

Automation for a Changing World

Delta AC Servo System



www.deltaww.com

 **DELTA**
Smarter. Greener. Together.



Smarter. Greener. Together.

Who We Are

Delta is a market leader that has won wide recognition as a:

- Global power and thermal solution provider, with partners such as Apple, IBM, HP, Lenovo and more; No.1 in Switching Power Supplies since 2002, DC Fans since 2006.
- Leading brand in industrial automation applications for factories, processes, and buildings; with specific system solutions for textiles, packaging, machine tools and more.
- Leading telecom power system provider in Europe, Americas, Asia and emerging markets; in long term partnerships with Vodafone, T-Mobile, Orange, China Mobile, Bharti and more.

About Delta Industrial Automation

Since the launch of our first AC motor drive in 1995, the Delta Industrial Automation Business Group (IABG) has focused on automation technology with quality, reliability and precision to realize our promise of “Automation for a Changing World”. We provide innovative automation products that include AC motor drives, power quality improvement devices, sensors, and control and motion devices. With enhanced integration and industrial network development, our industrial automation solutions find application in a broad range of machinery, including: metal processing machines used in the food industry, textile industry, chemical industry, electronics industry, plastic industry and more; automation equipment used in the pharmaceutical industry and printing industry; and energy-saving air-conditioning and water supply facilities used in buildings. Our mission is: “To elevate our living environment through advanced automation technology and value added innovation”. With Delta's innovative, reliable, energy-saving automation solutions and rapid global service, we help make the world “Smarter. Greener. Together.” with our partners and customers.

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ASDA-A2 Series

Features

High Positioning Accuracy

- ECMA series servo motors feature incremental encoders with 20-bit level resolution (1280000 p/rev) which can improve low speed stability, smooth motor operation and enhance the accuracy of positioning.
- Absolute type encoder with 17-bit level resolution (160000 p/rev) is supported.

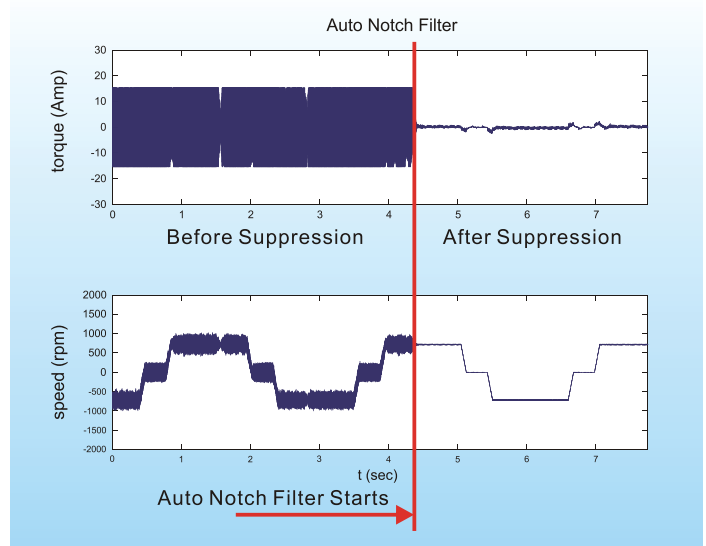
High Responsiveness

- Up to 1 kHz frequency response.
- Settling time below 1 ms.
- 7 ms acceleration time for speeds from -3000 r/min to 3000 r/min with an empty load!

(Note: The test record is of a 400 W motor with 60 mm frame size)

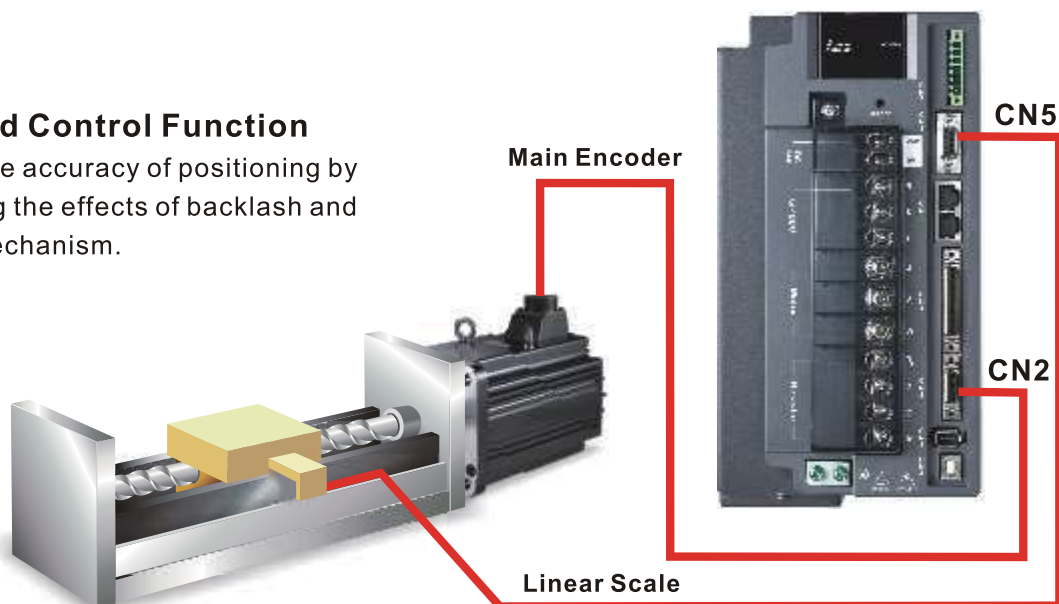
Excellent Suppression Functions

- Vibration Suppression (Low Frequency)
Two vibration suppression filters are provided for the long arm mechanism to settle down with less vibration.
- Resonance Suppression (High Frequency)
Two auto-notch filters and one manual notch filter are equipped to prevent resonance effects on the machine.



