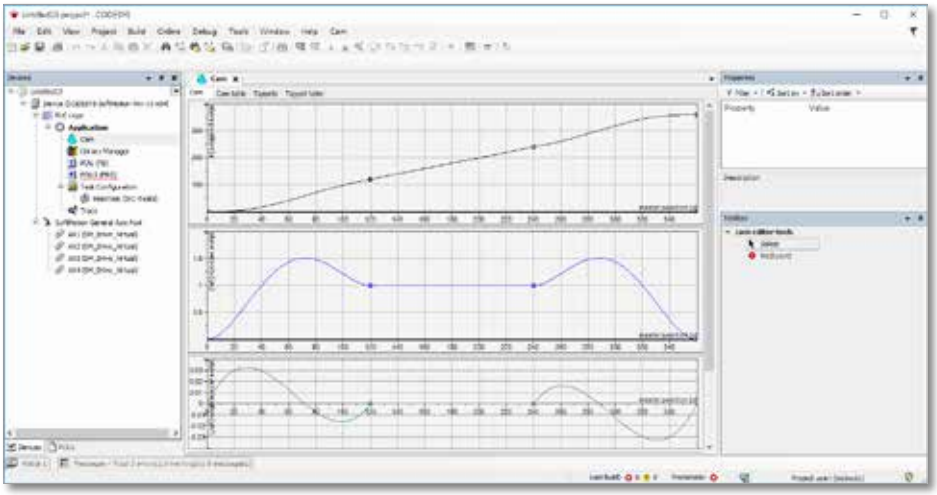
Standard IEC 61131-3 Programming

- Structured Text (ST)
- Ladder Programming (LD)
- Function Block Diagram (FBD)
- Sequential Function Chart (SFC)



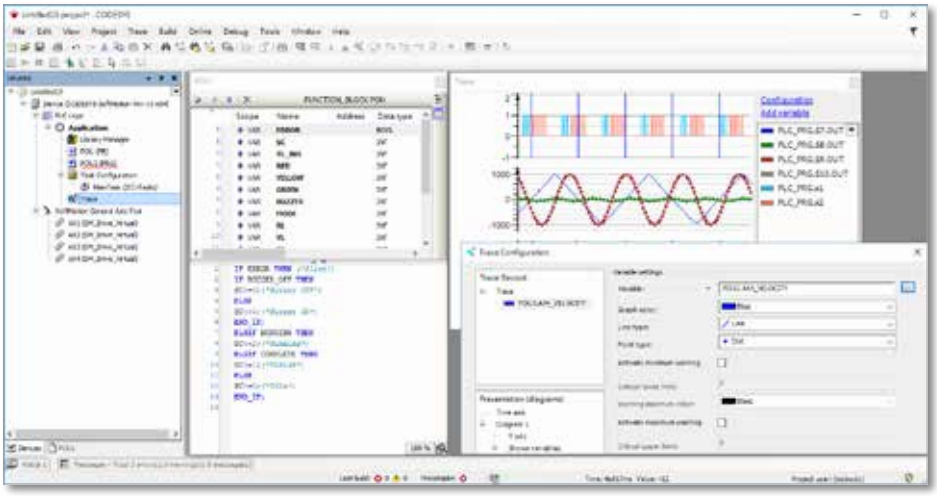
Motion Control Programming Software

- Supports single-axis and multi-axis motion (master/slave axis motion and CAM control)
- Adopts PLCopen certified POU libraries for programming
- Provides a graphical CAM programming interface



Tasks and Debugger

- Displays application data in SoftPLC and controller runtime simulation mode
- Enables users to monitor specific values in a watch list
- Supports reading, writing, and forced setting of variables in the editor
- Code can be executed in a single step or cycle



New Software Design Brings a More User-Friendly Interface

Features

- One single platform to create project programs from configuration to commissioning
- Supports IEC 61131-3 standard object-oriented programming and can integrate project functional programs
- Files can be directly integrated into the test library for easy development

