


Automation for a Changing World

Delta Motion Control Solution

www.deltaww.com

Smarter. Greener. Together.

Who We Are

- A global leader in power and thermal management technology with world-class customers in several industries.
- A leading brand of smart automation and energy management solutions for smart factories, industrial processes, data centers, telecom networks, green buildings and more.
- Our mission is “To provide innovative, clean and energy-efficient solutions for a better tomorrow”

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 industries such as food, textiles, chemicals, electronics, and plastics; automation equipment used in the pharmaceutical and printing industries; 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-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

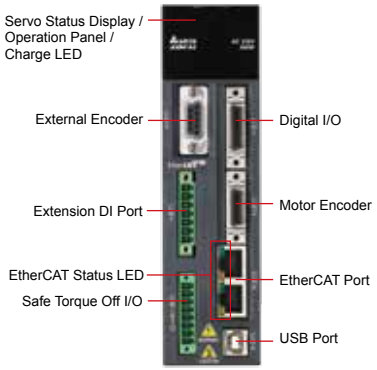
Implements High Precision Positioning Control

- 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



Ordering Information

ASD - A2 - 04 21 - E

- **E** — EtherCAT Model
- **A2** — Series : A2
- **ASD** — Product Name: AC Servo Drive
- **21** — Input Voltage and Phase
  - 21 : 220V 1-phase/3-phase
  - 23 : 220V 3-phase
  - 43 : 400V 3-phase
- **04** — Rated Output Power
  - 01 : 100 W
  - 02 : 200 W
  - 04 : 400 W
  - 07 : 750 W
  - 10 : 1 kW
  - 15 : 1.5 kW
  - 20 : 2 kW
  - 30 : 3 kW
  - 45 : 4.5 kW
  - 55 : 5.5 kW
  - 75 : 7.5 kW

ASDA-A2 Series

Features

High Positioning Accuracy

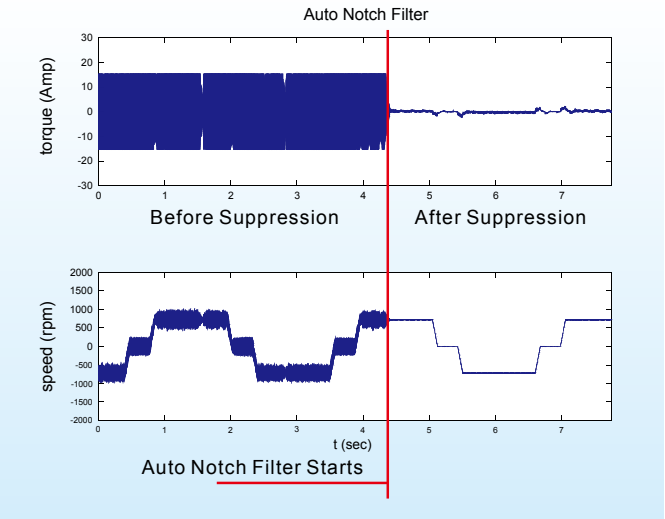
- ECMA series servo motors feature incremental encoders with 20-bit level resolution which can improve low speed stability, smooth motor operation and enhance the accuracy of positioning.
- Absolute type encoder with 17-bit level resolution is supported.

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).

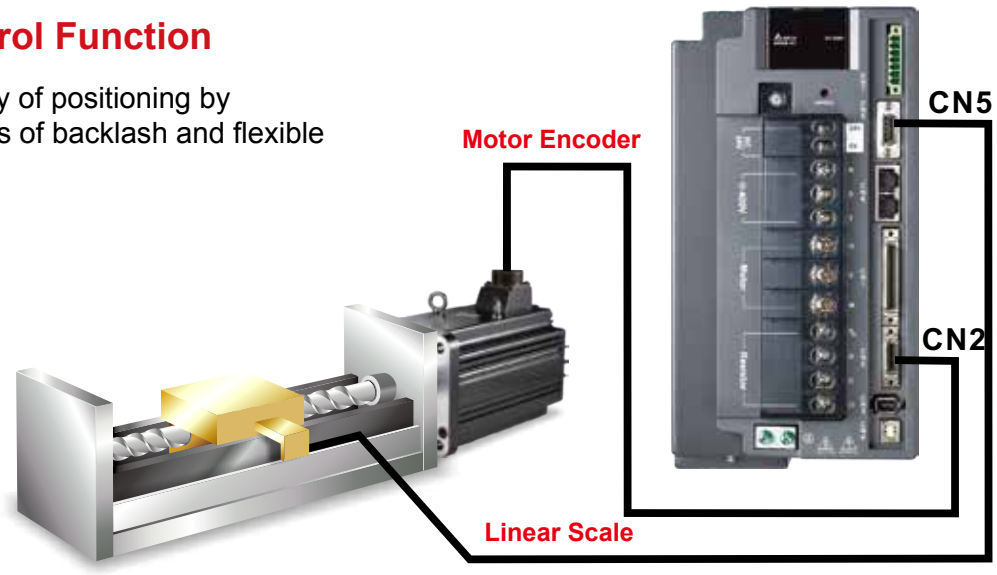
Excellent Suppression Functions

- 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.