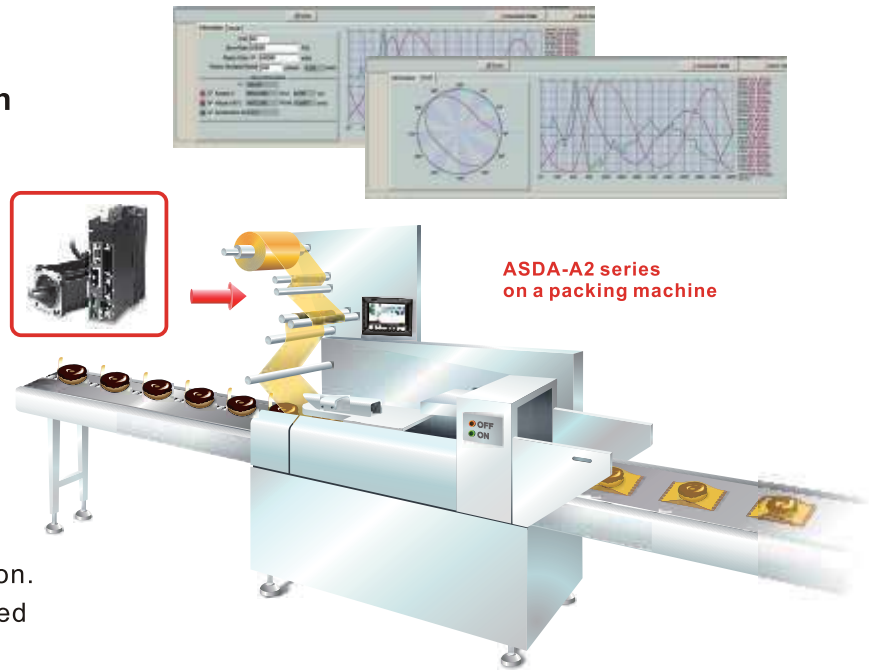
Full-Closed Control Function

- Ensures the accuracy of positioning by eliminating the effects of backlash and flexible mechanism.



Electronic Cam (E-Cam) Function

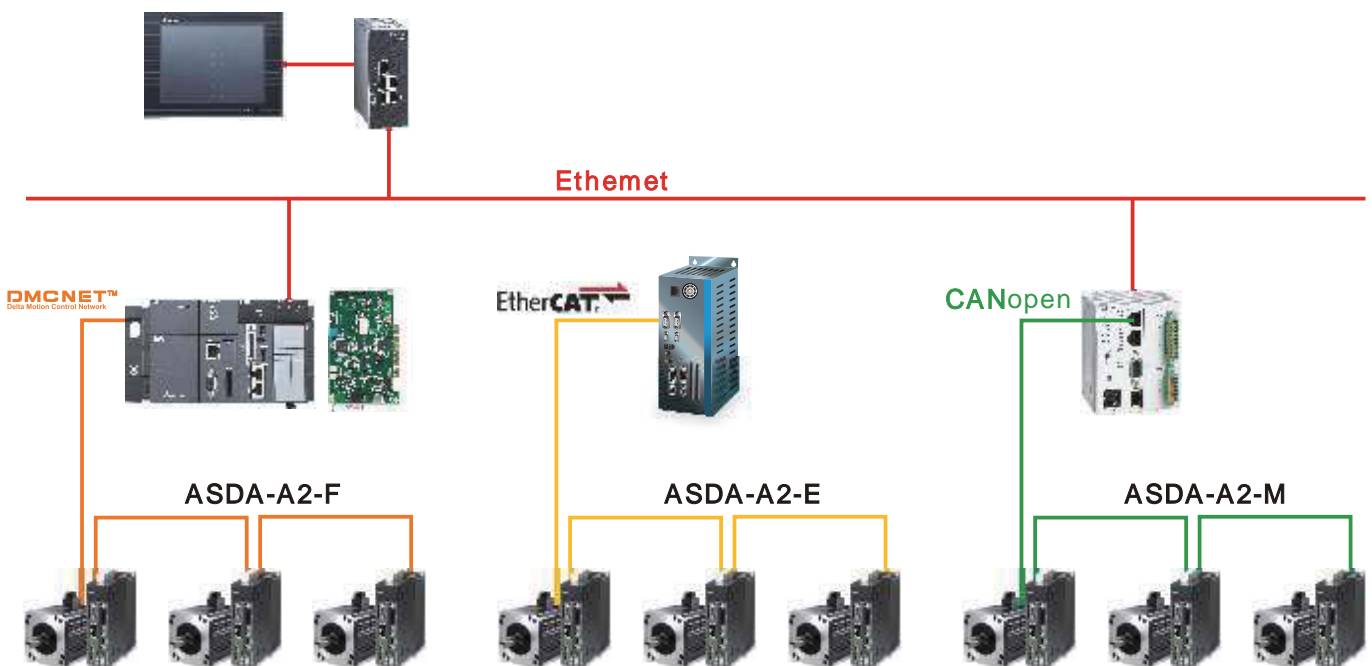
- 720 points max. for E-Cam outline.
- E-Cam curve smoothing function can bring out smooth motion.
- ASDA-Soft for easy designing of cam profile.
- Excellent for flying shear, rotary cut, and other cam applications.



Versatile PR Mode

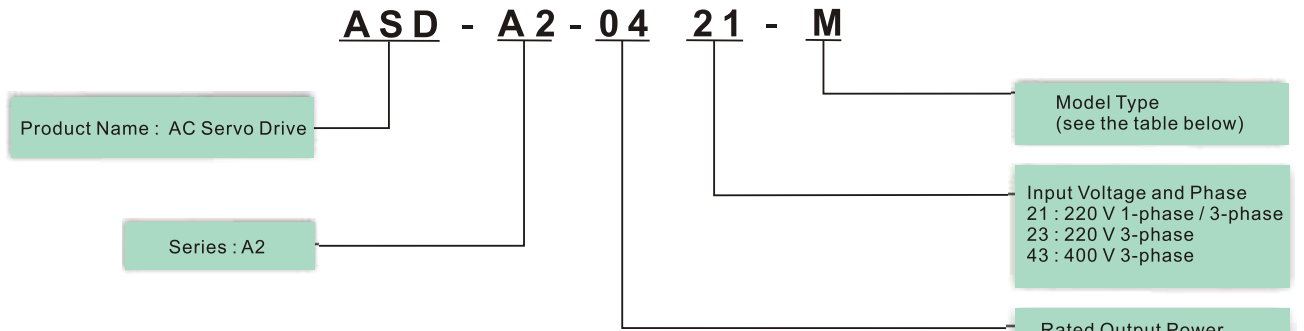
- ASDA-Soft for easy motion configuration.
- 64 motion paths and continuously jointed paths are supported.
- Abrupt motion command change is possible including speed and ACC / DEC slope.
- 35 different homing modes are supported.
- Procedure Jump, Parameter Writing, Speed Control, and Position Control modes are available.
- 4 different kinds of position commands. Absolute command, Relative command, Incremental command, and Fast Capture Relative command.