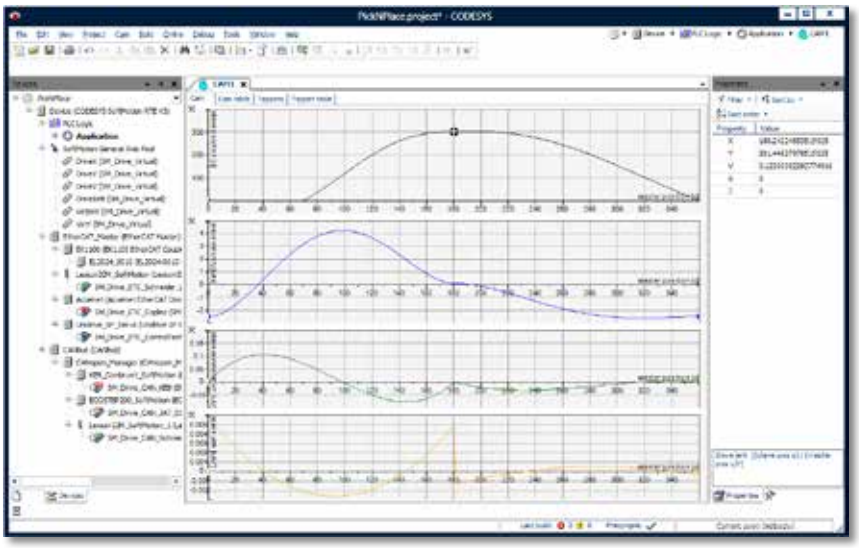
Benefits

Standard PLCopen Language

- Supports PLCopen motion control POU for single-axis or multi-axis control

Electronic CAM

- Supports electronic CAM synchronous motion control
- Provides a graphical electronic CAM programming interface



Features

- Highly compatible, can be deployed on multiple platforms and in various applications
- Modular design for multi-function expansion
- A simple user interface and customizable windows

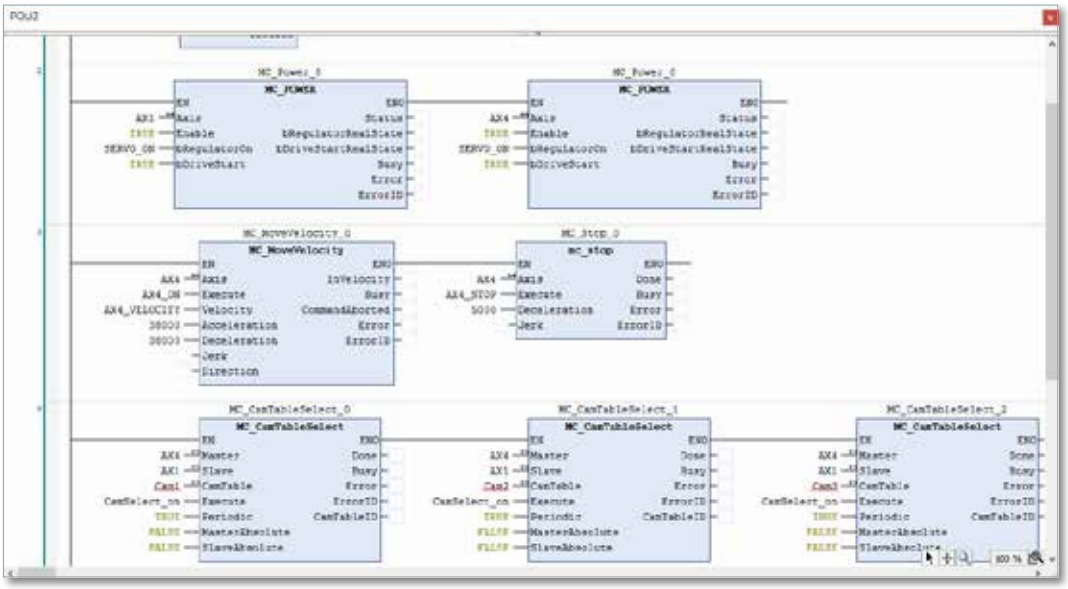
Benefits

Real-Time System

- Synchronizes 64 axes in 1 ms (real and virtual axes)