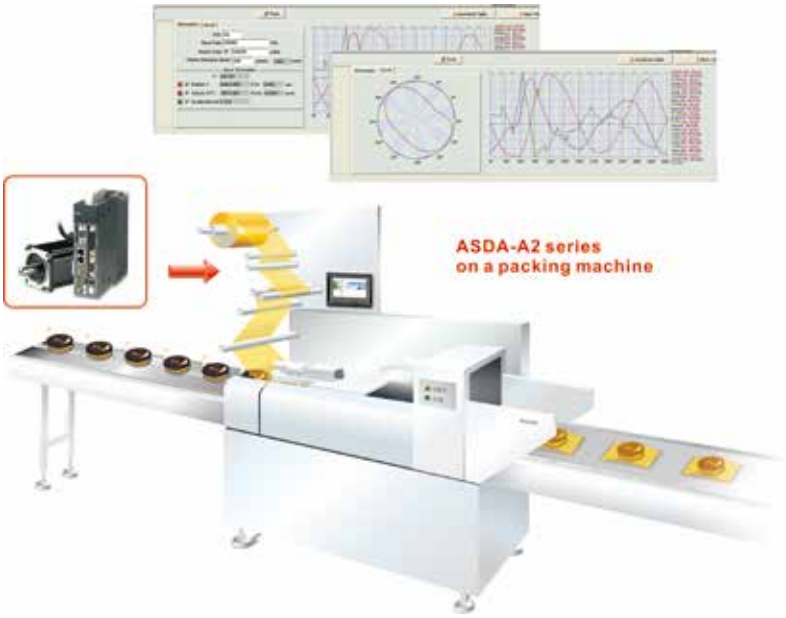
Full-Closed Control Function

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



Electronic Cam (E-Cam) Function

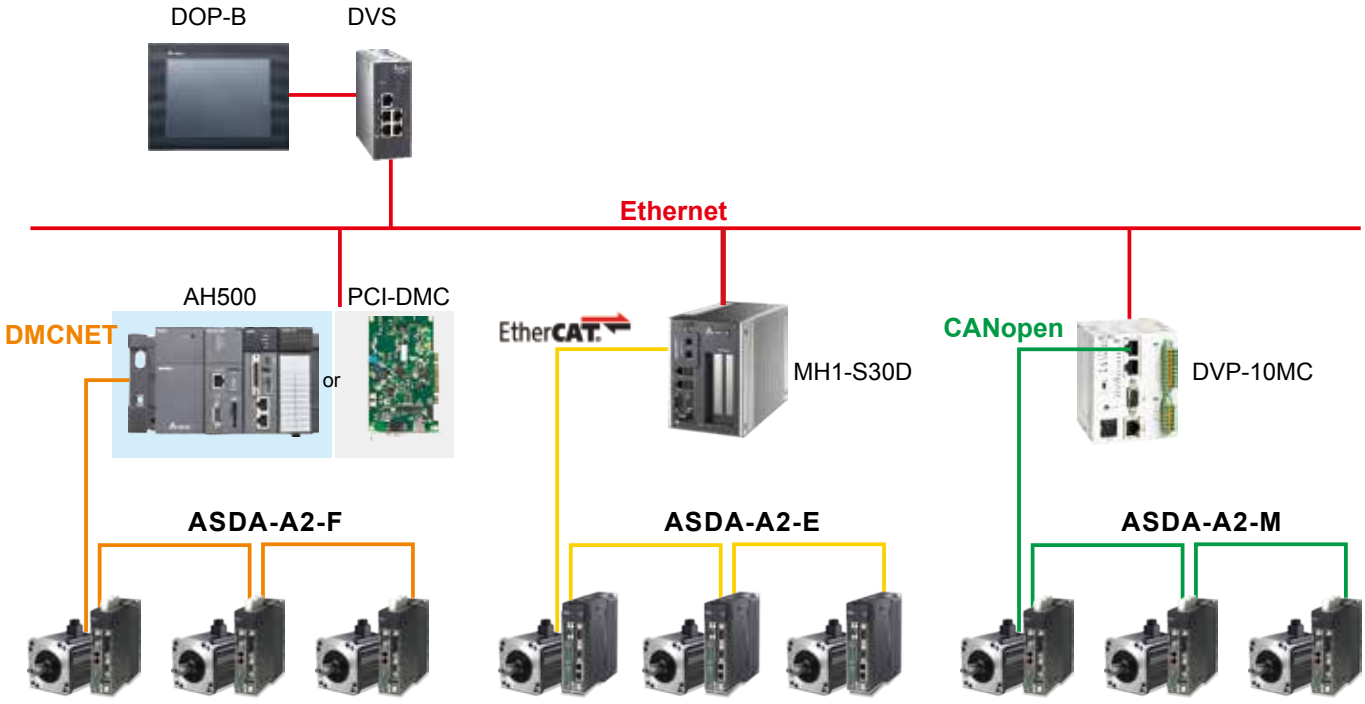
- 720 points max. for E-Cam outline.
- E-Cam curve smoothing function can bring out smooth motion.
- ASDA-Soft for easy designing of cam profile.
- Excellent for flying shear, rotary cut, and other cam applications.