Supports High-Speed DMCNET, EtherCAT, CANopen Protocols for Multi-Axis Synchronous Control



Model Explanation

ASDA-A2 Series Servo Drives



Model Type

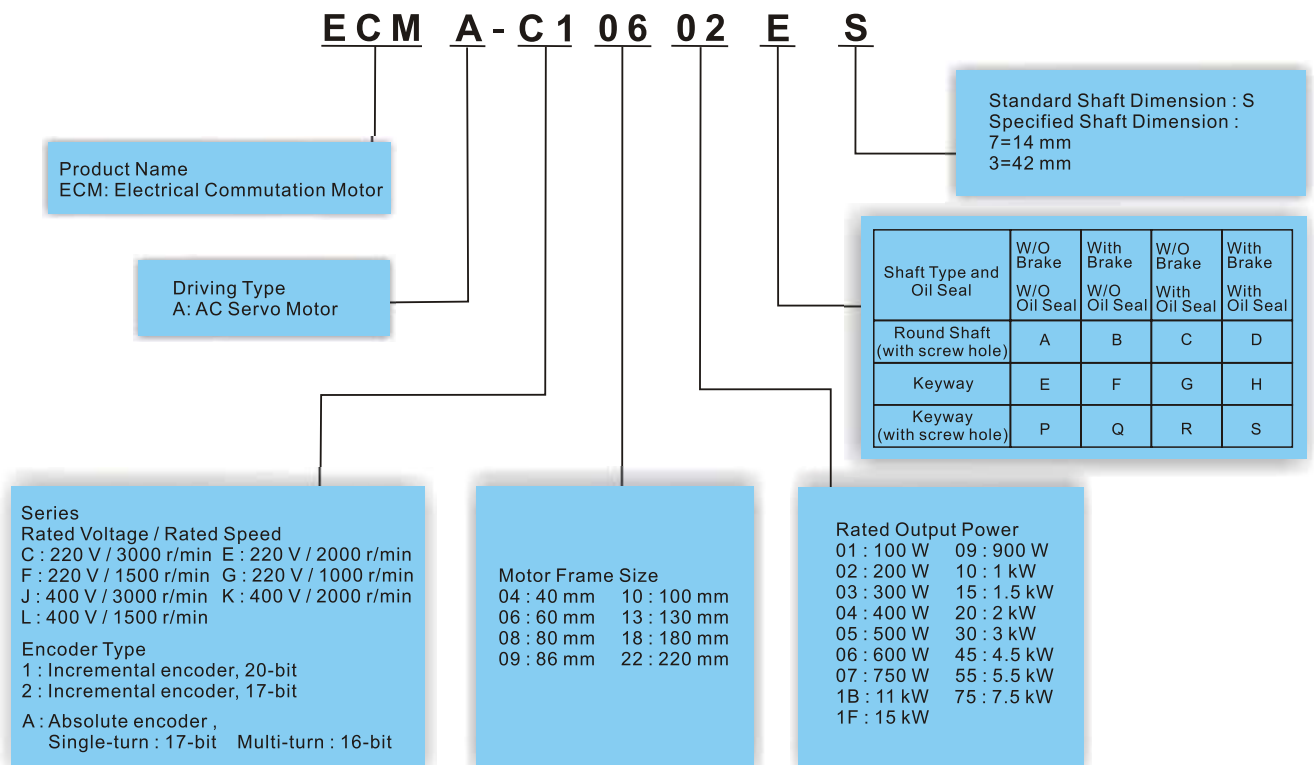
Type	CANopen	DMCNET	EtherCAT/STO	Extension Digital Input	Electronic Cam (E-Cam)
F	No	Yes	No	No	No
E	No	No	Yes	No	No
M	Yes	No	No	No	Yes
U	No	No	No	Yes	Yes
L	No	No	No	No	No

Rated Output Power

01 : 100 W	20 : 2 kW
02 : 200 W	30 : 3 kW
04 : 400 W	45 : 4.5 kW
07 : 750 W	55 : 5.5 kW
10 : 1 kW	75 : 7.5 kW
15 : 1.5 kW	1B : 11 kW
	1F : 15 kW

F: For DMCNET U: Without CANopen E: EtherCAT
 M: Supports CANopen L: Without E-Cam

ECMA Series Servo Motors



Features of ECMA Series Servo Motors

High efficiency permanent magnetic motors.

220 V series:

- Rated power from 100 W to 15 kW.
- Frame size: 40 mm, 60 mm, 80 mm, 86 mm, 100 mm, 130 mm, 180 mm, and 220 mm.
- Motor maximum speed up to 5000 r/min.
- Output torque: 1.92 N-m ~ 224 N-m.

400 V series:

- Rated power from 750 W to 15 kW.
- Frame size: 80 mm, 130 mm, 180 mm, and 220 mm.
- Motor maximum speed up to 5000 r/min.
- Output torque: 2.39 N-m ~ 224 N-m.



ASDA-B2 Series

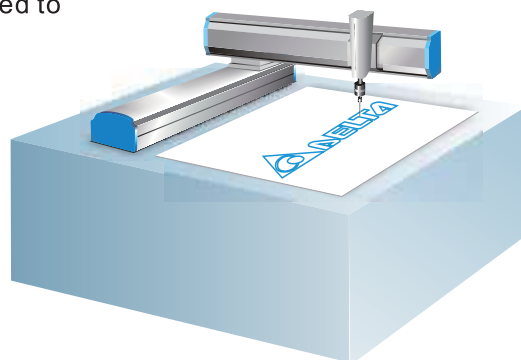
Features

Implements High Precision Positioning Control

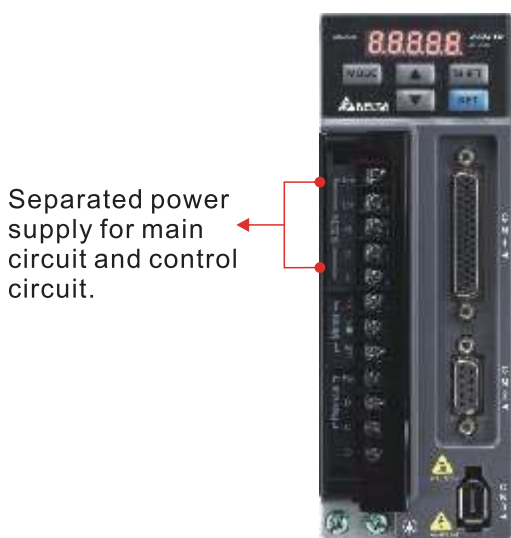
- High-resolution encoder with 17-bit (160,000 p/rev) is a standard feature which satisfies application needs for high precision positioning control and stable rotation at low speed.
- New 17-bit resolution encoder can reduce cogging torque to enhance the precision of the motor.

