Automation for a Changing World

Delta Motion Control Solution

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 for Apple, IBM, HP, Lenovo and more; No.1 in Switching Power Supplies since 2002, DC Fans since 2006.

- Leading telecom power system provider for telecom carriers in Europe, the Americas, Asia and emerging markets; Long term partnerships with Vodafone, Orange, China Mobile, Telefonica and more.

- Leading brand in industrial automation applications, factories, processes, machines, and robots; specific solutions for textile, packaging, machine tools 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.

Table of Contents

DELTA

ASDA A2-E Series

Delta's ASDA A2-E, an advanced AC Servo Drive with an EtherCAT communication interface, complies with IEC61158 and IEC61800-7 to enable faster, real-time, and accurate performance in high-end applications. The 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.

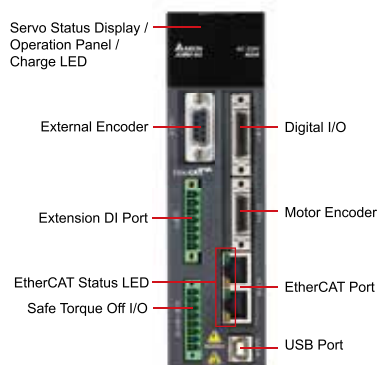## Features

Implements High Precision Positioning Control

▶ 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

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

Part Names and Functions

Servo Status Display / Operation Panel / Charge LED

External Encoder

Digital I/O

Extension DI Port

Motor Encoder

EtherCAT Status LED

Safe Torque Off I/O

EtherCAT Port

USB Port

Ordering Information

ASD - A2 - 04 21 - E

EtherCAT Model

Series : A2

Product Name
AC Servo Drive

Input Voltage and Phase
21 : 220V 1-phase/3-phase
23 : 220V 3-phase
43 : 400V 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-A2 Series

Features

High Positioning Accuracy

▶ ECMA series servo motors feature incremental encoders with 20-bit level resolution (1,280,000 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 (160,000 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.

Auto Notch Filter

Before Suppression — After Suppression

Auto Notch Filter Starts
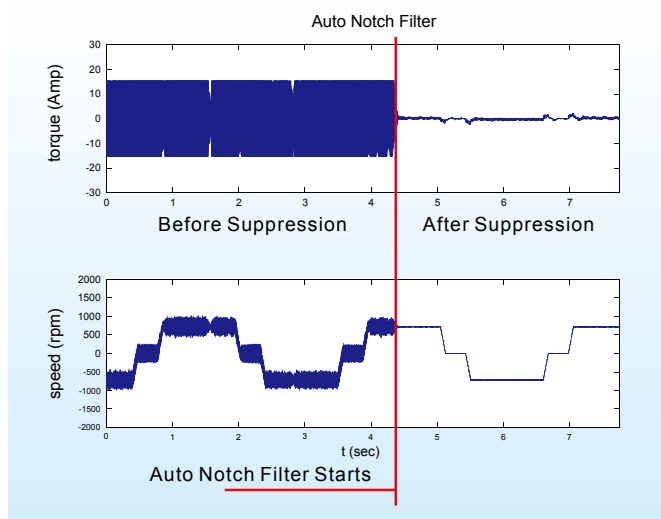
Full-Closed Control Function

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

Main Encoder

CN5

CN2

Linear Scale

ΔELTA
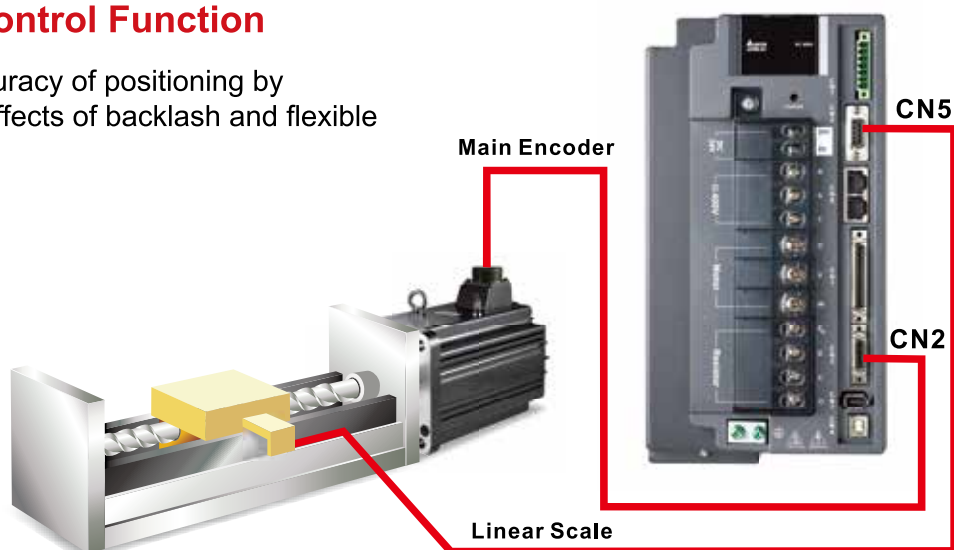
Electronic Cam (E-Cam) Function

▶ 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.

ASDA-A2 series
on a packing machine
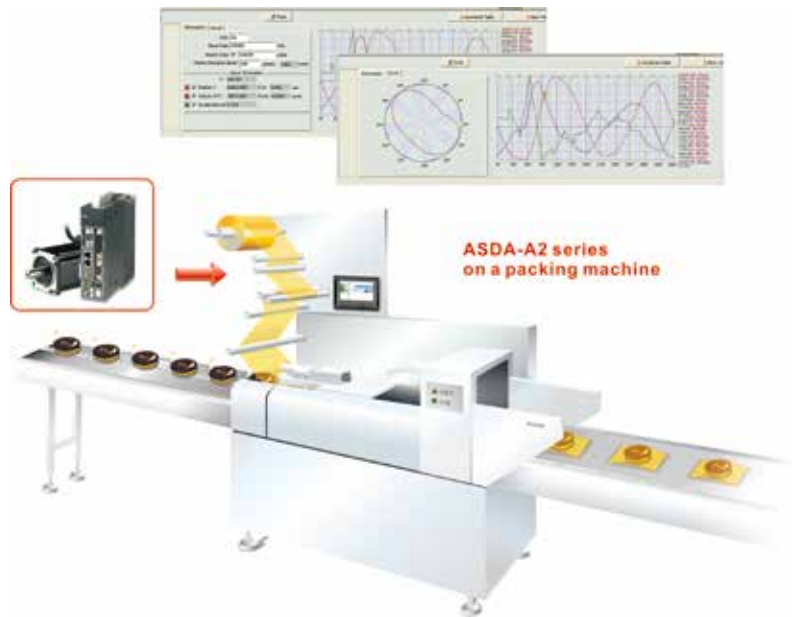
Versatile PR Mode

▶ 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

Ethernet

DMCNET™
Delta Motion Control Network

EtherCAT

CANopen

ASDA-A2-F
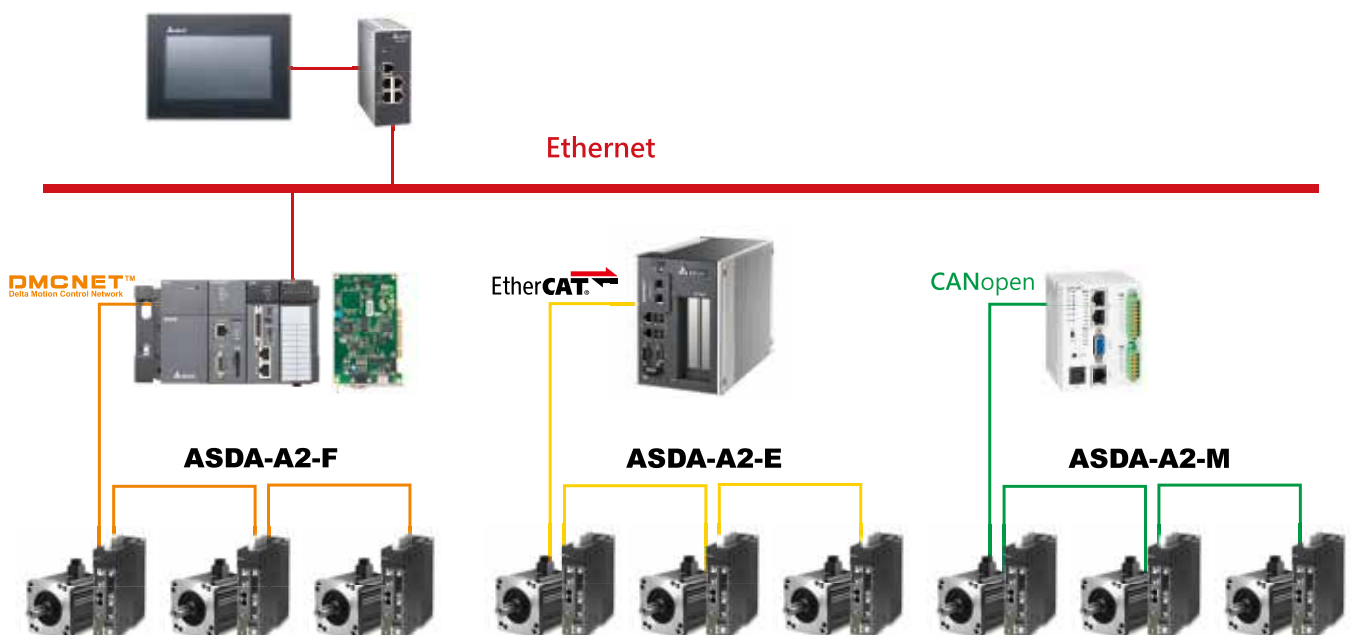
ASDA-A2-E

ASDA-A2-M

Model Explanation

ASDA-A2 Series Servo Drives

ASD - A2 - 04 21 - M

Product Name : AC Servo Drive

Series : A2

Model Type
(see the table below)

Input Voltage and Phase
21 : 220V 1-phase / 3-phase
23 : 220V 3-phase
43 : 400V 3-phase