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

ASD - A2 - 04 21 - M

Product Name:
AC Servo Drive

Series:
A2

Rated Output Power

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

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

Model Type
(see the table below)

	Type	RS-485 (CN3)	Full-Closed Control (CN5) *1	Extension Port for Digital Input (CN7)	EtherCAT	CANopen	DMCNET	Analog Voltage Control	Pulse Input Port	PR Parameters*2	E-Cam *3
Standard Type	L	○	○	X	X	X	X	○	○	○	X
	U	○	○	○	X	X	X	○	○	○	○
Network Type	E	X	○	○	○	X	X	X	X	○	○
	F	○	○	X	X	X	○	X	X	○	X
	M	○	○	X	X	○	X	○	○	○	○

NOTE

1. In PR mode, only A2-F supports full-closed control function.
2. PR parameters can be read and written through communication by DMCNET only.
3. E-Cam function can only be used in PR mode.

ECMA Series Servo Motors

ECM A - C1 06 02 E S

Product Name
ECM: Electrical Commutation Motor

Driving Type
A: AC Servo Motor

S: Standard Shaft Diameter
H: Specific Shaft Diameter / High Inertia Model

Shaft Type 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 screw hole)	-	-	C	D
Keyway	E	F	-	-
Keyway (with screw hole)	P	Q	R	S

Series
Rated Voltage / Rated Speed

C: 220V / 3000 r/min	J: 400V / 3000 r/min
E: 220V / 2000 r/min	K: 400V / 2000 r/min
F: 220V / 1500 r/min	L: 400V / 1500 r/min
G: 220V / 1000 r/min	M: 400V / 1000 r/min

Encoder Type

1: Incremental encoder, 20-bit	A: Absolute encoder,
2: Incremental encoder, 17-bit	Single-turn: 17-bit
3: 2500 ppr	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

0F: 50 W	08: 850 W	35: 3.5 kW
01: 100 W	09: 900 W	45: 4.5 kW
02: 200 W	10: 1 kW	50: 5.0 kW
03: 300 W	13: 1.3 kW	55: 5.5 kW
04: 400 W	15: 1.5 kW	75: 7.5 kW
05: 500 W	18: 1.8 kW	1B: 11 kW
06: 600 W	20: 2 kW	1F: 15 kW
07: 750 W	30: 3 kW	

Features of ECMA Series Servo Motors

High Efficiency Permanent Magnetic Motors

220 V series:

- Rated power from 50 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: 0.477 N-m ~ 224 N-m.

400 V series:

- Rated power from 400 W to 7.5 kW.
- Frame size: 60 mm, 80 mm, 86mm, 100mm, 130 mm, 180 mm.
- Motor maximun speed up to 5000 r/min.
- Output torque: 3.82 N-m ~ 119.36 N-m.

ASDA-B2 Series

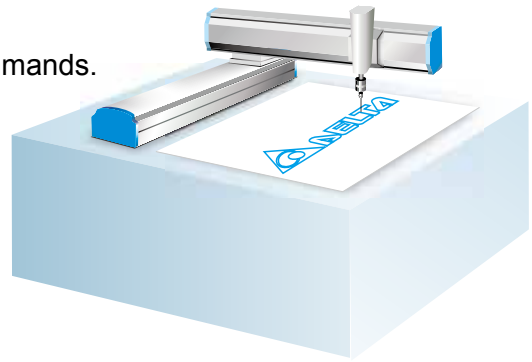
Features

Implements High Precision Positioning Control

- High-resolution encoder with 17-bit 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

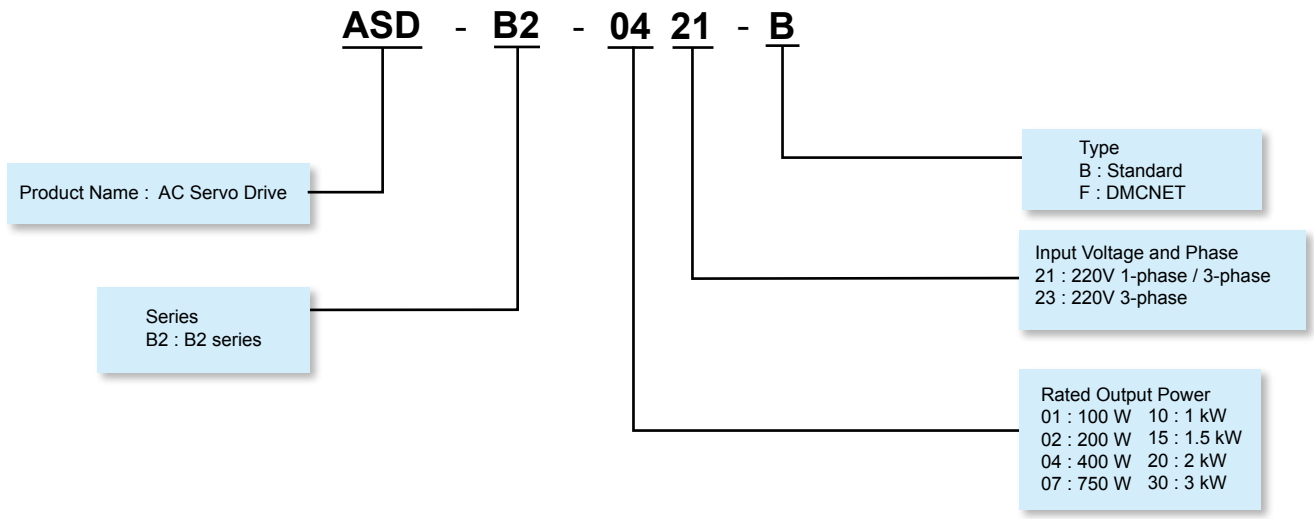
Power of control circuit and main power circuit is separated.