Satisfies a Variety of Demands in the Industry

- Built-in position, speed and torque - three control modes (speed and torque mode can be controlled via internal parameters or analog voltage command).
- Provides pulse input (up to 4 Mpps) and analog voltage commands
- Two vibration suppression filters are provided for the long arm mechanism to settle down with less vibration.
- Two auto-notch filters and one manual notch filter are equipped to prevent resonance effects on the machine.
- Friction compensation and motor protection functions are available to reinforce the system.



Offers Easy-To-Install Solution For Simple Start-Up



Separated power supply for main circuit and control circuit.

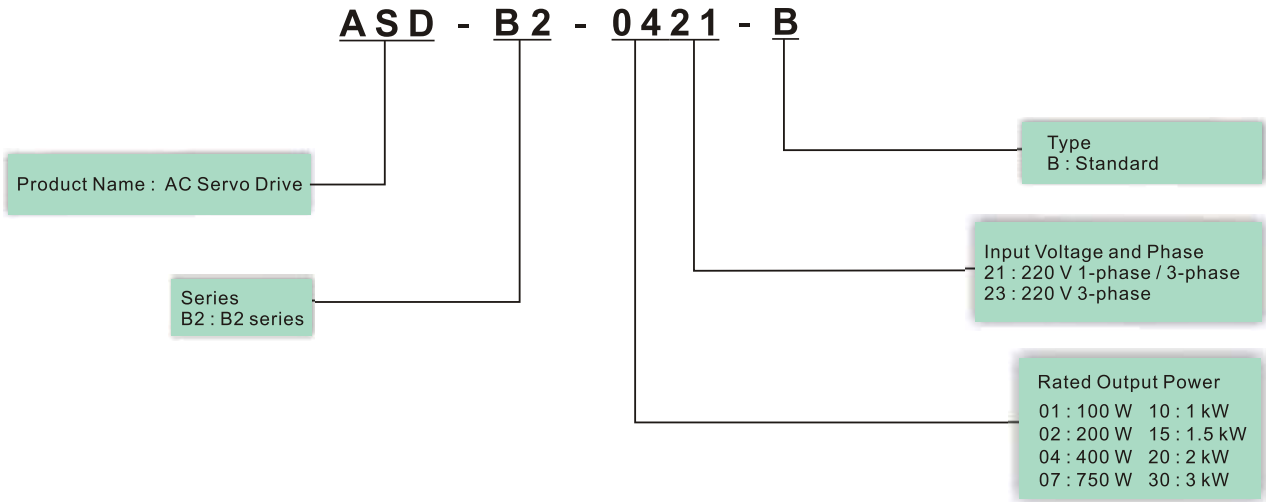
- The same power and encoder cables as the ASDA series. Easy to set up and no extra accessories.
- Servo motor provides brake, oil seal, and more, with optional configurations for the requirements of different applications.
- The control circuit and main power circuit are separated, safety is increased and maintenance is much easier.
- 400 W and above servo drives have a built-in regenerative resistor, for significant savings on wiring and cost.