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
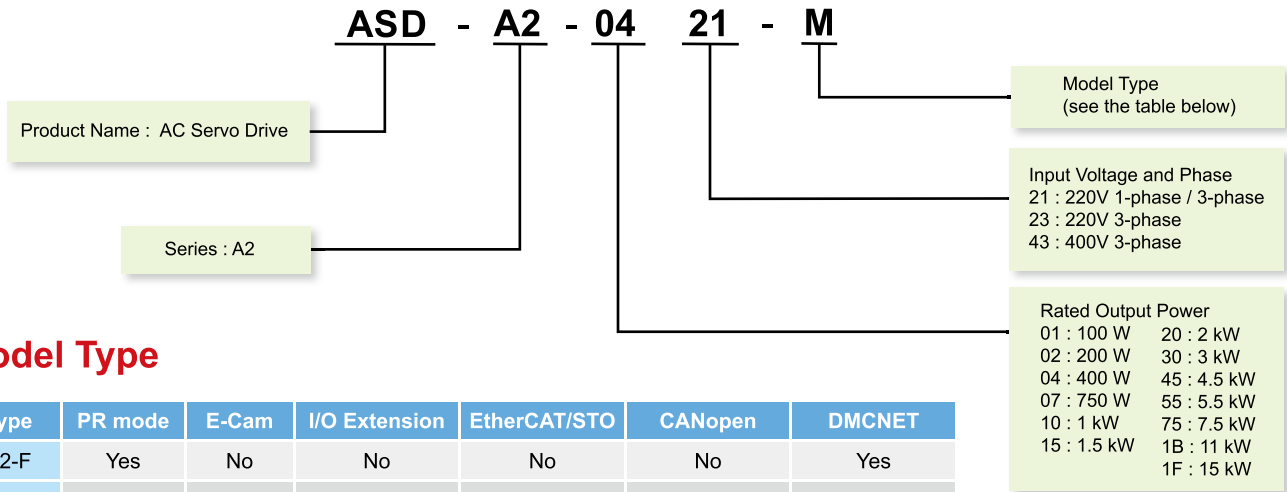
Model Type

Type	PR mode	E-Cam	I/O Extension	EtherCAT/STO	CANopen	DMCNET
A2-F	Yes	No	No	No	No	Yes
A2-E	Yes	Yes	No	Yes	No	No
A2-M	Yes	Yes	No	No	Yes	No
A2-U	Yes	Yes	Yes	No	No	No
A2-L	Yes	No	No	No	No	No

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

ECMA Series Servo Motors

ECM A - C1 06 02 E S

Product Name
ECM: Electrical Commutation Motor

Driving Type
A: AC Servo Motor

Standard Shaft Dimension : S
Specified Shaft Dimension :
7=14 mm
3=42mm

Type of Shaft Diameter and Oil Seal	w/o Brake w/o Oil Seal	With Brake w/o Oil Seal	w/o Brake With Oil Seal	With Brake With Oil Seal
Round Shaft (with fixed screw holes)	-	-	C	D
Keyway	E	F	-	-
Keyway (with fixed screw holes)	P	Q	R	S

Series
Rated Voltage / Rated Speed
C : 220V / 3000 r/min   E : 220V / 2000 r/min
F : 220V / 1500 r/min   G : 220V / 1000 r/min
J : 400V / 3000 r/min   K : 400V / 2000 r/min
L : 400V / 1500 r/min

Encoder Type
1 : Incremental encoder, 20-bit
2 : Incremental encoder, 17-bit

A : Absolute encoder ,
    Single-turn:17-bit   Multi-turn:16-bit

Motor Frame Size
04 : 40 mm   10 : 100 mm
06 : 60 mm   13 : 130 mm
08 : 80 mm   18 : 180 mm
09 : 86 mm   22 : 220 mm

Rated Output Power
01 : 100 W   15 : 1.5 kW
02 : 200 W   20 : 2 kW
03 : 300 W   30 : 3 kW
04 : 400 W   35 : 3.5 kW
05 : 500 W   45 : 4.5 kW
06 : 600 W   55 : 5.5 kW
07 : 750 W   75 : 7.5 kW
08 : 850 W   1B : 11 kW
09 : 900 W   1F : 15 kW
10 : 1 kW

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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 maximun 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 maximun 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.
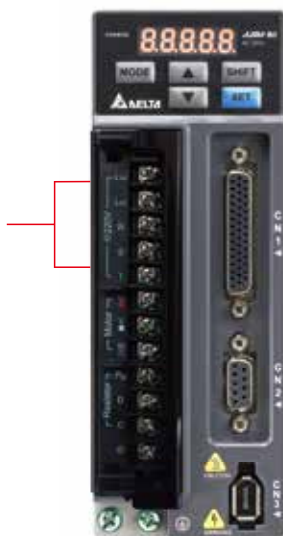
Satisfies a Variety of Demands in the Industry

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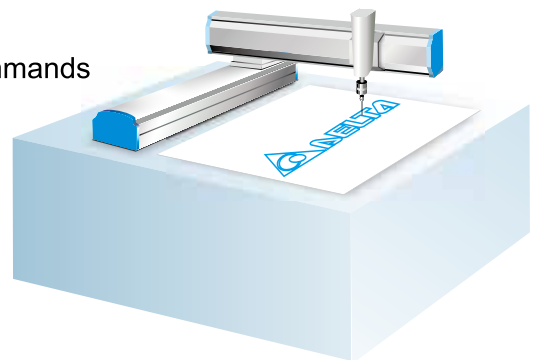
Offers Easy-To-Install Solution For Simple Start-Up

▶ 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.

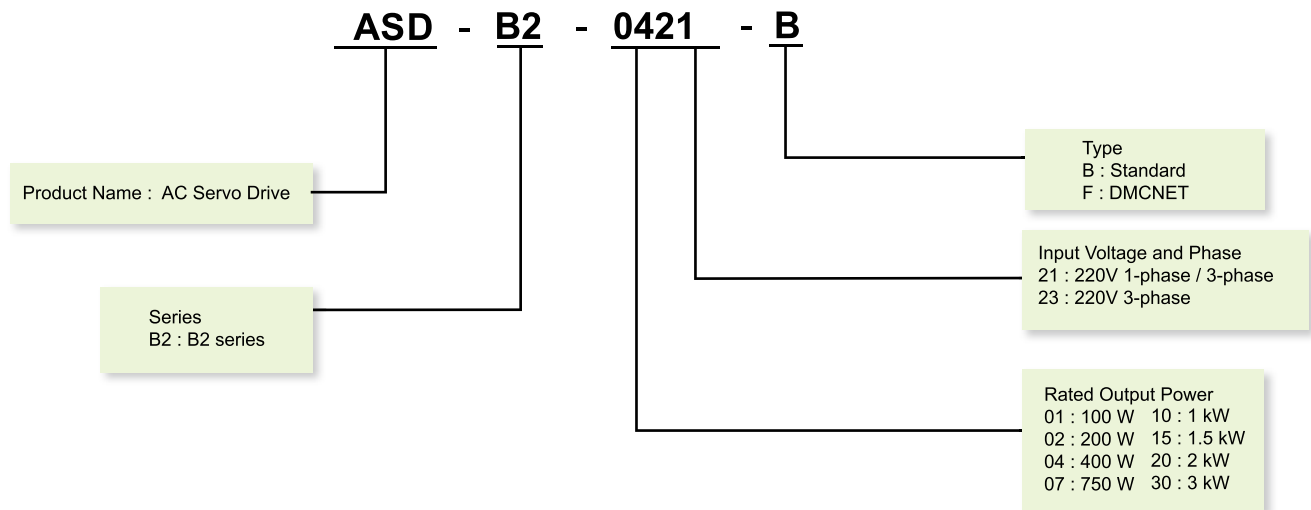▶ 400 W and above servo drives have a built-in regenerative resistor, for significant savings on wiring and cost.

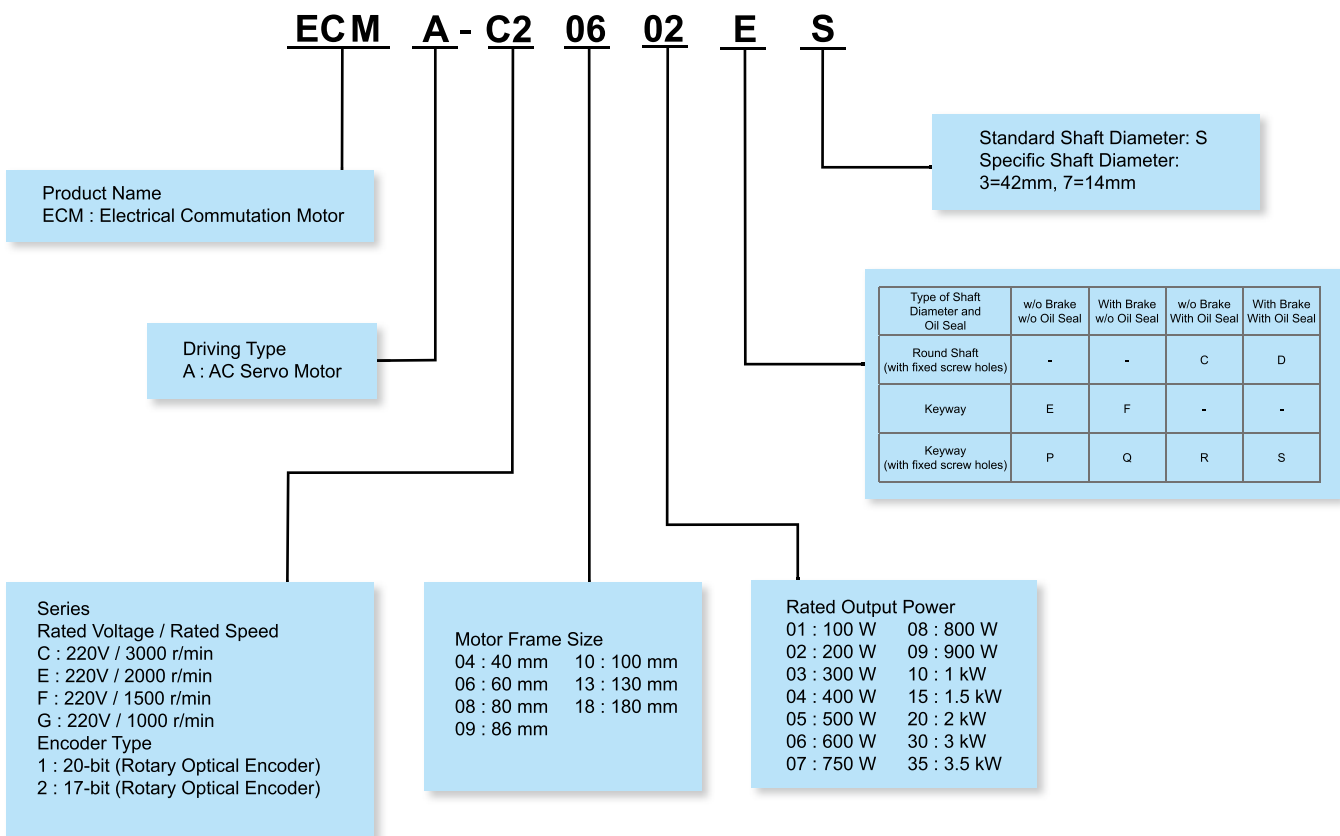Power of control circuit and main power circuit is separated.
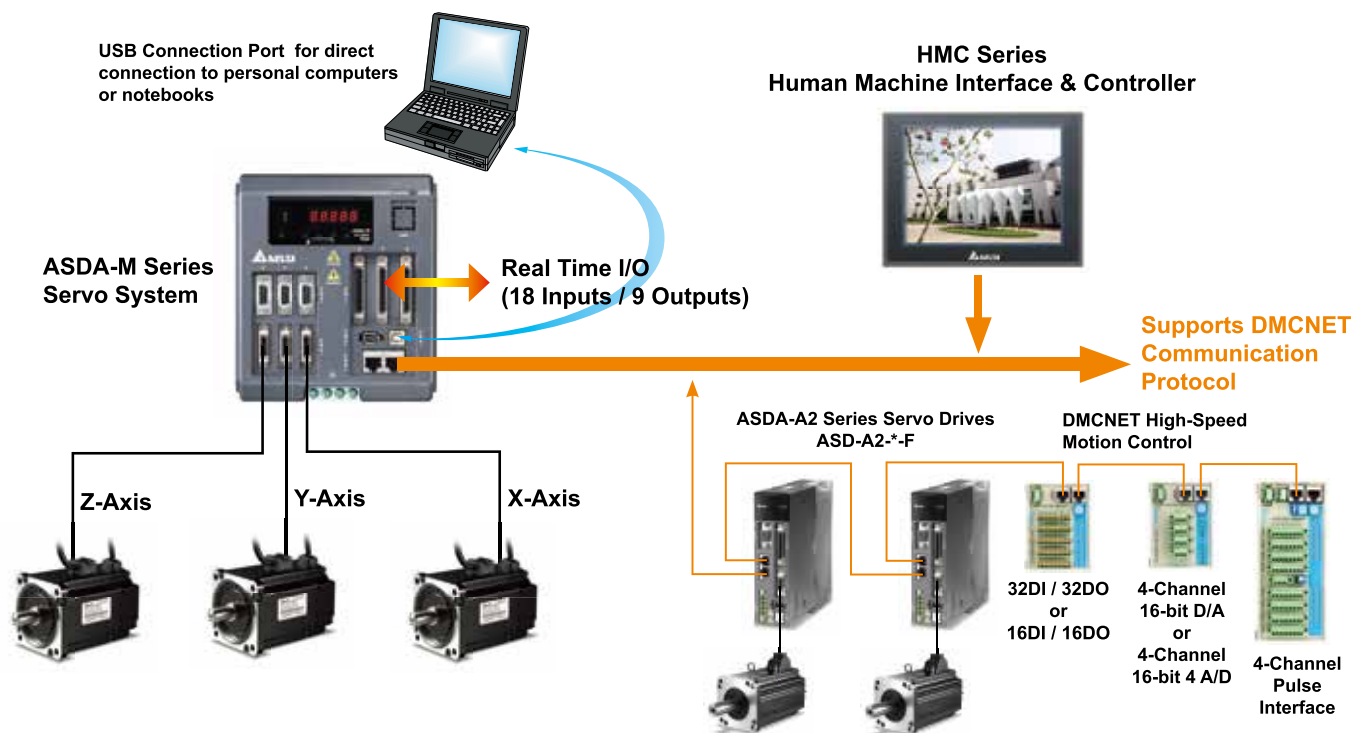
Built-in regenerative resistor