- 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.

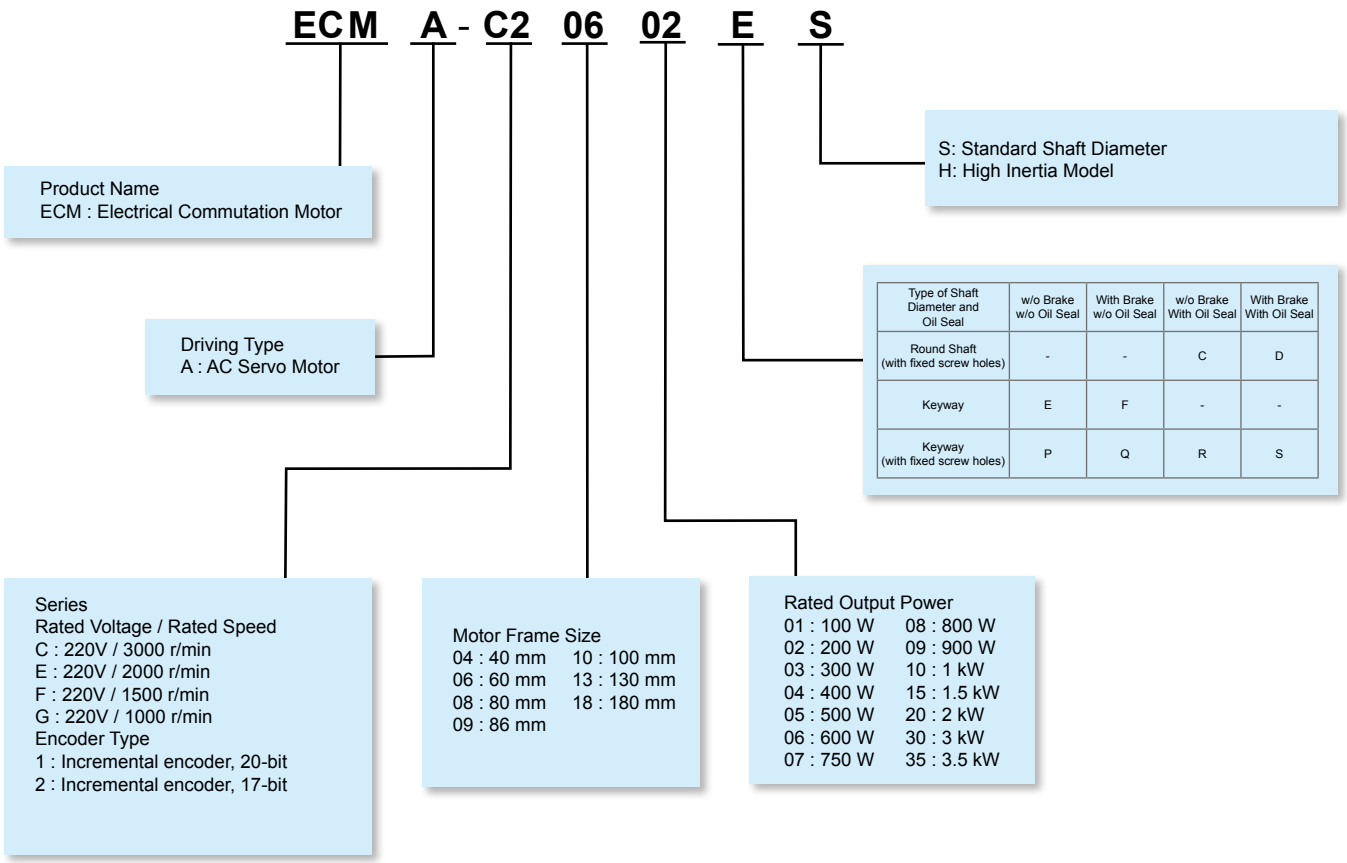
Built-in regenerative resistor

Model Explanation

ASDA-B2 Series Servo Drives

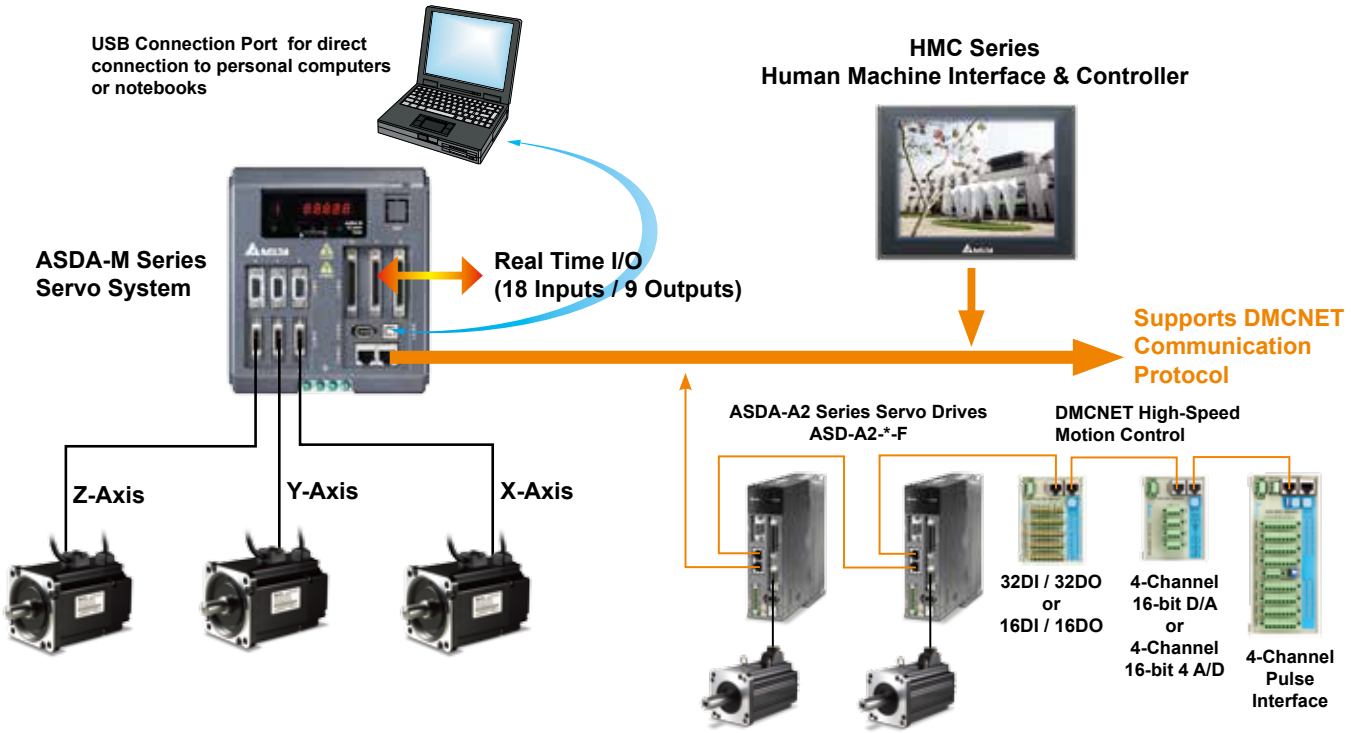


ECMA Series Servo Motors



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

ASDA-M Series



Features

Highly Integrated System

- Built-in motion control 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.