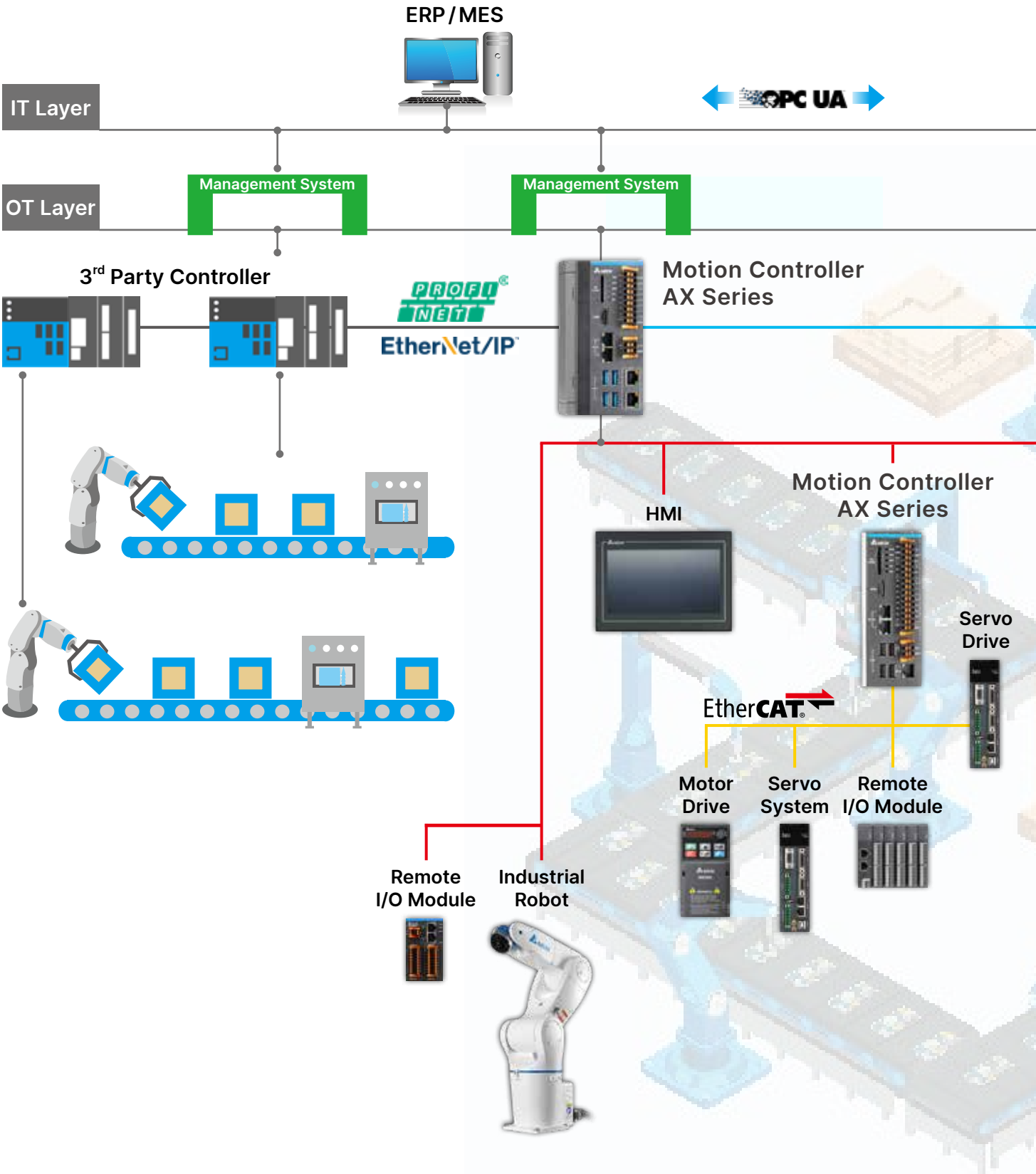
Multi-Axis Function Block

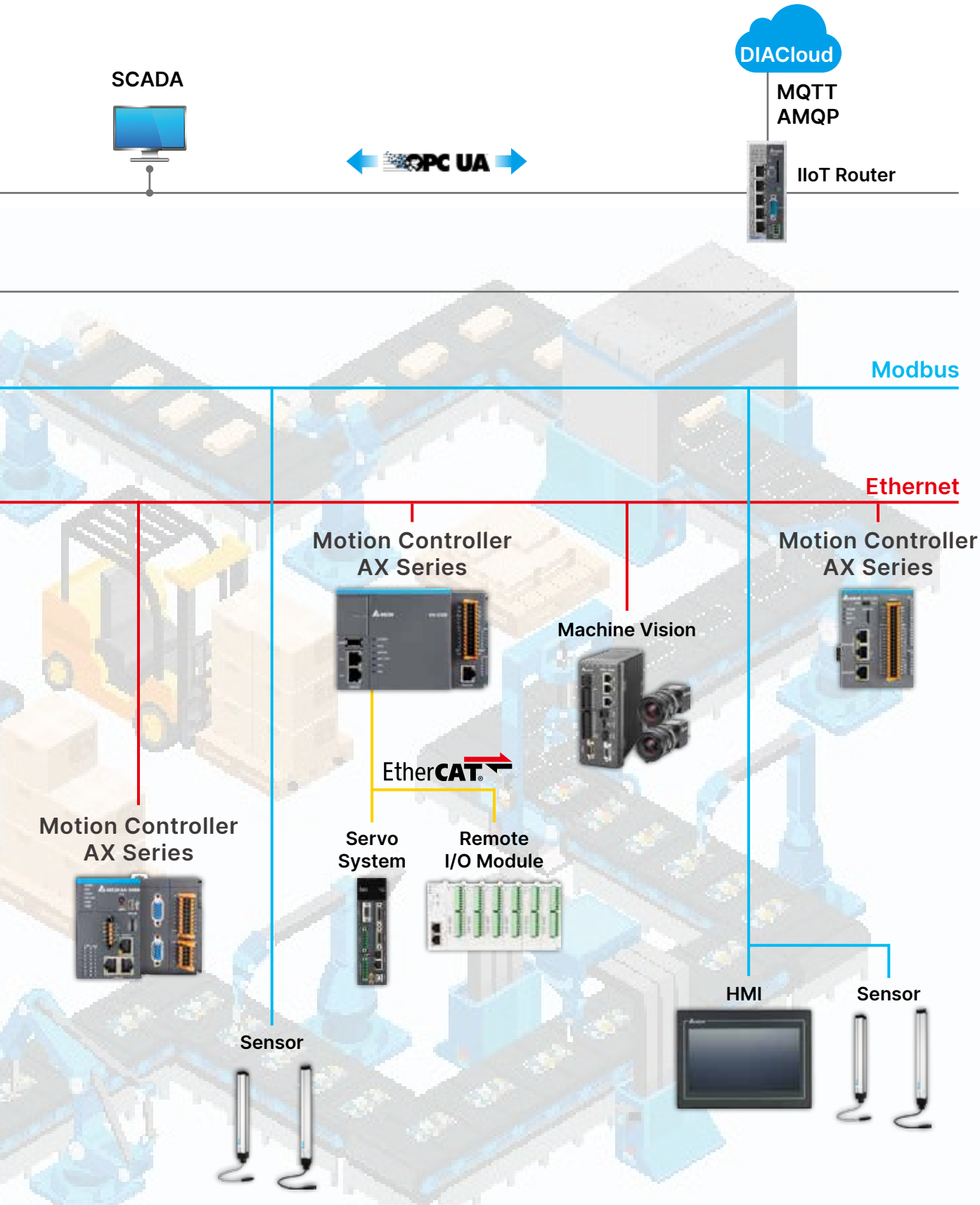
- Supports motion control function blocks compliant with the IEC 61131-3 standard