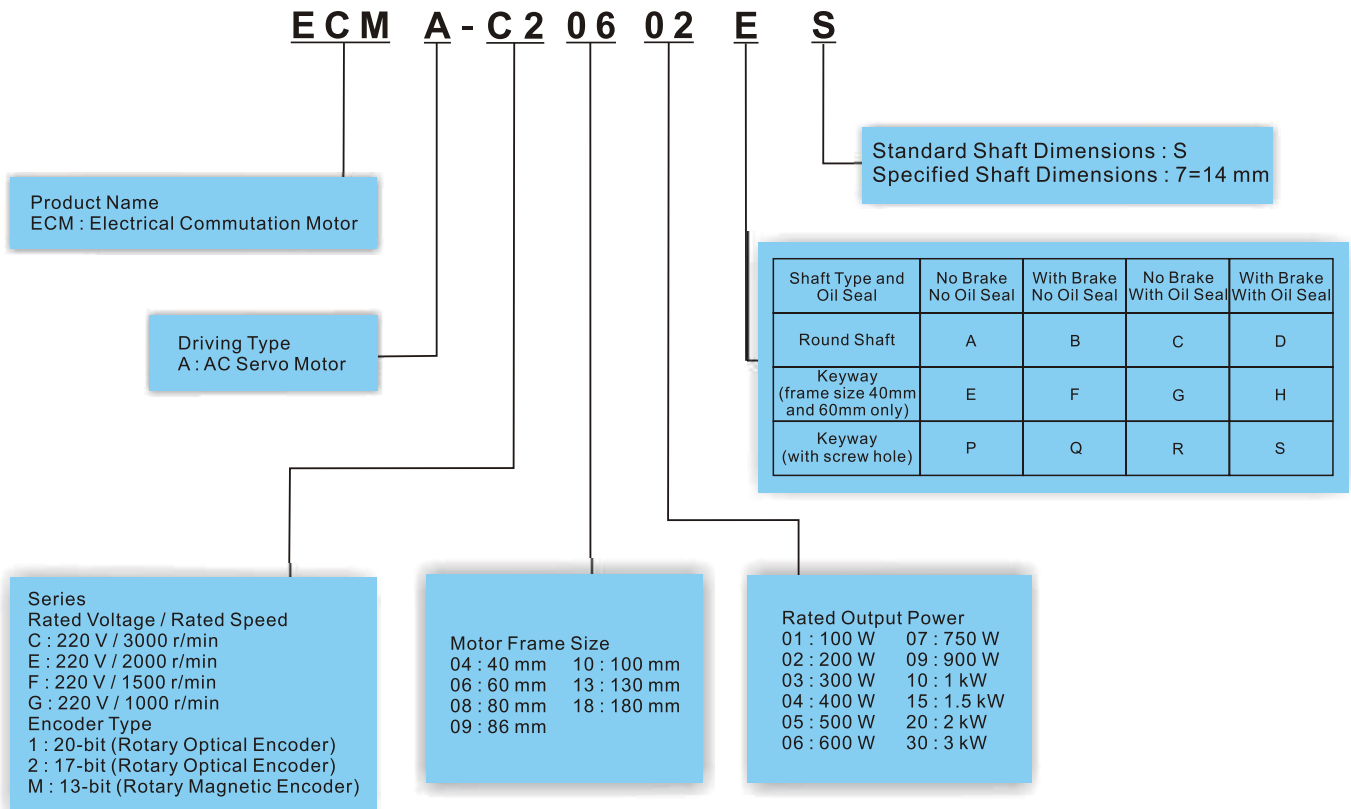
Built-in regenerative resistor

Model Explanation

ASDA-B2 Series Servo Drives



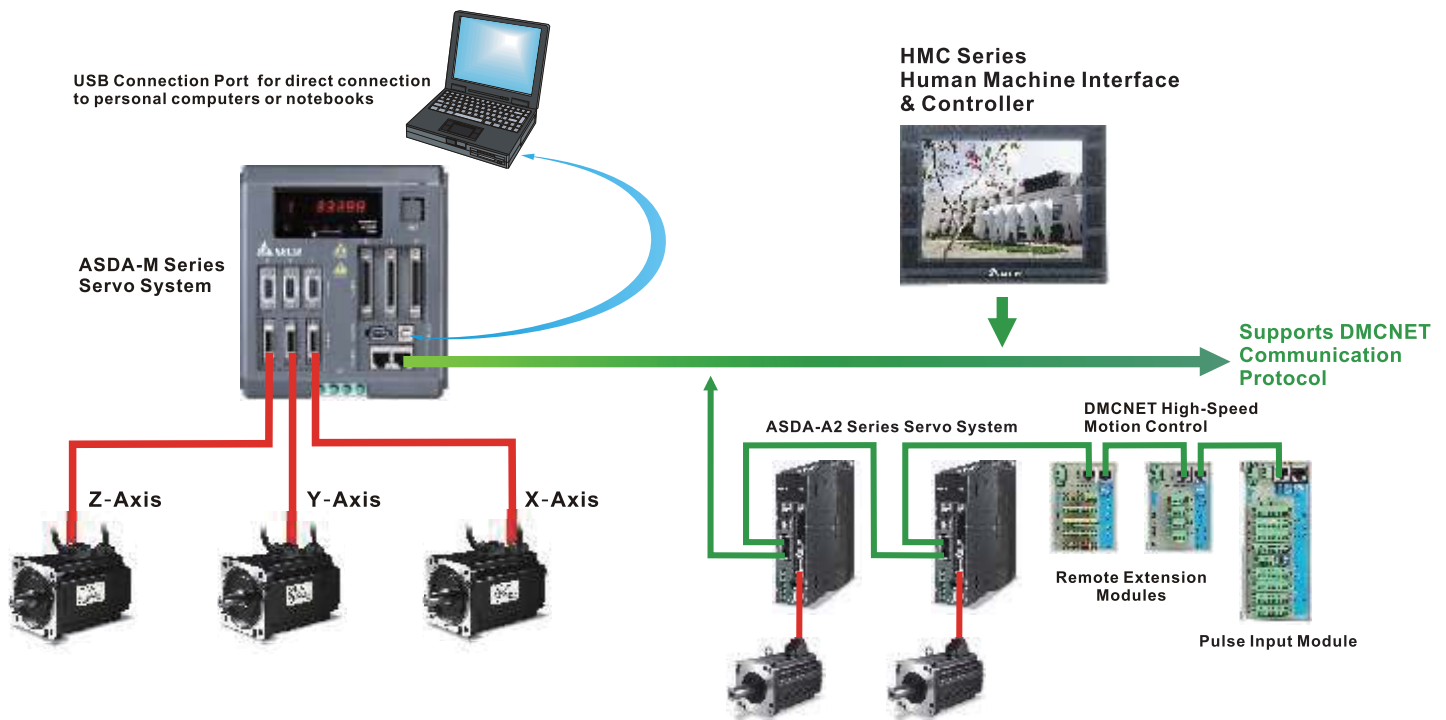
ECMA Series Servo Motors



Note:

Rotary Magnetic Encoder will be available starting in March, 2014.

ASDA-M Series



Features

Highly Integrated System

- Built-in motion control and PLC functions.
- Multi-axis synchronous interpolation.
- Advanced gantry control.
- Flexible electronic cam (E-Cam) function.
- High-speed frequency response.
- Excellent vibration and resonance suppression functions.
- High-precision full-closed control.
- Versatile PR mode.
- Real time Capture and Compare functions.
- Built-in G-code Interpreter.

New PC Software Functions

- ASDA-Soft provides built-in contour analysis function
- EzASD provides PLC programming and motion commands editing environment.
- Real Time I/O (18 Inputs / 9 Outputs)

Real Time, Reliable and High-Speed Motion Control Network

- Supports DMCNET and CANopen communication protocols.
- With the aid of Delta's Human Machine Controller (HMC), it can establish an integrated system configuration by DMCNET.
- Supports DMCNET interface for I/O extension modules.

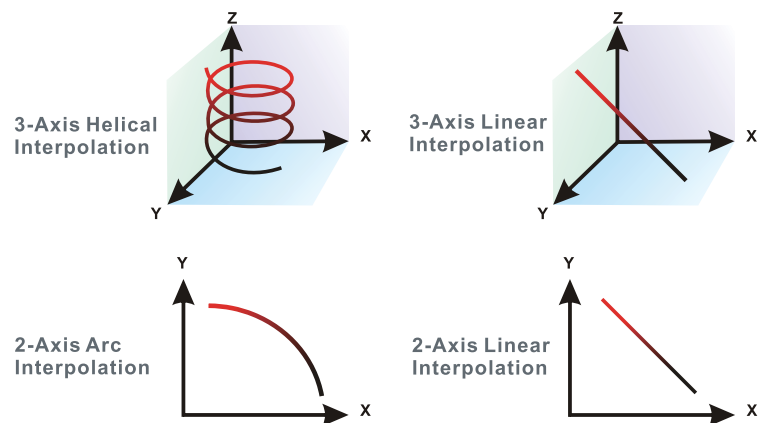
High Precision, High Performance Servo Motors

- Supports incremental type and absolute type encoders.
- Incremental type encoder provides up to 1280000 p/rev resolution for high-precision positioning.