New PC Software Functions

- ASDA-Soft provides built-in contour analysis function.
- 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.

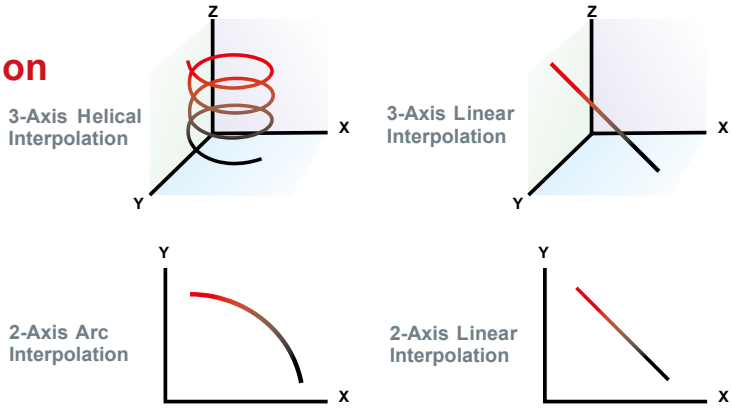
High Precision, High Performance Servo Motors

- Supports incremental type and absolute type encoders.
- Incremental type encoder provides up to 1,280,000 p/rev resolution for high-precision positioning.

Features (cont.)