Model Explanation

ASDA-B2 Series Servo Drives

ASD - B2 - 0421 - B

Product Name : AC Servo Drive

Series
B2 : B2 series

Type
B : Standard
F : DMCNET

Input Voltage and Phase
21 : 220V 1-phase / 3-phase
23 : 220V 3-phase

Rated Output Power
01 : 100 W   10 : 1 kW
02 : 200 W   15 : 1.5 kW
04 : 400 W   20 : 2 kW
07 : 750 W   30 : 3 kW

ECMA Series Servo Motors

ECM A - C2 06 02 E S

Product Name
ECM : Electrical Commutation Motor

Driving Type
A : AC Servo Motor

Standard Shaft Diameter: S
Specific Shaft Diameter:
3=42mm, 7=14mm

Type of Shaft Diameter and Oil Seal	w/o Brake w/o Oil Seal	With Brake w/o Oil Seal	w/o Brake With Oil Seal	With Brake With Oil Seal
Round Shaft (with fixed screw holes)	-	-	C	D
Keyway	E	F	-	-
Keyway (with fixed screw holes)	P	Q	R	S

Series
Rated Voltage / Rated Speed
C : 220V / 3000 r/min
E : 220V / 2000 r/min
F : 220V / 1500 r/min
G : 220V / 1000 r/min
Encoder Type
1 : 20-bit (Rotary Optical Encoder)
2 : 17-bit (Rotary Optical Encoder)

Motor Frame Size
04 : 40 mm   10 : 100 mm
06 : 60 mm   13 : 130 mm
08 : 80 mm   18 : 180 mm
09 : 86 mm

Rated Output Power
01 : 100 W   08 : 800 W
02 : 200 W   09 : 900 W
03 : 300 W   10 : 1 kW
04 : 400 W   15 : 1.5 kW
05 : 500 W   20 : 2 kW
06 : 600 W   30 : 3 kW
07 : 750 W   35 : 3.5 kW

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ASDA-M Series

USB Connection Port for direct connection to personal computers or notebooks

ASDA-M Series Servo System

Real Time I/O (18 Inputs / 9 Outputs)

Z-Axis

Y-Axis

X-Axis

HMC Series Human Machine Interface & Controller

Supports DMCNET Communication Protocol

ASDA-A2 Series Servo Drives ASD-A2-*-F

DMCNET High-Speed Motion Control

32DI / 32DO or 16DI / 16DO

4-Channel 16-bit D/A or 4-Channel 16-bit 4 A/D

4-Channel Pulse Interface

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 1,280,000 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.

3-Axis Helical Interpolation

3-Axis Linear Interpolation

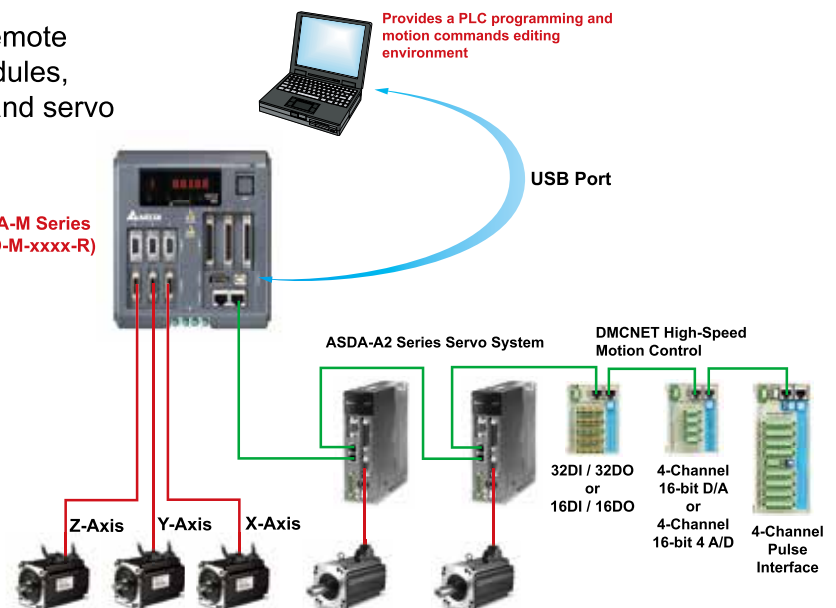**2-Axis Arc Interpolation**

2-Axis Linear Interpolation
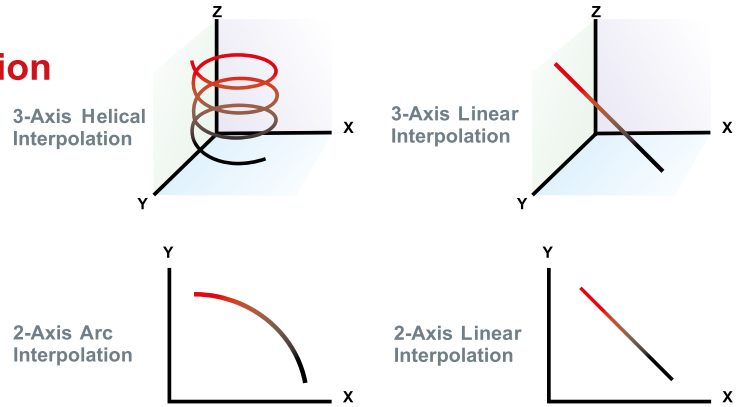
Advanced Gantry Control Servo

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.
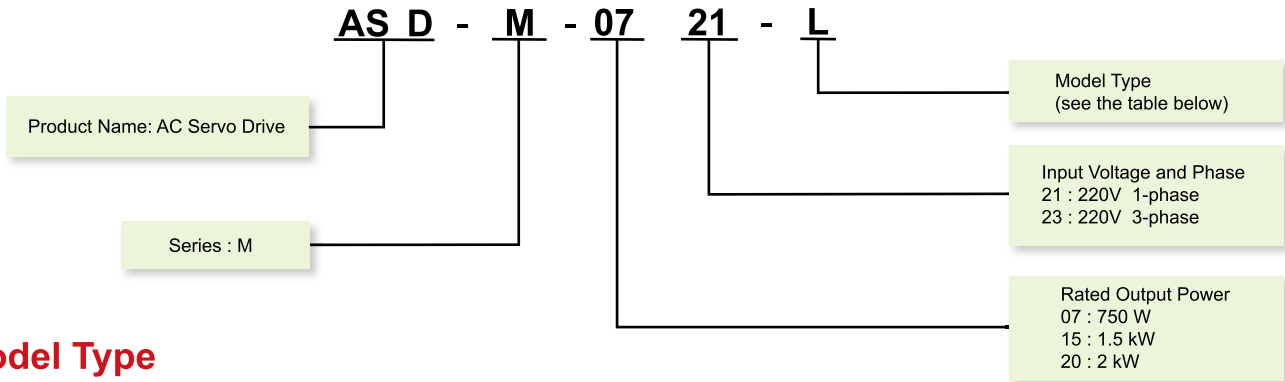
Axis1 — Axis2

Data exchange once every **62.5μs**
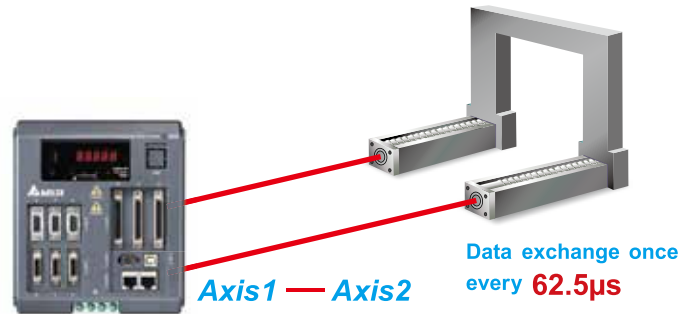
DMCNET Communication

▶ Up to 10 Mbps 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.