Features

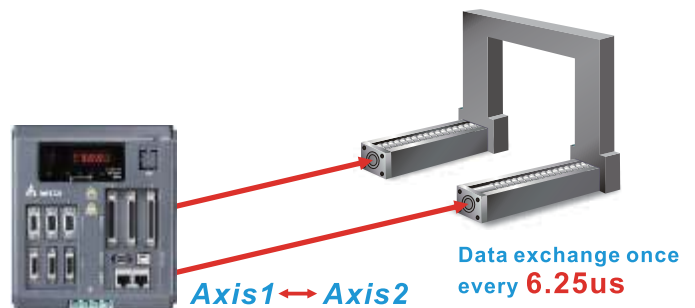
Multi-axis Synchronous Interpolation

- Various kinds of interpolation functions maximize the motion control performance of the ASDA-M series.
- Interpolation commands are built into the ASDA-M series servo drive to offer high synchronous control accuracy.



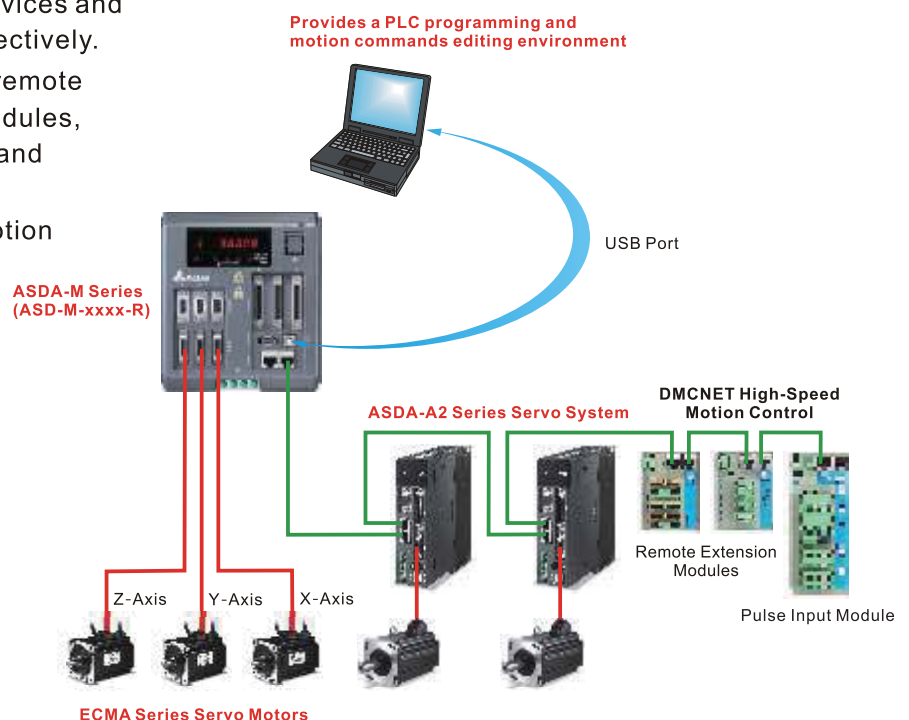
Advanced Gantry Control

- Plenty of data can be exchanged in real-time among 3 axes without any time delay. This greatly increases the efficiency and performance of gantry control.
- In rigid or general mechanical systems, no matter if the loading on multiple axes is equal or not, the ASDA-M series can perform precise motion control and drive each axis simultaneously.



DMCNET Communication

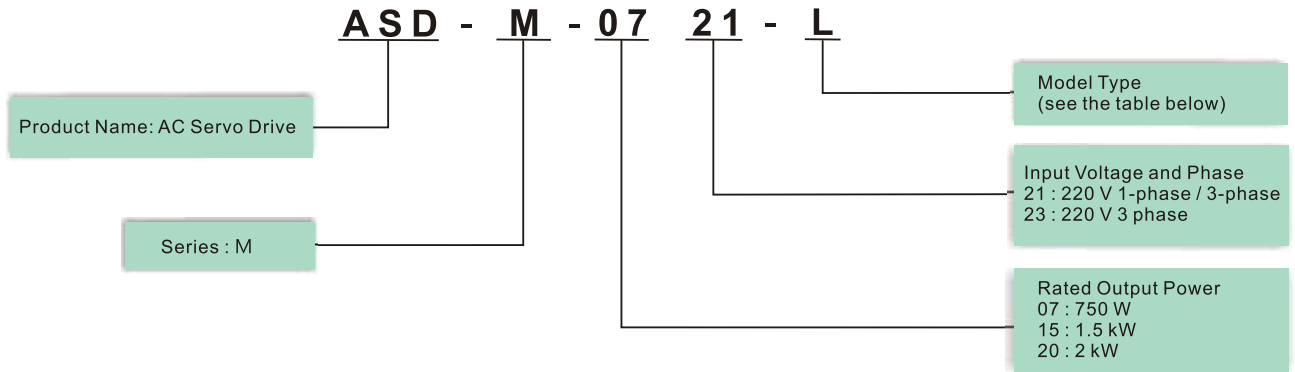
- Up to 10Mbps communication bandwidth is provided. It is capable of controlling up to 12 servo system units.
- In the DMCNET networking structure, the ASDA-M acts as a master and supports high-speed DMCNET to extend connection with more devices and control the whole system more effectively.
- Capable of connecting to various remote extension modules such as I/O modules, AD/DA modules, the 04PI module and servo drives.
- Provides a 3-axis synchronous motion control system with performance better than comparable three servo drives.



Note:
More servo drives with built-in PLC functions as standard will be available soon.