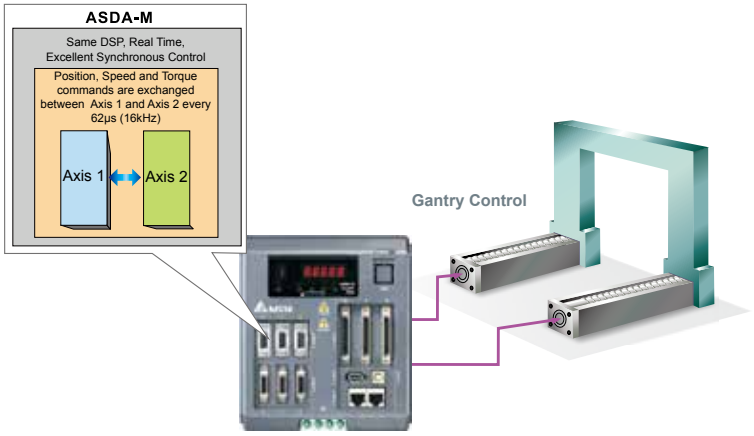
Multi-axis Synchronous Interpolation

- 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.



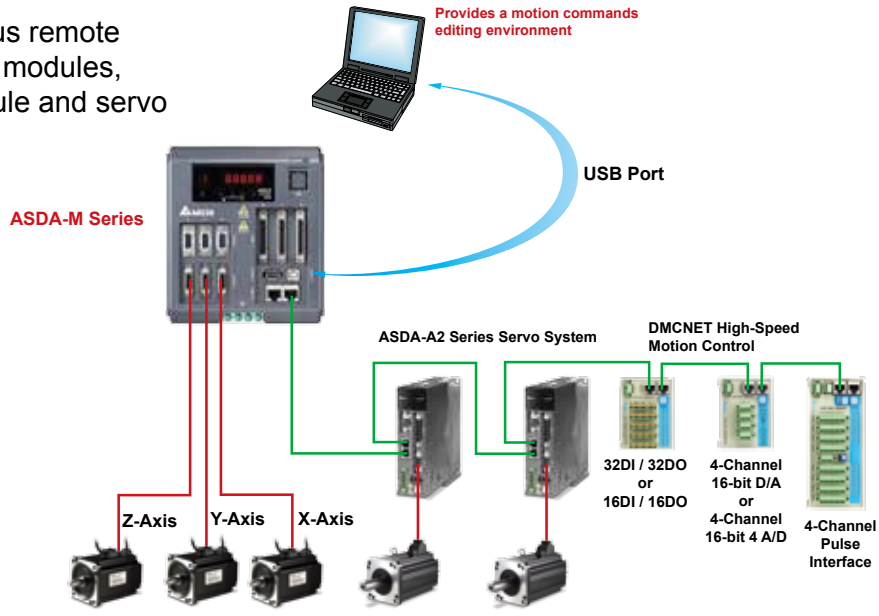
Advanced Gantry Control Servo

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.



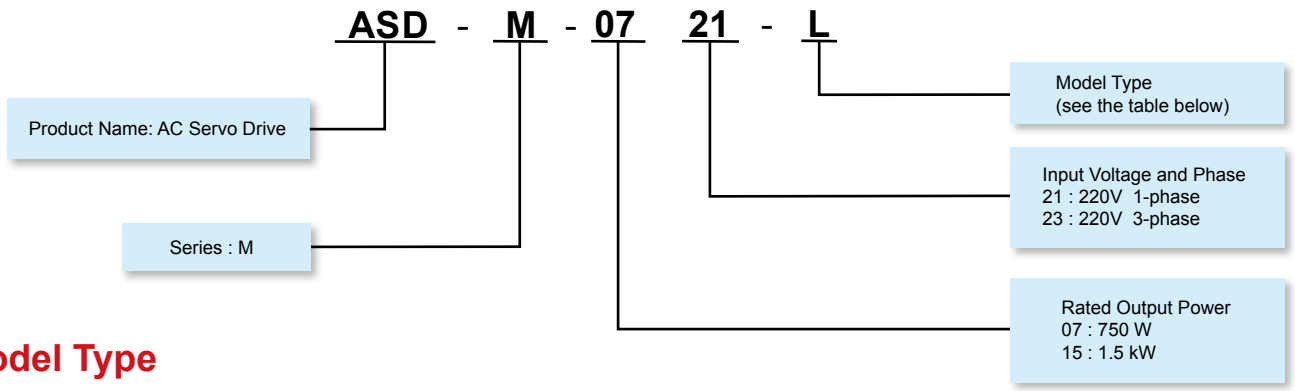
DMCNET Communication

- 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.