Provides a PLC programming and motion commands editing environment

USB Port

ASDA-M Series (ASD-M-xxxx-R)

ASDA-A2 Series Servo System

DMCNET High-Speed Motion Control

32DI / 32DO or 16DI / 16DO

4-Channel 16-bit D/A or 4-Channel 16-bit 4 A/D

4-Channel Pulse Interface

Z-Axis   Y-Axis   X-Axis

Model Explanation

ASDA-M Series Servo Drives

AS D - M - 07 21 - L

Product Name: AC Servo Drive

Series : M

Model Type
(see the table below)

Input Voltage and Phase
21 : 220V 1-phase
23 : 220V 3-phase

Rated Output Power
07 : 750 W
15 : 1.5 kW
20 : 2 kW

Model Type

Type	Full-Closed Control	CANopen	DMCNET	Built-in PLC functions
L	Yes	No	No	No
M	Yes	Yes	No	No
F	Yes	No	Yes	Yes
R	Yes	No	Yes	Yes

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

ECMA Series Servo Motors

ECM A - C1 06 02 E S

Product Name
ECM : Electrical Commutation Motor

Driving Type
A : AC Servo Motor

Standard Shaft Diameter: S
Specific Shaft Diameter:
3=42mm, 7=14mm

Type of Shaft Diameter and Oil Seal	w/o Brake w/o Oil Seal	With Brake w/o Oil Seal	w/o Brake With Oil Seal	With Brake With Oil Seal
Round Shaft (with fixed screw holes)	-	-	C	D
Keyway	E	F	-	-
Keyway (with fixed screw holes)	P	Q	R	S

Series
Rated Voltage / Rated Speed
C : 220V / 3000 r/min
E : 220V / 2000 r/min
G : 220V / 1000 r/min

Sensor Type
1 : Incremental encoder, 20-bit
2 : Incremental encoder, 17-bit
A : Absolute encoder

Motor Frame Size
04 : 40 mm
06 : 60 mm
08 : 80 mm
09 : 86 mm
10 : 100 mm
13 : 130 mm
18 : 180 mm

Rated Output Power
01 : 100 W   09 : 900W
02 : 200 W   10 : 1 kW
03 : 300 W   15 : 1.5 kW
04 : 400 W   20 : 2 kW
05 : 500 W
06 : 600 W
07 : 750 W

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ASDA-A2R Series

ASDA-A2R Series Features

System Operation with High Flexibility:
Connecting Various Kinds of Linear Motors and Servo Motors

▶ Support for Delta's permanent-magnet synchronous linear motors and servo (rotary) motors.

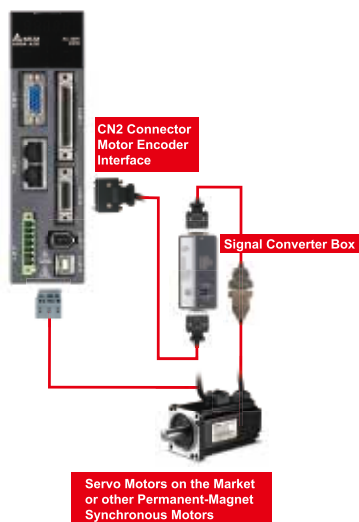▶ Support for other brands of permanent-magnet synchronous linear motors and servo (rotary) motors.

**For different feedback configurations, please refer to the following recommended wiring methods for connecting the ASDA-A2R series servo drive.**

1. Using Delta's ECMA series servo motor.
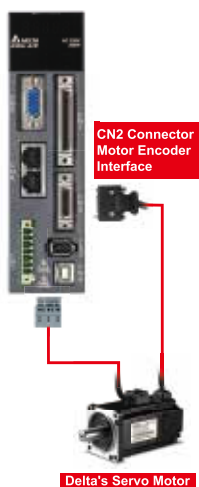
2. When not using Delta's servo motor and if the encoder signals are sine wave, the sine wave can be converted into communication signals by Delta's Signal Converter Box through the CN2 connector for the use of Delta's ASDA-A2R servo system.
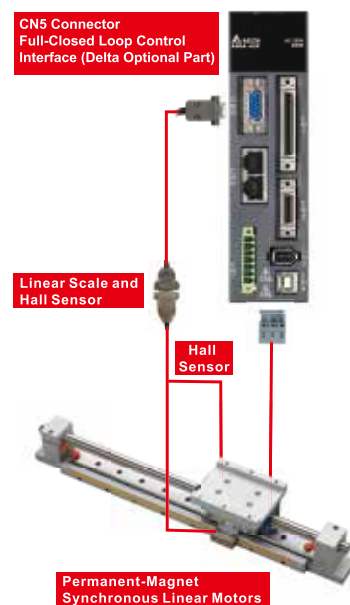
3. When not using Delta's servo motor and if the encoder signals are square wave, the square wave can be converted into communication signals directly through the CN5 connector for the use of Delta's ASDA-A2R servo system.

CN2 Connector
Motor Encoder
Interface

Delta's Servo Motor

CN2 Connector
Motor Encoder
Interface

Signal Converter Box

Servo Motors on the Market
or other Permanent-Magnet
Synchronous Motors

CN5 Connector
Full-Closed Loop Control
Interface (Delta Optional Part)

Servo Motors on the Market
or other Permanent-Magnet
Synchronous Motors

4. When using the linear motor with a linear scale and if the encoder signals are sine wave, the sine wave can be converted into communication signals by Delta's Signal Converter Box through the CN2 connector for the use of Delta's ASDA-A2R servo system.
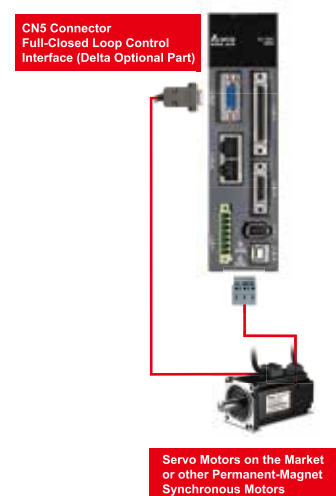
CN2 Connector
Motor Encoder
Interface

Signal
Converter Box

Signal Converter Box
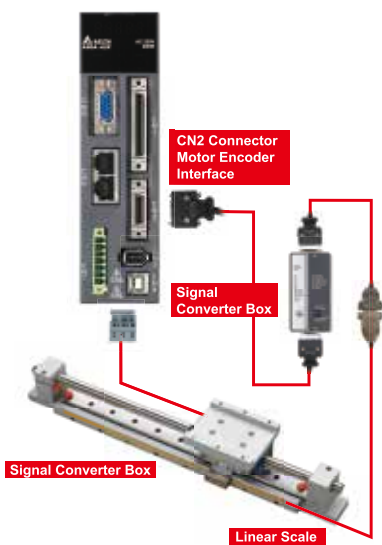
Linear Scale

5. When using the linear motor with a linear scale and if the encoder signals are square wave, the square wave can be converted into communication signals directly through the CN5 connector for the use of Delta's ASDA-A2R servo system. In addition, when a Hall Sensor is included and placed in-between, the signal can be transmitted via CN5 connector and controlled.

CN5 Connector
Full-Closed Loop Control
Interface (Delta Optional Part)

Linear Scale and
Hall Sensor

Hall
Sensor

Permanent-Magnet
Synchronous Linear Motors

Satisfying Customers' High Speed
Communication Requirements:
# The ASD-IF-EN0A20 Signal Converter Box (Optional)

▶ Converts the square wave and sine wave tocommunication signals that can be used and controlled by Delta's servo drive.

▶ Supports AB phase square waves of digital signals and sine waves of analog signals.

▶ Divides signals up to 2,048 times for accurate signaltransmission and enhanced positioning resolution.

▶ Delivers original signals over 20m without attenuation to ensure communication quality.

ASDA-A2R Series Features

Simple Setup Procedures Make Motor Connection Quick and Effortless

▶ Easy-to-operate and step-by-step procedures help users quickly complete motor setup and connection.
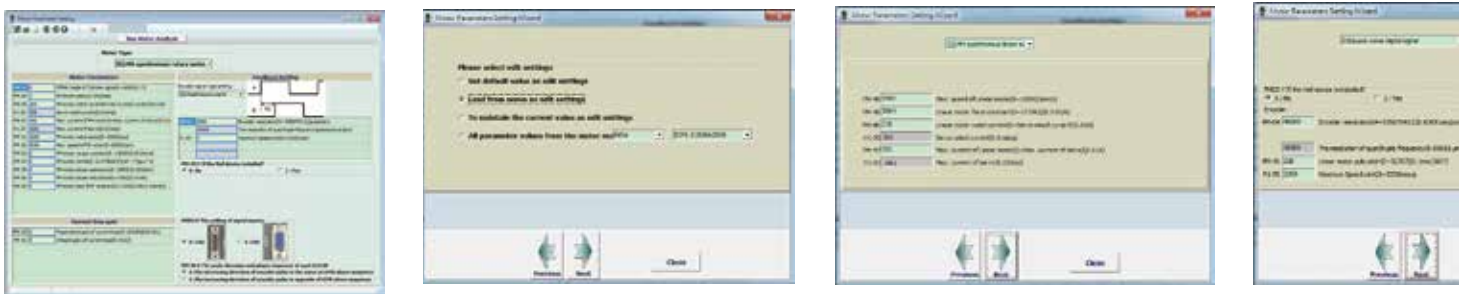

Intelligent Motor Parameter Measuring and Tuning

▶ Detects related electrical circuit parameterssuch as motor inductance and resistance.

▶ Provides motor current loop parameters for motor auto-tuning.

▶ Measures initial conditions on the magnetic field amplification and corrects phase sequence and deviation values of a Hall sensor unit

▶ Detects and offsets the phase sequence of the motor's U, V, W terminals

Excellent Suppression Functions

▶ Vibration Suppression (Low Frequency) Vibration suppression filters are provided for long arm systems to minimize vibration at the machine edges effectively.

▶ Resonance Suppression (High Frequency) Auto notch filters are provided to suppress mechanical resonance efficiently.
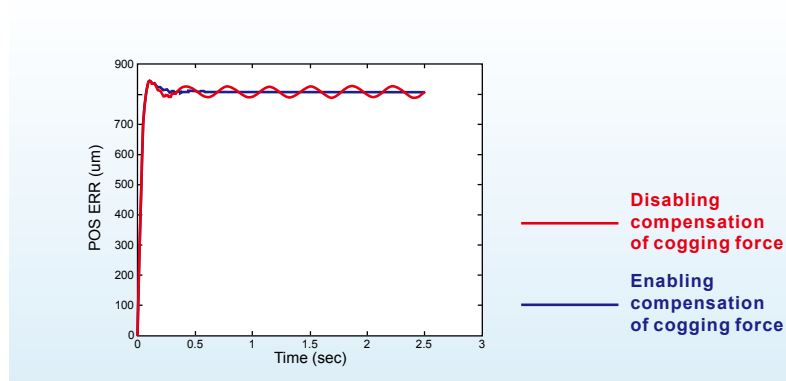
Accurate Positioning and Initiation without a Hall Sensor

▶ Keeps high positioning accuracy and reliability while the motor is running without connecting a Hall sensor unit.