Model Explanation

ASDA-M Series Servo Drives



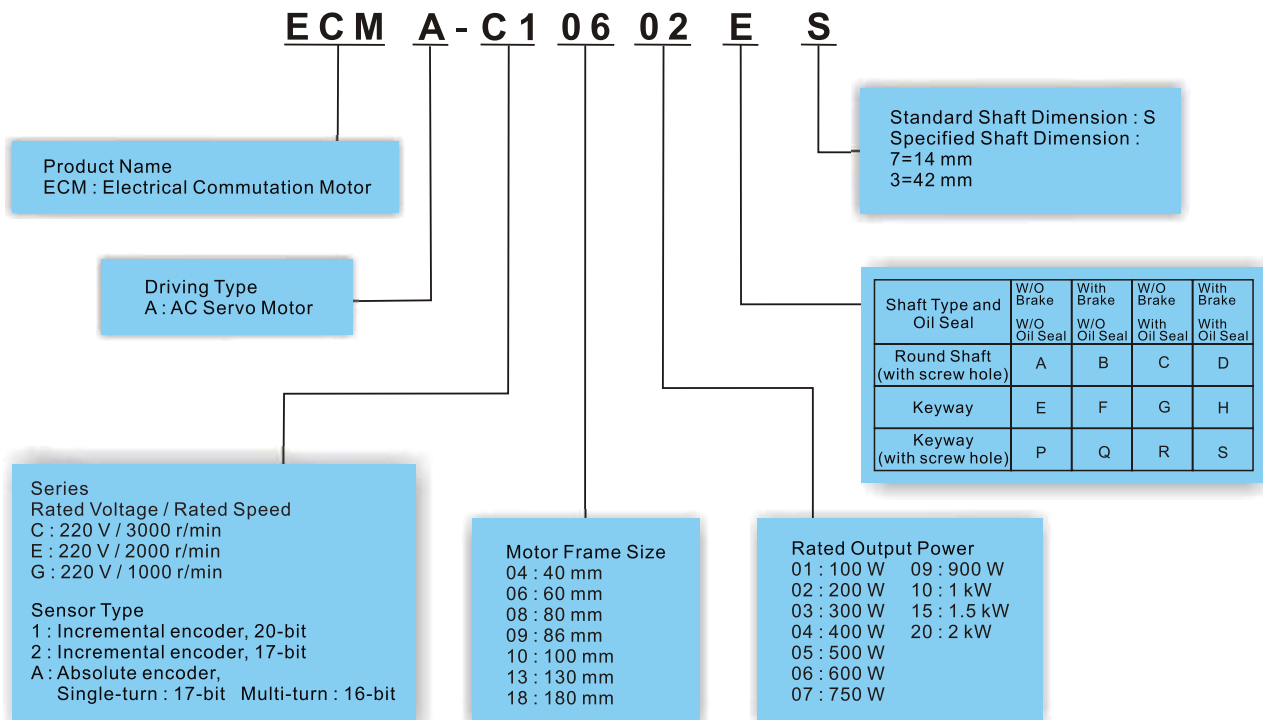
Model Type

Type	Full-Closed Control	CANopen	DMCNET	Built-in PLC functions
L	O	X	X	X
M	O	O	X	X
F	O	X	O	X
R	O	X	O	O

L: Without E-Cam F: For DMCNET M: Supports CANopen R: With Communication Extension Function

*R type models will be available soon.

ECMA Series Servo Motors



ASDA A2-E Series

Delta's ASDA A2-E, an advanced AC Servo Drive with EtherCAT communication interface, complies with IEC61158 and IEC61800-7 to enable faster, real-time, and accurate performance in high-end applications. This new A2-E supports the CoE device profile based on CiA402, and all command types of EtherCAT.

In addition to the EtherCAT communication function, A2-E features the integrated Safe Torque Off (STO), short cycle time, and extension digital input port, which makes the A2-E ideal for multi-axis synchronization applications in a wide range of machinery automation applications. This series offers a large range of rated power to drive motors, from 400 W to 7.5 kW for 400 V* and 100 W to 3 kW for 220 V.

* 7.5 kW 400 V drive model will be available soon

Features

- Touch Probe function can be enabled with the Digital Inputs (DI) on CN7 or the external encoder
- Integrated Safe Torque Off (STO) safety function complies with the standards of IEC61508, SIL2; IEC62061, SILCL2; ISO13849-1, Cat. 3 PL=d
- Wide power range coverage for both 220V and 400V versions
- Supports full-closed loop control*
- Supports absolute type* and incremental type ECMA Series motors



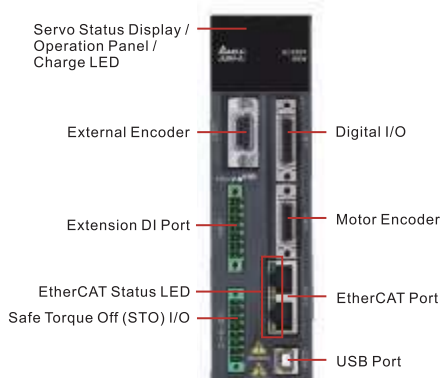
* This function will be available in a new version soon to come.

Communication Specifications

Physical Layer	IEEE802.3u (100 BASE-TX)
EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
Device Profile (CiA402)	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn. Velocity Mode, Cyclic Syn. Torque Mode, Touch Probe Function, Torque Limit Function
Process Data Size	Tx: 8 Object (32 byte, Max.); Rx: 8 Object (32 byte, Max.) Dynamic Mapping supported.
Bus Clock	DC cycle with min. 250 us*
LED Indicator	EtherCAT Link/Activity Indicator (L/A) x 2 EtherCAT RUN Indicator (RUN) x 1 EtherCAT ERROR Indicator (ERR) x 1

* This function will be available in a new version soon to come.

Part Names and Functions



Ordering Information

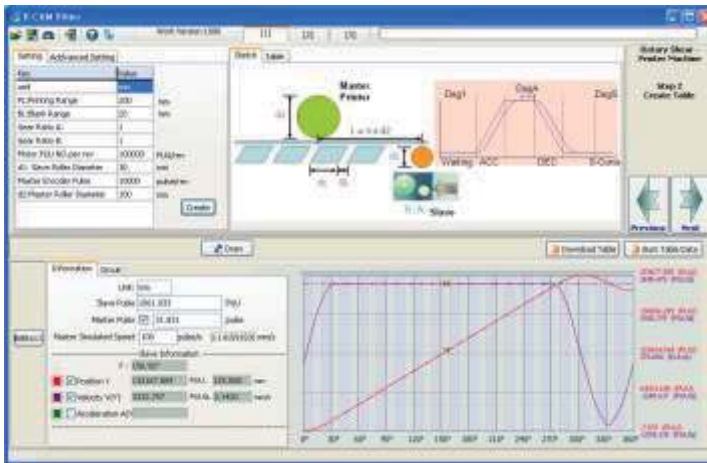
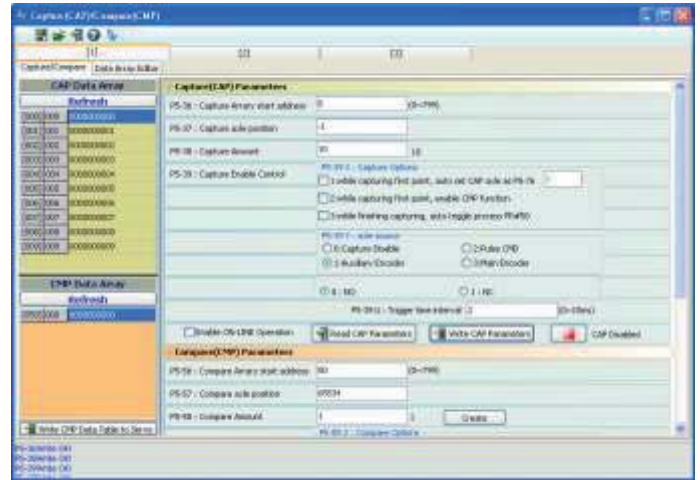
ASD - A2 - 04 21 - E	
Product Name AC Servo Drive	Series A2
	EtherCAT model
	Input Voltage and Phase 21 : 220 V 1-phase / 3-phase 23 : 220 V 3-phase 43 : 400 V 3-phase
	Rated Output Power 01 : 100 W 15 : 1.5 kW 02 : 200 W 20 : 2 kW 04 : 400 W 30 : 3 kW 07 : 750 W 45 : 4.5 kW 10 : 1 kW 55 : 5.5 kW