Model Explanation

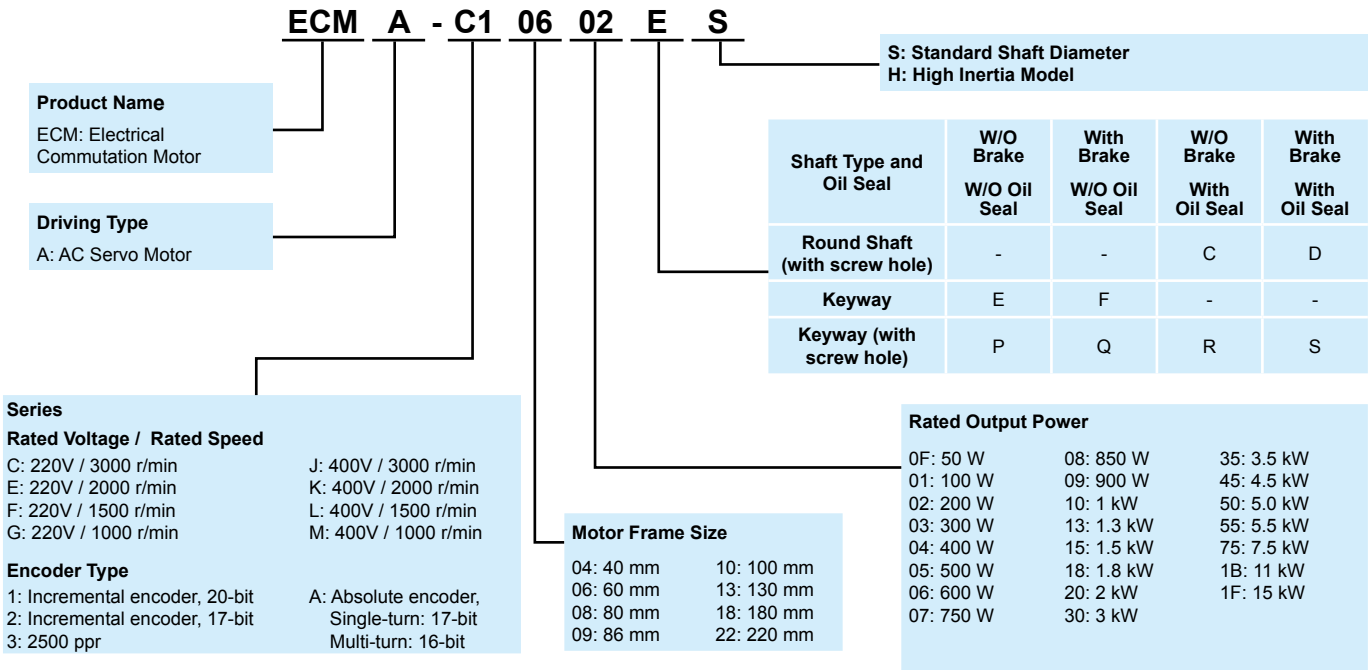
ASDA-M Series Servo Drives



Model Type

	Type	RS-485 (CN3)	Full-Closed Control (CN5)	DMCNET	PR Parameters	E-Cam
Standard Type	L	○	○	X	○	○
Network Type	F	○	○	○	○	○

ECMA Series Servo Motors



ASDA-A2R Series

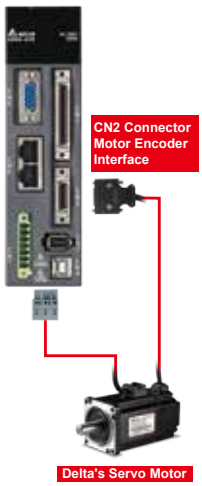
ASDA-A2R Series Features

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

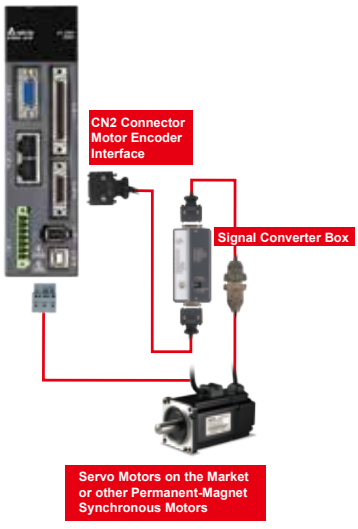
- Support for Delta's permanent-magnet synchronous linear motors and servo (rotary) motors.
- Support for other brands of permanent-magnet synchronous linear motors and servo (rotary) motors.

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.

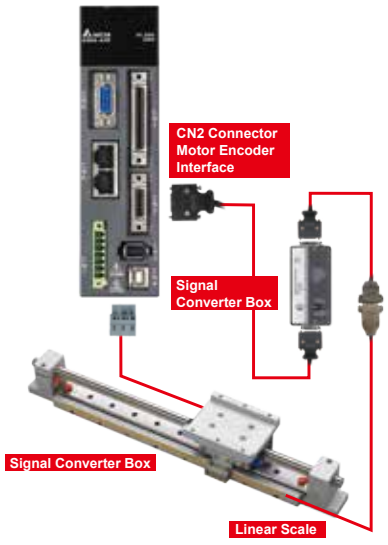


2. When not using Delta's servo motor and if the encoder signals are sine wave, the sine wave can be converted into communication signals by Delta's Signal Converter Box through the CN2 connector for the use of Delta's ASDA-A2R servo system.

