

EtherCAT Motion Controllers

Product information for five Delta AX-3 series controllers

The AX-3 series are CODESYS-based EtherCAT controllers that scale from 4 to 64 axes. Programming is done in **DIADesigner-AX**, which integrates CODESYS into Delta's DIASstudio platform and follows IEC 61131-3 and PLCopen. The **AX-308E**, **AX-316E** and **AX-332E** run full motion control with interpolation, while the **AX-304EL** and **AX-364EL** are point-to-point models.

At a glance

Model	Control mode	EtherCAT axes	Min. sync time	Program / data memory
AX-304EL	Point-to-point	4	Not listed	Not listed*
AX-308E	Motion + interpolation	8	2 ms at 8 axes	8 MB / 16 MB
AX-316E	Motion + interpolation	16	Not listed	8 MB / 16 MB
AX-332E	Motion + interpolation	32	1 ms at 32 axes	128 MB / 256 MB**
AX-364EL	Point-to-point	64	Not listed	8 MB / 16 MB

Common features

- Built-in EtherCAT master with Modbus, Modbus TCP, EtherNet/IP and OPC UA (server) support
- Motion functions: single-axis and multi-axis movements, gearing, electronic cams and interpolation, with an oscilloscope, simulator and CAM design editor in DIADesigner-AX
- Expansion with Delta AS-series power, digital I/O, analog I/O and temperature modules: up to 32 modules, of which up to 16 analog
- Built-in 16 DI / 8 DO on most models, with 2 incremental encoder inputs and 1 SSI absolute encoder input on the AX-308E
- 24 V DC supply; operating temperature -20 to 55 C; IP20

Product profiles

AX-304EL

EtherCAT point-to-point controller, 4 axes

Smallest model in the AX-3 range. An EtherCAT master for simple point-to-point positioning of up to 4 axes, programmed in the same CODESYS-based environment as the larger models.

- Up to 4 EtherCAT axes in point-to-point mode
- EtherCAT master, 2 Ethernet ports, serial ports, 16 built-in digital inputs and 8 digital outputs
- Programmed in DIADesigner-AX (CODESYS-based, IEC 61131-3 and PLCopen)
- Supports OPC UA, Modbus and EtherNet/IP; remote I/O with Delta AS-series modules
- Launched in EMEA in June 2023

AX-308E

EtherCAT motion controller, 8 axes

The first CODESYS-based controller in the AX-3 range, launched in 2021. Controls up to 8 servo drives plus inverters, remote I/O modules and third-party EtherCAT devices.

- Up to 8 EtherCAT motion axes; minimum EtherCAT synchronisation time 2 ms at 8 axes
- Program capacity 8 MB, data capacity 16 MB; basic instruction 5 ns
- Built-in 16 DI and 8 DO (4 channels at 200 kHz, supports pulse-train servo drives)
- Built-in encoder interfaces: 2 x incremental and 1 x SSI absolute
- Protocols: EtherCAT, OPC UA (server), EtherNet/IP, Modbus and Modbus TCP

AX-316E

EtherCAT motion controller, 16 axes

Mid-range model with twice the axis capacity of the AX-308E, for machines with more servo axes on one EtherCAT network.

- Up to 16 EtherCAT motion axes
- Program capacity 8 MB, data capacity 16 MB
- EtherCAT master, 2 Ethernet ports, serial ports, 16 built-in DI and 8 DO
- Gearing, electronic cams and interpolation supported
- Launched in EMEA in June 2023

AX-332E

EtherCAT motion controller, 32 axes

High-performance model with a faster processor and much larger memory, built for machines with up to 32 synchronised EtherCAT axes.

- Up to 32 EtherCAT motion axes; minimum synchronisation time 1 ms at 32 axes
- Program capacity 128 MB, data capacity 256 MB; instruction speed 2.3 ns (Boolean and integer), 4.5 ns floating point**
- Built-in I/O: 6 DI and 6 DO
- Ports: USB, Ethernet (switch), RS-232, RS-422/485 and EtherCAT**

AX-364EL

EtherCAT point-to-point controller, 64 axes

Top of the AX-3 range for axis count: up to 64 EtherCAT axes in point-to-point mode.

- Up to 64 EtherCAT axes in point-to-point mode
- Program capacity 8 MB, data capacity 16 MB
- EtherCAT master, 2 Ethernet ports, serial ports, 16 built-in DI and 8 DO
- Programmed in DIADesigner-AX; launched in EMEA in June 2023

Notes and sources

* Delta's published tables do not list memory for the AX-304EL. Delta's documents also do not give a minimum sync time for the AX-316E, AX-304EL or AX-364EL.

** Delta's catalogue lists the 128 MB / 256 MB memory, 2.3 ns instruction speed and 6 DI / 6 DO against the AX-332E, and one copy labels this column AX-332EP. Confirm which variant you are quoting.

Dimensions in Delta documents are given as roughly 98.3 x 88 x 110 mm for the standard motion models, and one brochure lists the AX-308E at 420 g. Floating-point instruction speed is shown as 33 to 36 ns in different Delta documents.

Compiled from Delta Industrial Automation catalogues and product pages, Delta's EMEA AX-308E page, trade press coverage of the AX-3 launches (Drives & Controls, i4.0 Today) and distributor listings. Delta's own datasheets could not be retrieved in full, so confirm figures against the current Delta catalogue before quoting or ordering.