ASDA-Soft

ASDA-Soft Configuration Software

Capture / Compare

- Strong Capture and Compare functions for position latch and detection help you complete system configuration quickly.



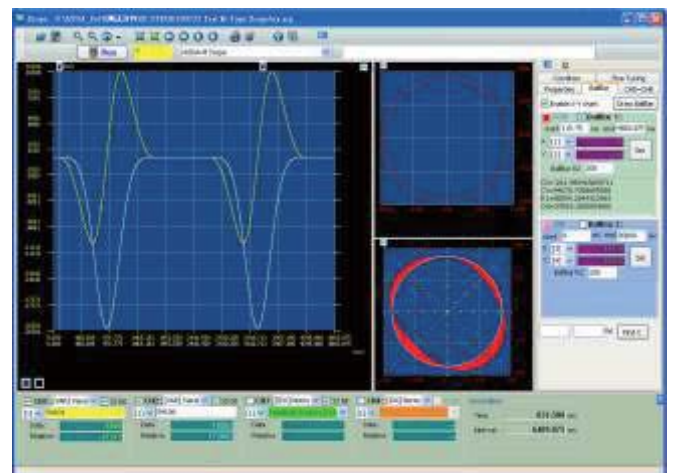
Electronic Cam (E-Cam)

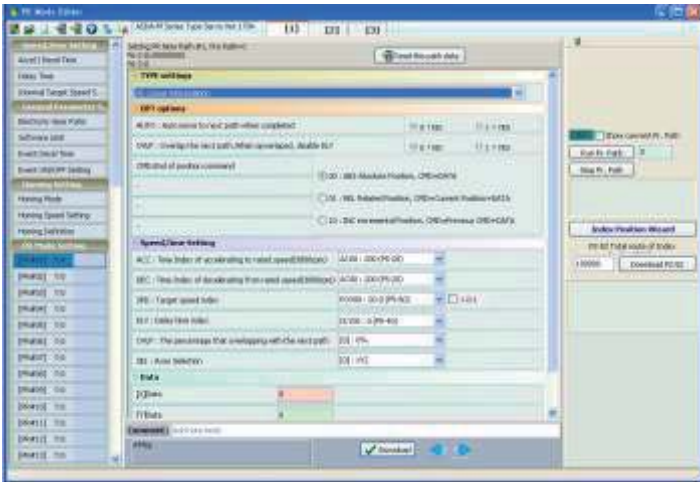
- User-friendly E-Cam editing interface is provided for designing E-Cam outlines and curves freely. In addition, quick settings for flying shear and rotary cut applications are offered.



Scope

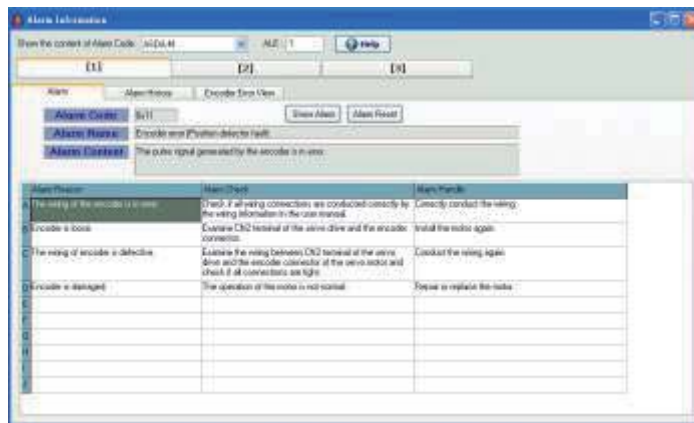
- Versatile on-line monitoring function, similar to a digital oscilloscope is able to quickly record the status and data of each axis. Real-time monitoring is easy.





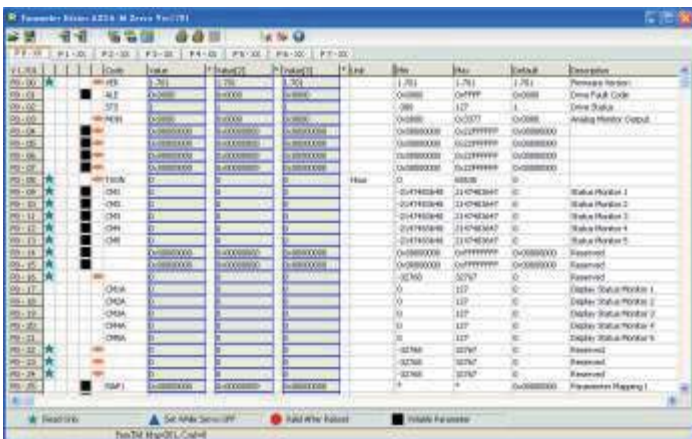
PR Mode

- Easy-to-use editing interface is designed for the new and enhanced PR control mode. Homing, point-to-point and other motion control functions for multi-axis positioning control are easily achieved.



Alarm

- Convenient alarm display function is capable of troubleshooting the system easily and recommending timely corrective actions.



Parameter

- Multi-functional parameter editor lets you read back all of the parameters of the servo drive to a PC, and then write all of the parameters set in the PC into the servo drive. It also allows you to display, edit, change, compare and print the setting values of specific parameters.



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