▶ Detects the angle of a motor magnet by fine-sensing to ensure that magnetic field lines are passing at right angles at power-on.
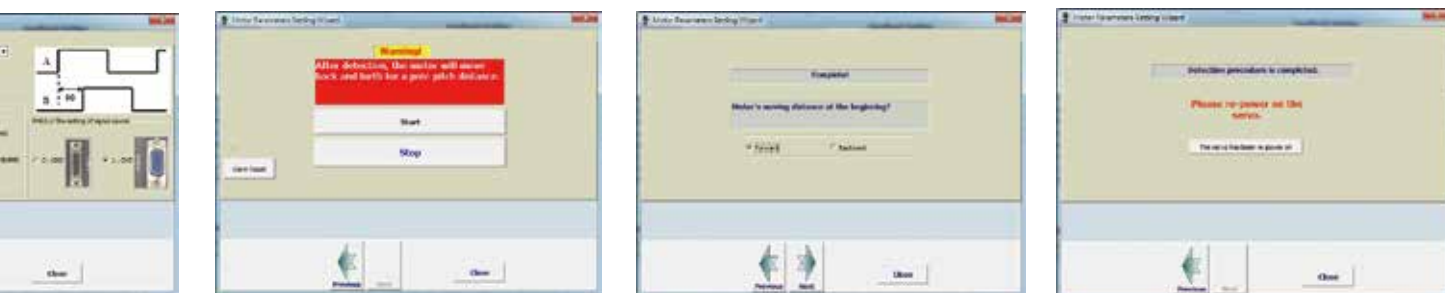
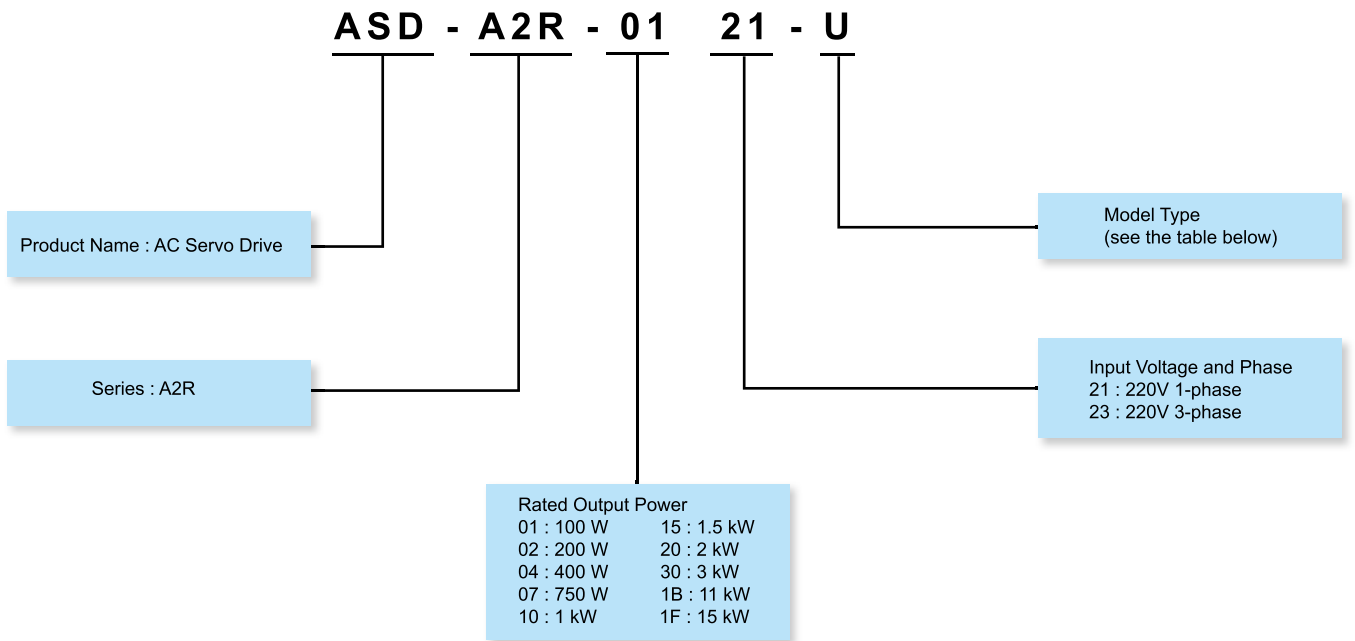## Detection and Compensation of Motor Cogging Force

▶ After the generated cogging force is reduced, the operation of the motor is more smooth and stable.

POS ERR (um)

900
700
600
500
400
300
200
100
0

0   0.5   1   1.5   2   2.5   3
Time (sec)

— Disabling compensation of cogging force

— Enabling compensation of cogging force

Model Explanation

ASDA-A2R Series Servo Drive

A S D - A 2 R - 0 1   2 1 - U

Product Name : AC Servo Drive

Series : A2R

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   1B : 11 kW
10 : 1 kW   1F : 15 kW

Model Type
(see the table below)

Input Voltage and Phase
21 : 220V 1-phase
23 : 220V 3-phase

Model Type

Type	Full-closed Loop	CANopen	DMCNET	E-Cam	I/O Extension
M	Yes	Yes	No	Yes	No
U	Yes	No	No	Yes	Yes
F	Yes	No	Yes	No	No
L	Yes	No	No	No	No

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

Motor Features

ECMA

ECMA series servo motors are permanent-magnet AC servo motors, capable of combining with 200V to 230V ASDA-A2R series AC servo drives from 50 W to 3 kW. There are seven frame sizes available: 40 mm, 60 mm, 80 mm, 86 mm, 100 mm, 130 mm and 180 mm. The motor speed is from 1000 r/min to 5000 r/min and maximum torque range is between 1.92 N-m to 119.36 N-m.

For optional configurations, the ECMA series provides brake and oil seal models to fully support customer needs. It also offers two different shaft selections, round shaft and keyway, for various applications.
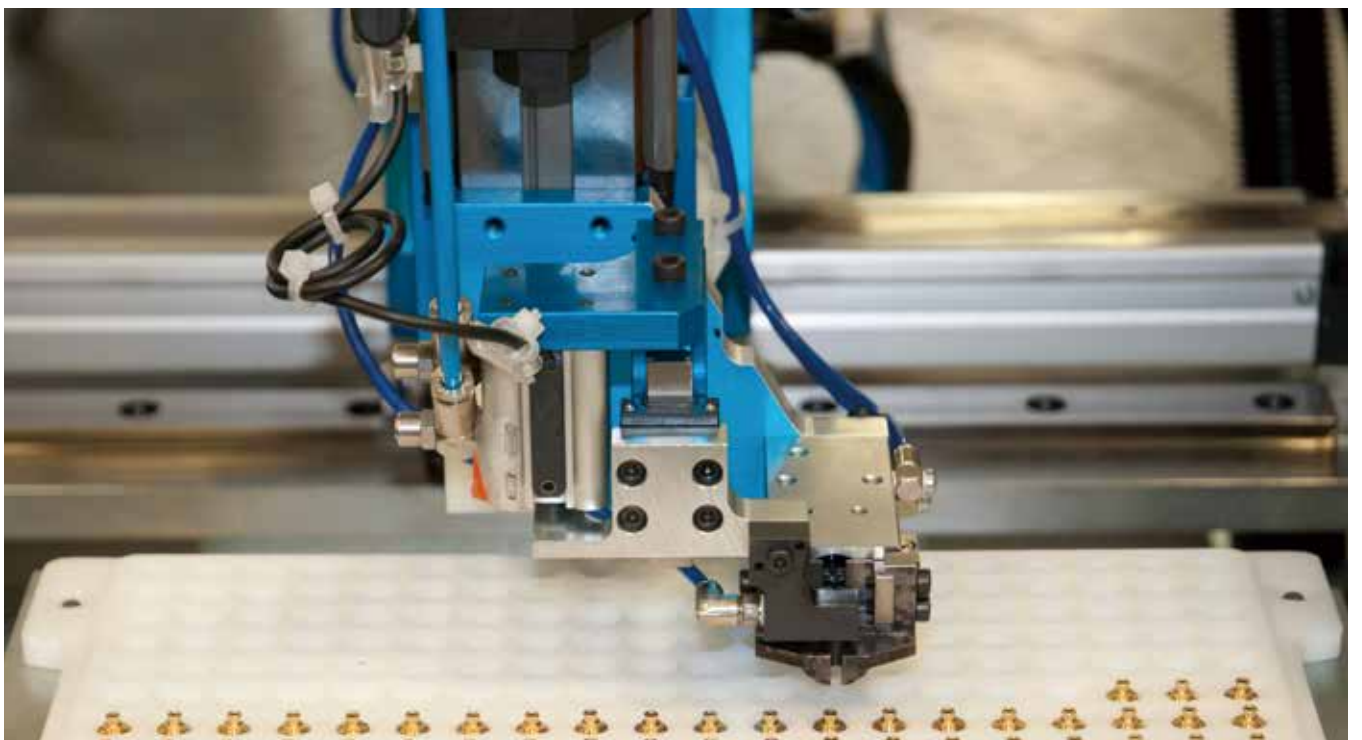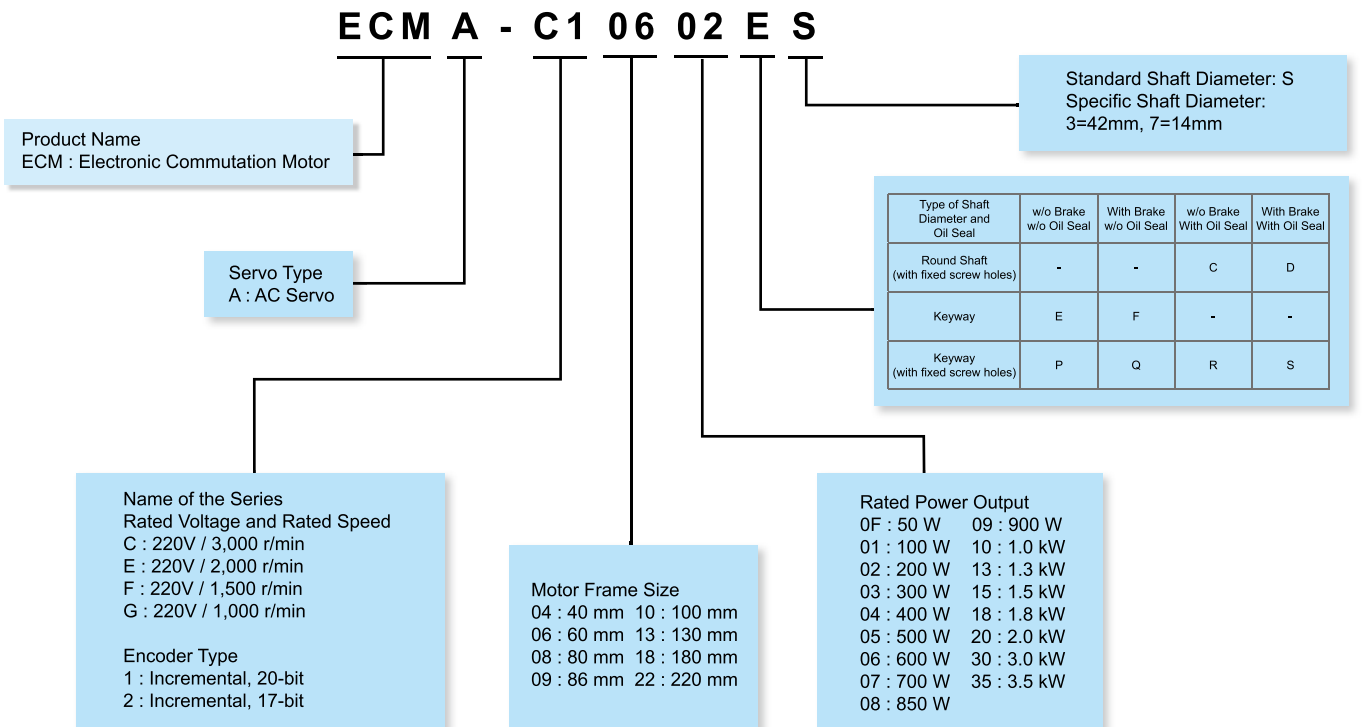
ECML