Solution Architecture

Creates Comprehensive Systems with Exceptional Interoperability




SCADA
OPC UA
DIACloud
MQTT
AMQP
IIoT Router
Modbus
Ethernet
Motion Controller
AX Series
Motion Controller
AX Series
Machine Vision
Motion Controller
AX Series
EtherCAT
Servo
System
Remote
I/O Module
HMI
Sensor
Sensor

Hardware Specifications

Product Model		Standalone Motion Controller		
		AX-C12EB0MD1T	AX-8__EP0_B1_	AX-8__EP0_E1_
Processor	CPU	Cortex-A7, 1.0 GHz	Intel® Celeron J1900 2.0 GHz Quad. Core	
	Memory	DDR4-SDRAM 1 GB	DDR3L-1333 4 GB	DDR3L-1333 2 GB
	Retain Memory	896 KB	96 KB	
Monitor	Display Type	N/A	HDMI 1.4a ×1	
Number of Controllable Axes		12: 12 Axes	16: 16 Axes, 32: 32 Axes, 64: 64 Axes	
DO Output Type		T: NPN	T: NPN, P: PNP	
Software and Firmware Version	Motion Function	PLCopen Part1, Part2 Multi-axis Interpolation	PLCopen Part1, Part2 Multi-axis Interpolation CNC & Robotic (Advanced Type)	
	Operating System	N/A	Win10 IoT 64-bit, Linux	
	Visualization	N/A	Delta HMI CODESYS Target Visualization	
Communication Interface	Ethernet I/F	IEEE 802.3 / 802.3u / 802.3ab 1 Gbps ×2		
	FieldBus I/F	EtherCAT ×1		
	USB	N/A	USB 2.0 ×4	
	Serial Port	Isolated RS-485 ×1	Isolated RS-485 / 422 ×1	
Expansion Interface	Specifications	SD Card Slot ×1		
Storage Device	HDD	N/A	M.2 Module ×1 (Built-in SSD 32 G)	EMMC 8 GB
	Program Capacity	128MB	1G	
Power Supply	Input Voltage	24 V_{DC} (-15 % ~ +20 %)		
	Rated Power	10 W (24 V / 0.41 A)	28.8 W (24 V / 1.2 A)	
	RTC Backup Battery	N/A	3V CR2032 Lithium × 1 for BIOS use	
Dimensions	Size (W×H×D)	100 × 73 × 100 mm	54.2 × 141 × 137.5 mm	
	Weight	360 g	750 g	
I/O Device	In/Out	131,072 bytes / 131,072 bytes		
Instruction Processing Speed	LD Instruction	5.629 ns	1.573 ns	
	Math Instruction	66.81 ns	1.660 ns	
Environment	Operating Temp.	-20 ~ 55 °C	0 ~ 50 °C	
	Storage Temp.	-40 ~ 80 °C	-20 ~ 70 °C	
	Humidity	5 ~ 95 % RH (Non-Condensing)		
	Vibration Test	Sine Wave 5 Hz ≤ f ≤ 8.4 Hz; Displacement 3.5 mm ; 8.4 Hz ≤ f ≤ 150 Hz, 1G Acceleration		
	Shock Test	Half Sine Wave Peak 15 g, 11 ms Duration		
	Protection Level	IP20		
	Certification	CE, UL		