ECML series linear motors are permanent-magnet synchronous linear motors which feature:
- Built-in digital hall sensor: When a ECML motor is re-servo on, it can find the phase angle without moving.
- Built-in temperature sensor: A thermistor type of temperature sensor is installed inside the ECML motor. Users can acquire the motor's internal temperature by servo drive or ohmmeter.
- Coil assembly has two sides of mounting holes: This allows users to have more flexibility and expandability for device installation.
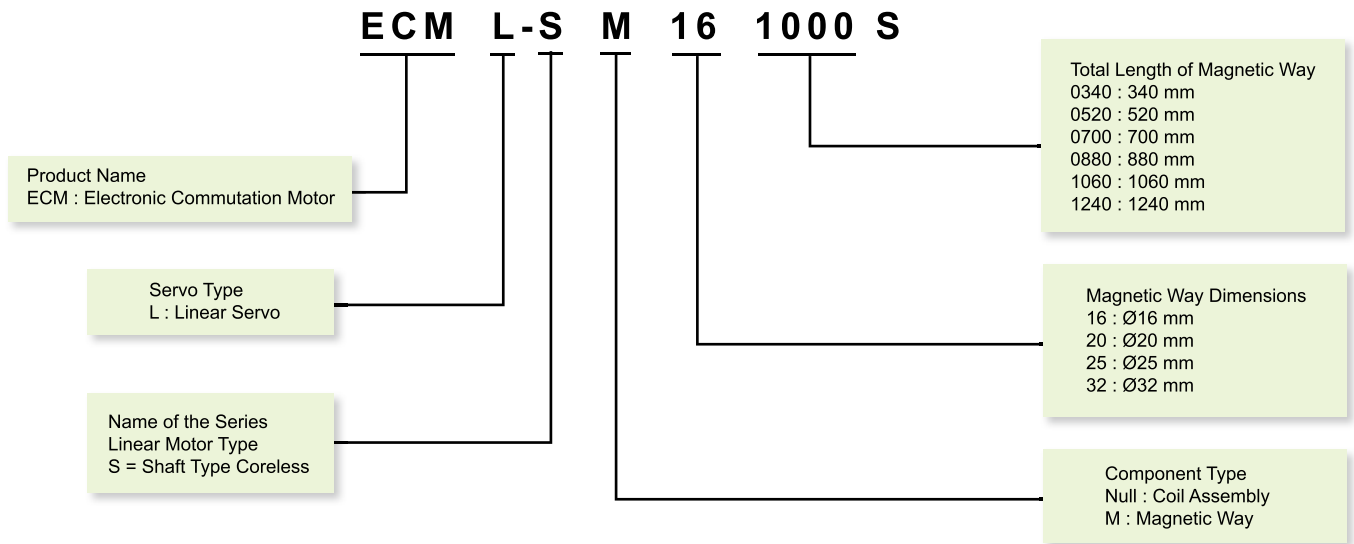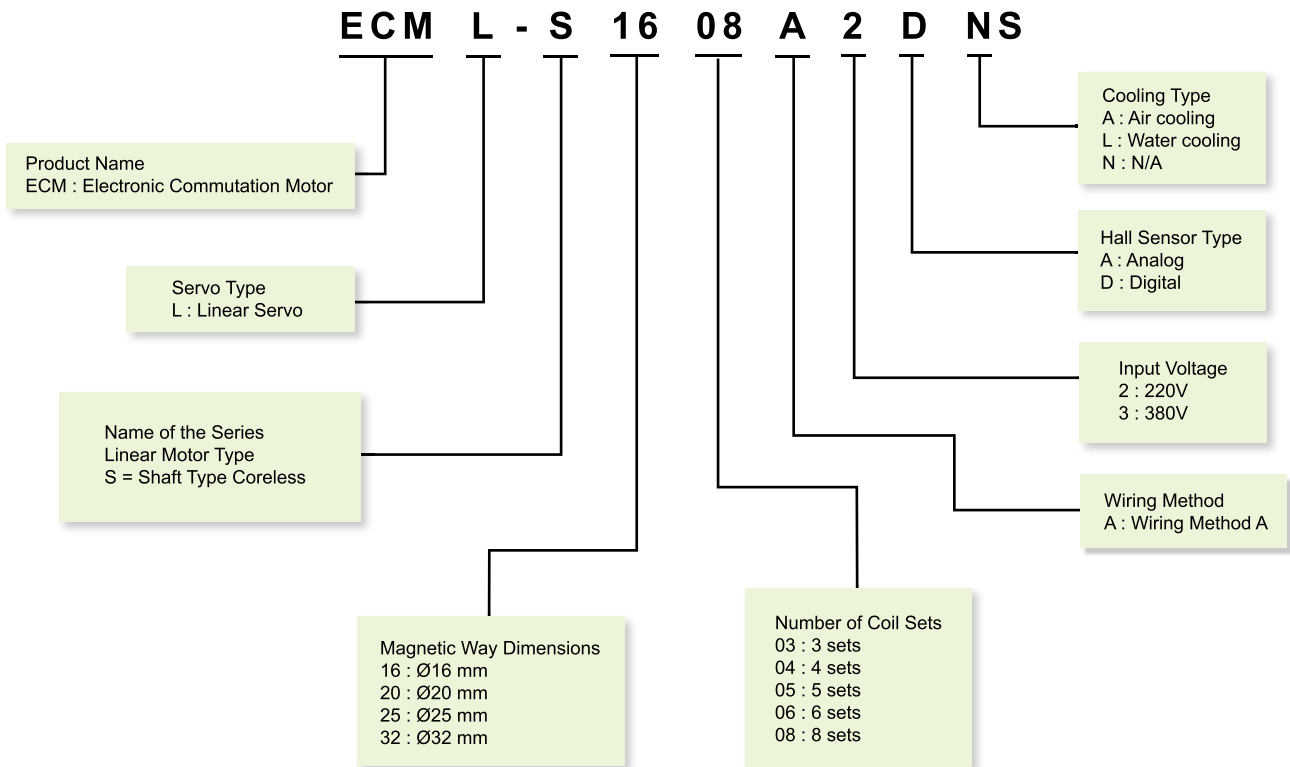
Model Explanation

ECMA Series Servo Motor

ECM A - C1 06 02 E S

Product Name
ECM : Electronic Commutation Motor

Servo Type
A : AC Servo

Name of the Series
Rated Voltage and Rated Speed
C : 220V / 3,000 r/min
E : 220V / 2,000 r/min
F : 220V / 1,500 r/min
G : 220V / 1,000 r/min

Encoder Type
1 : Incremental, 20-bit
2 : Incremental, 17-bit

Motor Frame Size
04 : 40 mm   10 : 100 mm
06 : 60 mm   13 : 130 mm
08 : 80 mm   18 : 180 mm
09 : 86 mm   22 : 220 mm

Rated Power Output
0F : 50 W   09 : 900 W
01 : 100 W   10 : 1.0 kW
02 : 200 W   13 : 1.3 kW
03 : 300 W   15 : 1.5 kW
04 : 400 W   18 : 1.8 kW
05 : 500 W   20 : 2.0 kW
06 : 600 W   30 : 3.0 kW
07 : 700 W   35 : 3.5 kW
08 : 850 W

Standard Shaft Diameter: S
Specific Shaft Diameter:
3=42mm, 7=14mm

Type of Shaft Diameter and Oil Seal	w/o Brake w/o Oil Seal	With Brake w/o Oil Seal	w/o Brake With Oil Seal	With Brake With Oil Seal
Round Shaft (with fixed screw holes)	-	-	C	D
Keyway	E	F	-	-
Keyway (with fixed screw holes)	P	Q	R	S

ECML Series Linear Motor - Magnetic Way

ECM L - S M 16 1000 S

Product Name
ECM : Electronic Commutation Motor

Servo Type
L : Linear Servo

Name of the Series
Linear Motor Type
S = Shaft Type Coreless

Total Length of Magnetic Way
0340 : 340 mm
0520 : 520 mm
0700 : 700 mm
0880 : 880 mm
1060 : 1060 mm
1240 : 1240 mm

Magnetic Way Dimensions
16 : Ø16 mm
20 : Ø20 mm
25 : Ø25 mm
32 : Ø32 mm

Component Type
Null : Coil Assembly
M : Magnetic Way

ECML Series Linear Motor - Coil Assembly

ECM L - S 16 08 A 2 D NS

Product Name
ECM : Electronic Commutation Motor

Servo Type
L : Linear Servo

Name of the Series
Linear Motor Type
S = Shaft Type Coreless

Cooling Type
A : Air cooling
L : Water cooling
N : N/A

Hall Sensor Type
A : Analog
D : Digital

Input Voltage
2 : 220V
3 : 380V

Wiring Method
A : Wiring Method A

Magnetic Way Dimensions
16 : Ø16 mm
20 : Ø20 mm
25 : Ø25 mm
32 : Ø32 mm

Number of Coil Sets
03 : 3 sets
04 : 4 sets
05 : 5 sets
06 : 6 sets
08 : 8 sets

ΔELTA

ASDA-Soft

ASDA-Soft Configuration Software

Capture / Compare

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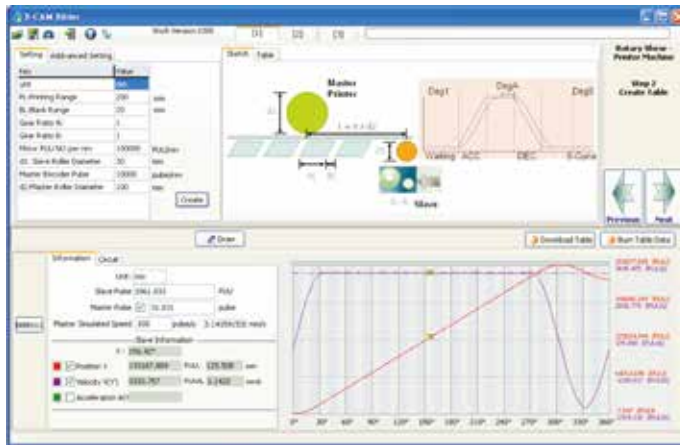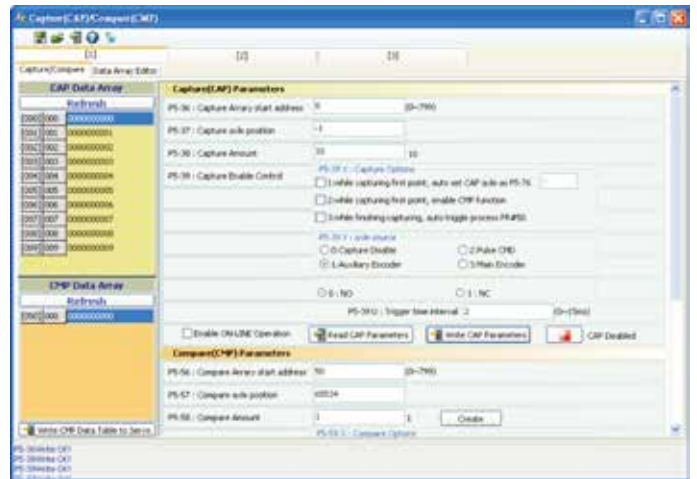

Electronic Cam (E-Cam)

- 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.
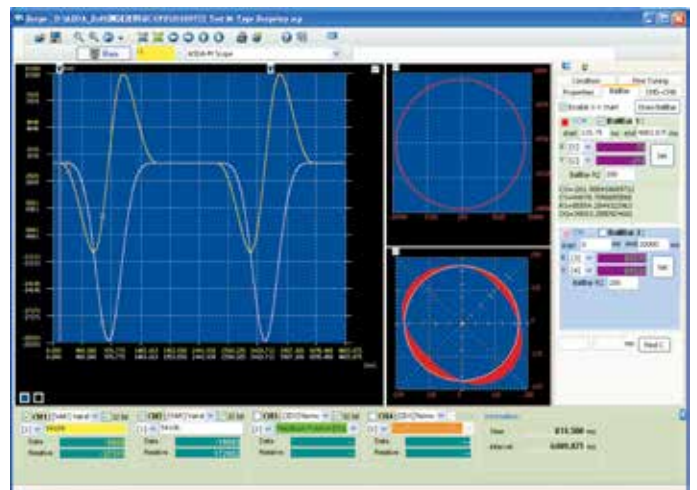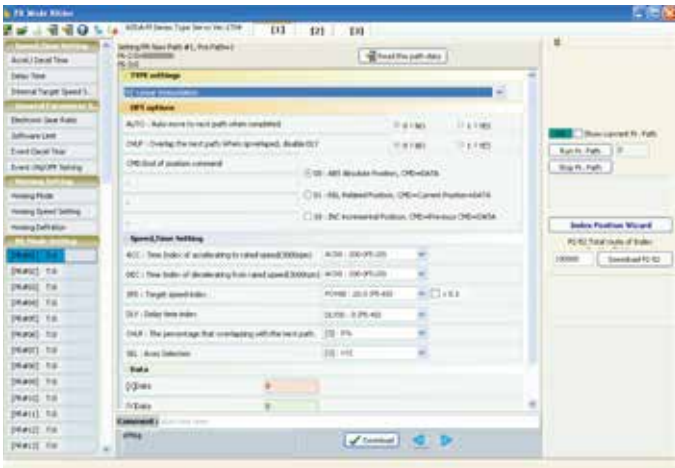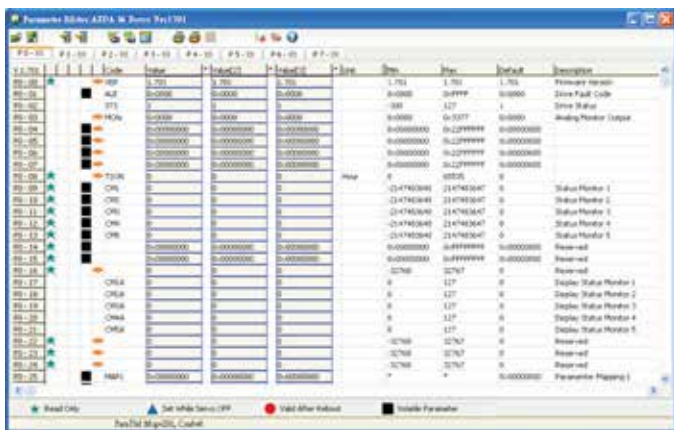
PR Mode
■ Easy-to-use editing interface is designed for the new and enhanced PR control mode. Homing, point-to-point and other motion control functions for multi-axis positioning control are easily achieved.
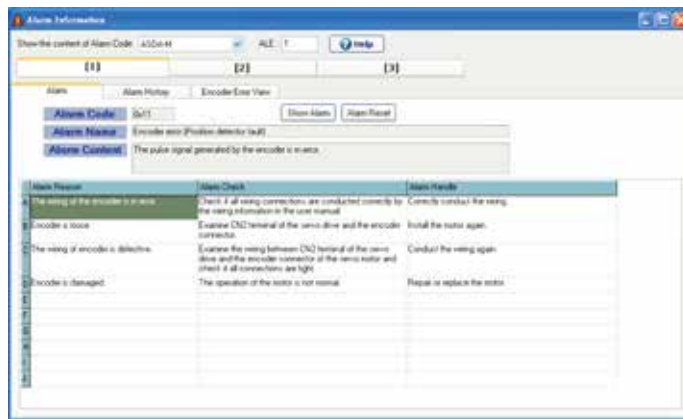
Alarm
■ Convenient alarm display function is capable of troubleshooting the system easily and recommending timely corrective actions .

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.
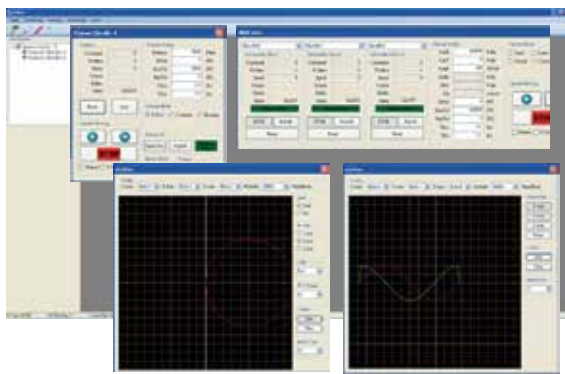
PAC Solution

Programmable Automation Controller (PAC)
MH1-S30D-A01DE

A Perfect Balance of EtherCAT Fieldbus and High-Performance Motion Control

▶ **Robust Hardware:** 1.2 GHz dual-code processor, built-in USB and CFast Card slots, cable-less and fan-less design for increased reliability and low power consumption

▶ **Stable Storage:** Easy installation of large-capacity SATA hard disk for easy maintenance and data management

▶ **Integrated Control:** Perfect integration of motion control and logic programming control enables better synchronization with EtherCAT communication

▶ **Multiple Communication Interfaces:** 1 COM port, 2 giga Ethernet ports and 2 DMCNET communication ports for fast and convenient data transmission

▶ **Flexible Extension Interfaces:** 2 PCI or 1 PCIe extension slots for more flexible applications

▶ **EtherCAT Master Port:** Up to 4 kHz synchronous cycle time for multi-axis control and automation

▶ **Easy Setting:** Control of the slave modules and servo systems are simple with easy to understand key operation

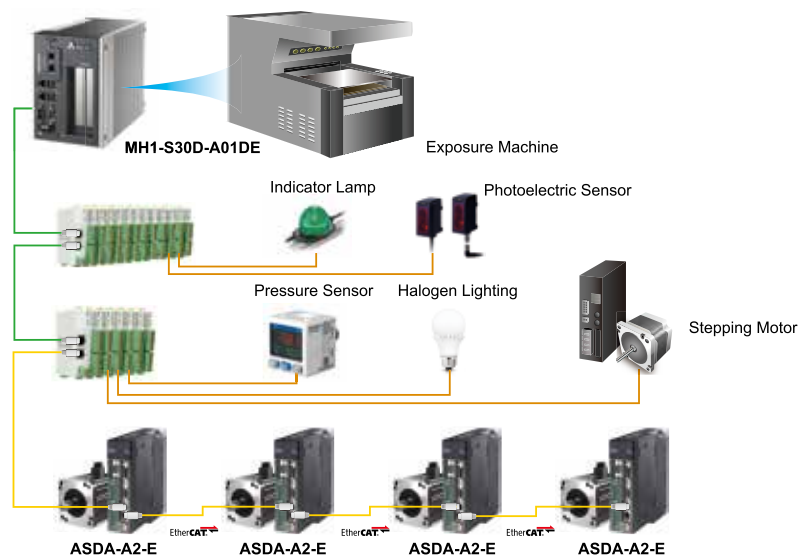▶ **High Security:** Customizable IC device for secured confidential programming protection

Motion

- Built-in EherCAT and DMCNET master
- Enables up to 64 axes of control via EtherCAT or up to 12 axes of servo system units via DMCNET
- Connects max. 100 units of EtherCAT slave modules or 24 units of DMCNET slave modules
- Electronic Cam (E-Cam) function
- Linear, Arc, Helical and high-speed continuous interpolation

Software

- Optional Soft HMI functions
- Optional CNC control functions
- Optional robot arm control functions
- Optional IEC61131 PLC functions

▶ **EtherCAT Automation Software:** EcNAVI development software is for configuring an EtherCAT network that includes an EtherCAT master controller and slave devices for data communication, functional identification, programming and debugging

Applications

Exposure machines, laser engraving, frame cutting, robot arms, five-axis CNC machine tools, waterjet cutting

MH1-S30D-A01DE   Exposure Machine

Indicator Lamp   Photoelectric Sensor

Pressure Sensor   Halogen Lighting

Stepping Motor

ASDA-A2-E   ASDA-A2-E   ASDA-A2-E   ASDA-A2-E

PAC Selection Guide

MH1

Model Name		MH1-S30D	MH1-C30D	MH1-C50D	MH1-C30E	MH1-C50E	MH1-A12E
Processor System	Processor	VIA Nano X2 Dual Core 1.2GHz	Intel Core i3-3210ME Dual Core 2.4GHz	Intel Core i5-3610ME Dual Core 2.7GHz	Intel Core i3-3210ME Dual Core 2.4GHz	Intel Core i5-3610ME Dual Core 2.7GHz	Intel ATOM E3845 Quad Core 1.91GHz
	MRAM	128KB					
	BIOS	AMI BIOS					
	System Memory	1 x DDR3-1066 Max. up to 8 GB	2 x DDR3-1600 Max. up to 16 GB		2 x DDR3-1600 Max. up to 16 GB		1 x DDR3L-1333 Max. up to 2 GB
Display Interface	CRT						
I/O Interface	Ethernet	2 x IEEE 802.3/802.3u/802.3ab 1Gbps					
	Fieldbus	DMCNET			EtherCAT		
	USB	4 x USB 2.0					
	Serial Port	1 x RS-232 (hardware auto flow control)					
	Expansion	2 x PCI slot/ 2 x PCIe x1 slot	2 x PCI slot/2 x PCIe x1 slot/ 1 x PCIe x4 + 1 x PCIe x1		2 x PCI slot/2 x PCIe x1 slot/ 1 x PCIe x4 + 1 x PCIe x1		2 x PCI slot / 2 x PCIe x1 slot
Storage	CFast Card	1 x CFast Card					
	Micro-SD Card	1 x Micro-SD Card					1 x eMMC on Board
	Solid State Disk	1 x 2.5" SATA SSD					
Power Requirement	Input Voltage & Type	DC9~36V±10%, ATX					
Dimensions (W x H x D)		127 x 175 x 250 mm					
Operation Temperature		0°C ~50°C					
OS Support		WinCE 7.0, Window XP/7 Embedded, RTX					