Product Model		Standalone Motion Controller	PLC-Based Motion Controller	
		AX-8__E30_E2T / AX-8__E30_E2P	AX-304EL / AX-308EA / AX-316EA / AX-364EL	AX-332E
Processor	CPU	Intel® I3 Tiger Lake UP3 Dual Core 3.00 GHz	N/A	Intel® Celeron J1900 2.0 GHz Quad. Core
	Memory	LPDDR4X 4 GB	N/A	DDR3L-1333 2 GB
	Retain Memory	4 MB	N/A	4 MB
Monitor	Display Type	HDMI 2.0 ×1	N/A	
Number of Controllable Axes		64: 64 Axes, H1: 128 Axes	04: 4 Axes, 08: 8 Axes 16: 16 Axes, 64: 64 Axes	32: 32 Axes
DO Output Type		T: NPN	T: NPN, P: PNP	T: NPN
Software and Firmware Version	Motion Function	PLCopen Part1, Part2 Multi-axis Interpolation CNC & Robotic (Advanced Type)	PLCopen Part1, Part2 Multi-axis Interpolation	
	Operating System	Win10 IoT 64-bit、Linux	N/A	
	Visualization	N/A		
Communication Interface	Ethernet I/F	IEEE 802.3 / 802.3u / 802.3ab 2.5 Gbps ×2	10BASE-T / 100BASE-TX / 1000BASE-T Switch ×2	IEEE 802.3 / 802.3u / 802.3ab 1G bps (Intel I210IT) ×2
	FieldBus I/F	EtherCAT ×2	EtherCAT ×1	
	USB	USB 3.0 ×4	USB 2.0 ×1	
	Serial Port	Isolated RS-485 ×1	RS-232 ×1, RS-485 ×1	RS-485 / 422 ×1
Expansion Interface	Specifications	SD Card Slot ×1		
Storage Device	HDD	M.2 SATA 32GB ×1	N/A	N/A
	Program Capacity	512 MB	8 MB	128 MB
Power Supply	Input Voltage	24 V_{DC} (-15 % ~ +20 %)		
	Rated Power	72 W (24 V / 3 A)	11 W	24 W
	RTC Backup Battery	N/A	CR1620 Lithium × 1	Please contact local distributors
Dimensions	Size (W×H×D)	140.5 × 77.7 × 141 mm	110 × 88 × 100 mm	135 × 88 × 100 mm
	Weight	1,000 g	380 g	390 g
I/O Device	In/Out	131,072 bytes / 131,072 bytes	8,192 bytes / 8,192 bytes	
Instruction Processing Speed	LD Instruction	0.4 ns	5 ns	1.6 ns
	Math Instruction	0.4 ns	36 ns	1.6 ns
Environment	Operating Temp.	0 ~ 50 °C	-20 ~ 55 °C	-20 ~ 50 °C
	Storage Temp.	-20 ~ 70 °C	-40 ~ 80 °C	
	Humidity	5 ~ 95 % RH (Non-Condensing)		
	Vibration Test	Sine Wave 5 Hz ≤ f ≤ 8.4 Hz; Displacement 3.5 mm ; 8.4 Hz ≤ f ≤ 150 Hz, 1G Acceleration		
	Shock Test	Half Sine Wave Peak 15 g, 11 ms Duration		
	Protection Level	IP20		
	Certification	CE, UL		

Model Explanation

Standalone Motion Controller

AX - C 12 E B0 MD1 T

Product Series
AX - C Series
AX - 8 Series

Number of Controllable Axes
08: 8 Axes
12: 12 Axes
16: 16 Axes
32: 32 Axes
64: 64 Axes
H1: 128 Axes

Communication Protocol
E: EtherCAT

Hardware Version

1st Digit	B: Multi Core ARM P: Intel® Celeron 3: Intel® Core I3 Series
2nd Digit	0: 1st Version

I/O: (Transistor)
T: NPN
P: PNP

Software and Firmware Version

1st Digit	M: SoftMotion C: SoftMotion - CNC P: SoftPLC Only
2nd Digit	B: B Type (Win10 IoT 64-bit OS) C: C Type (Win10 IoT 64-bit + CODESYS Target Visualization) D: D Type (Linux OS) E: E Type (Linux OS + QT HMI)
3rd Digit	1: 1st Version 2: 2nd Version