■ Centralized Slave Module

■ Bus Adapter Type Module

R1-EC5500
EtherCAT to E-BUS power module

■ Motion Type Module

R1-EC5621
Single-axis pulse output motion control module, suitable for stepping and servo-based systems

■ Digital Input Type Module

R1-EC6022
16 digital inputs, sink / source type
The available models are listed below for different response-time requirements:
- R1-EC6002: < 0.1ms
- R1-EC6012: 1ms
- R1-EC6022: 2ms
- R1-EC6032: 3ms

■ Digital Output Type Module

R1-EC7062
16 digital outputs, sink type
Max. output current: 0.5A per each port

■ ADC Type Module

R1-EC8124
4 channels 16-bit single-ended A/D control module
Input filter limit frequency: 10 kHz
Signal voltage: ±5V, ±10V

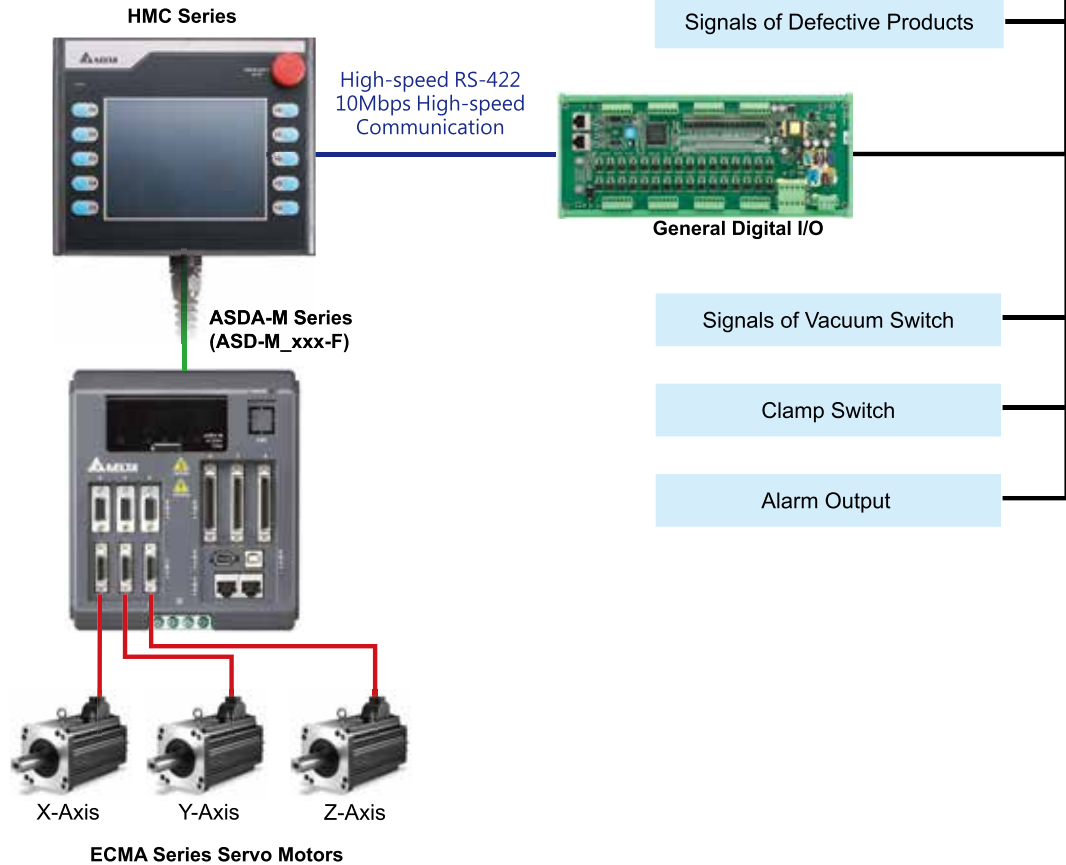### ■ DAC Type Module

R1-EC9144
4 channels 16-bit D/A control module
Voltage output: ±5V, ±10V, 0 ~ 5V, 0 ~ 10V
Current output: 0 ~ 20 mA, 4 ~ 24 mA, 0 ~ 24 mA

HMC Series

Field Applications

Cartesian Robotic Arms

HMC Series

High-speed RS-422
10Mbps High-speed
Communication

**ASDA-M Series
(ASD-M_xxx-F)**

X-Axis   Y-Axis   Z-Axis

ECMA Series Servo Motors

Mold Opening Signals of
Injection Molding Machine

Signals of Defective Products

General Digital I/O

Signals of Vacuum Switch

Clamp Switch

Alarm Output

Features

Powerful Dual Processors

The HMC is equipped with two high-speed CPUs.
One CPU is for the operation of the human machine interface.
The other is a DSP (Digital Signal Processor) that serves
as a motion processor for sequence control, which
guarantees no worries for execution efficiency and the
performance of the system when running large and
complicated PLC programs. The HMC is capable of
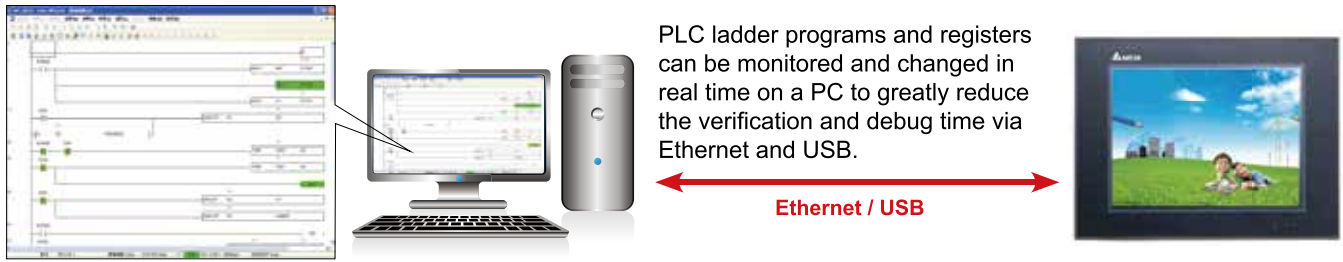controlling up to 4 major PLC tasks synchronously.

DOPSoft, HMI Screen Editor & PLC Programming Software

DOPSoft provides a direct editing
environment for fast and effective
HMI screen editing and PLC
programming which simplifies the
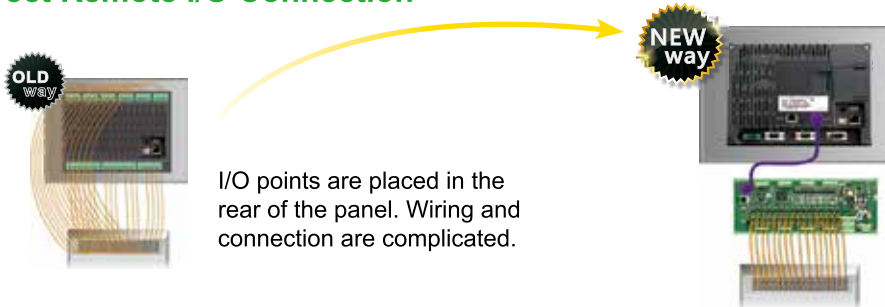design time and minimizes the cost.
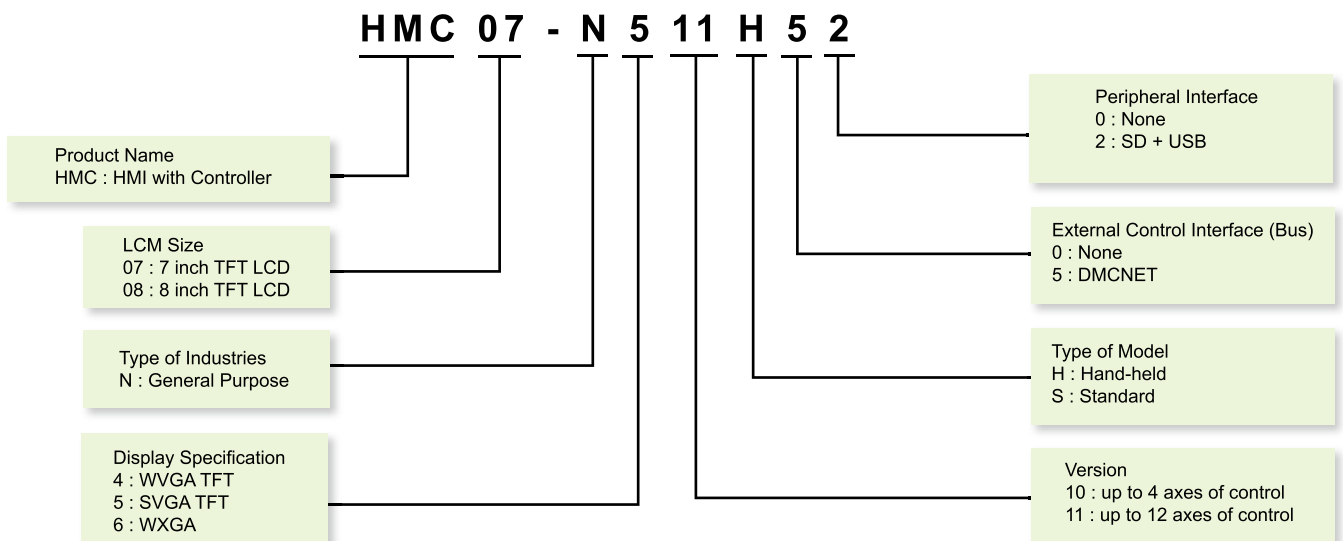
Quick PLC Ladder Monitoring

PLC ladder programs and registers can be monitored and changed in real time on a PC to greatly reduce the verification and debug time via Ethernet and USB.

Ethernet / USB

Built-in PLC ladder monitor devices allow users to display programs in real time and confirm machine operations without using a PC.

Direct Remote I/O Connection

OLD way

I/O points are placed in the rear of the panel. Wiring and connection are complicated.

NEW way

Direct remote I/O connection provides simple and effortless wiring. Only one communication cable is needed to complete I/O connection.

Model Name Explanation

HMC 07 - N 5 11 H 5 2

Product Name
HMC : HMI with Controller

LCM Size
07 : 7 inch TFT LCD
08 : 8 inch TFT LCD

Type of Industries
N : General Purpose

Display Specification
4 : WVGA TFT
5 : SVGA TFT
6 : WXGA

Peripheral Interface
0 : None
2 : SD + USB

External Control Interface (Bus)
0 : None
5 : DMCNET

Type of Model
H : Hand-held
S : Standard

Version
10 : up to 4 axes of control
11 : up to 12 axes of control

ΔELTA

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