PLC-Based Motion Controller

AX - 3 08 E A0 MA1 T

Product Series
AX - 3 Series

Number of Controllable Axes
04: 4 Axes
08: 8 Axes
16: 16 Axes
32: 32 Axes
64: 64 Axes

Communication Protocol
E: EtherCAT
EL: EtherCAT Delta Motion Light

Hardware Version

1st Digit	A: Internal identification code
2nd Digit	0: Built-in I/O Version 0

I/O: (Transistor)
T: NPN
P: PNP

Software and Firmware Version

1st Digit	M: Motion Control
2nd Digit	A: Internal identification code
3rd Digit	1: Internal identification code

Ordering Information

Standalone Motion Controller AX-C Series			
Model	**Description**	**Model**	**Description**
AX-C12EB0MD1T	Entry-Level Motion Controller (12 Axes / NPN)		
Standalone Motion Controller AX-8 Series			
AX-816EP0MB1T	Basic Type Motion Controller (16 Axes / NPN)	AX-816EP0MB1P	Basic Type Motion Controller (16 Axes / PNP)
AX-816EP0ME1T	Basic Type Motion Controller (16 Axes / NPN)	AX-816EP0ME1P	Basic Type Motion Controller (16 Axes / PNP)
AX-816EP0CB1P	Advanced Type Motion Controller (16 Axes / PNP)	AX-816EP0CE1T	Advanced Type Motion Controller (16 Axes / NPN)
AX-816EP0CE1P	Advanced Type Motion Controller (16 Axes / PNP)	AX-832EP0MB1T	Basic Type Motion Controller (32 Axes / NPN)
AX-832EP0MB1P	Basic Type Motion Controller (32 Axes / PNP)	AX-832EP0ME1T	Basic Type Motion Controller (32 Axes / NPN)
AX-832EP0ME1P	Basic Type Motion Controller (32 Axes / PNP)	AX-832EP0CE1T	Advanced Type Motion Controller (32 Axes / NPN)
AX-832EP0CE1P	Advanced Type Motion Controller (32 Axes / PNP)	AX-864EP0MB1T	Basic Type Motion Controller (64 Axes / NPN)
AX-864EP0MB1P	Basic Type Motion Controller (64 Axes / PNP)	AX-864EP0ME1T	Basic Type Motion Controller (64 Axes / NPN)
AX-864EP0ME1P	Basic Type Motion Controller (64 Axes / PNP)	AX-864EP0CB1T	Advanced Type Motion Controller (64 Axes / NPN)
AX-864EP0CB1P	Advanced Type Motion Controller (64 Axes / PNP)	AX-864EP0CE1T	Advanced Type Motion Controller (64 Axes / NPN)
AX-864EP0CE1P	Advanced Type Motion Controller (64 Axes / PNP)	AX-864EP0MC1T	Basic Type Motion Controller (64 Axes / CODESYS TV / NPN)
AX-864EP0MC1P	Basic Type Motion Controller (64 Axes / CODESYS TV / PNP)	AX-864EP0CC1T	Advanced Type Motion Controller (64 Axes / CODESYS TV / NPN)
AX-864EP0CC1P	Advanced Type Motion Controller (64 Axes / CODESYS TV / PNP)	AX-8H1E30CD2T	High-End Type Motion Controller (64 Axes / NPN)
PLC-Based Motion Controller AX-3 Series			
AX-304ELA0PA1T	Basic Type Motion Controller (4 AxesP2P / NPN)	AX-304ELA0PA1P	Basic Type Motion Controller (4 AxesP2P / PNP)
AX-308EA0MA1T	Basic Type Motion Controller (8 Axes / NPN)	AX-308EA0MA1P	Basic Type Motion Controller (8 Axes / PNP)
AX-316EA0MA1T	Basic Type Motion Controller (16 Axes / NPN)	AX-332EP0MB1T	Basic Type Motion Controller (32 Axes / NPN)
AX-364ELA0MA1T	Basic Type Motion Controller (64 Axes P2P/ NPN)		

Smarter. Greener. Together.

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