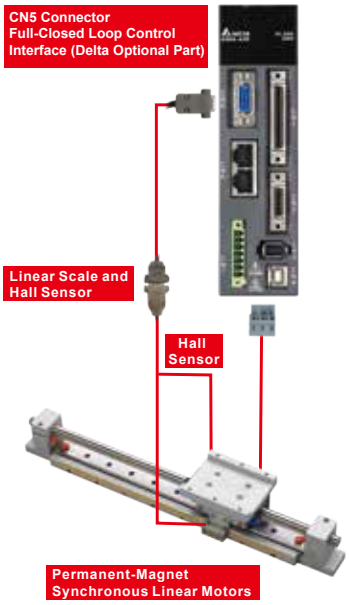


3. When not using Delta's servo motor and if the encoder signals are square wave, the square wave can be converted into communication signals directly through the CN5 connector for the use of Delta's ASDA-A2R servo system.

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.



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.



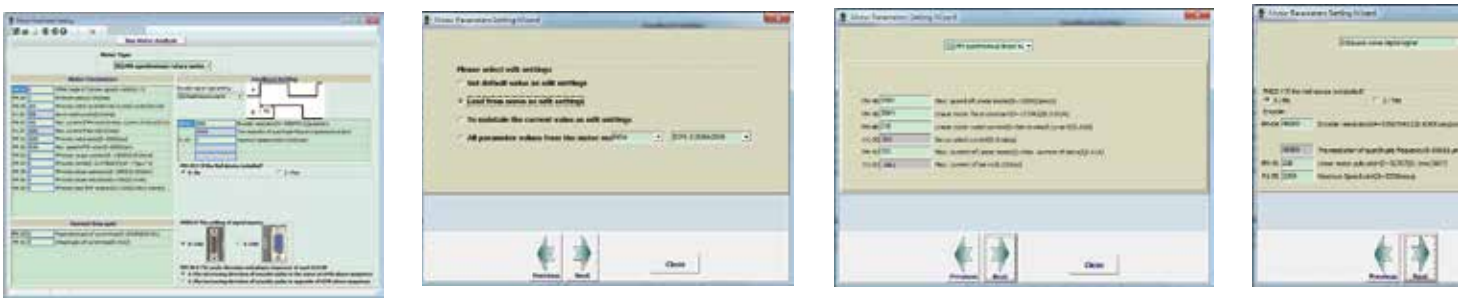
Satisfying Customers' High Speed Communication Requirements: The ASD-IF-EN0A20 Signal Converter Box (Optional)

- 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

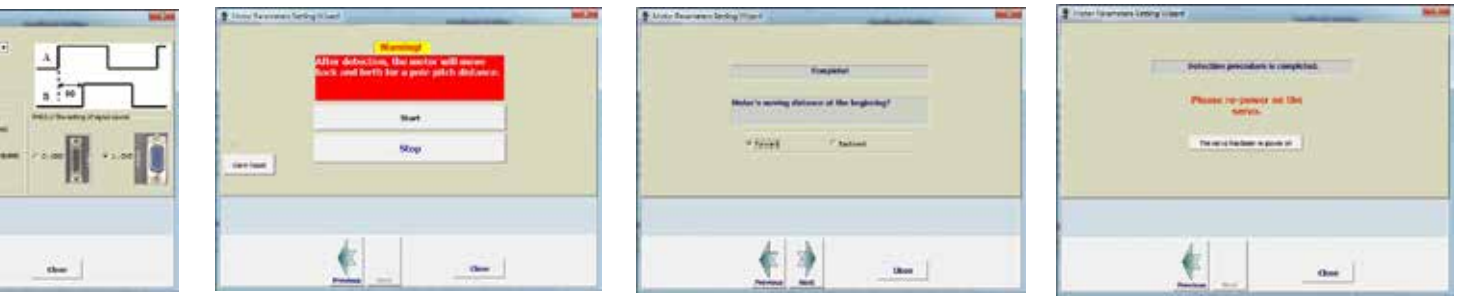
- Detects related electrical circuit parameters such as motor inductance and resistance.
- Provides motor current loop parameters for motor auto-tuning.
- Measures initial conditions on the magnetic field amplification and corrects phase sequence and deviation values of a Hall sensor unit.
- Detects 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.

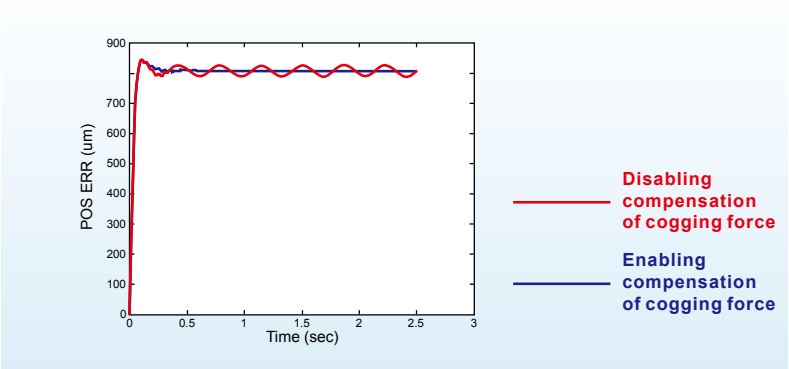
Accurate Positioning and Initiation without a Hall Sensor

- 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.



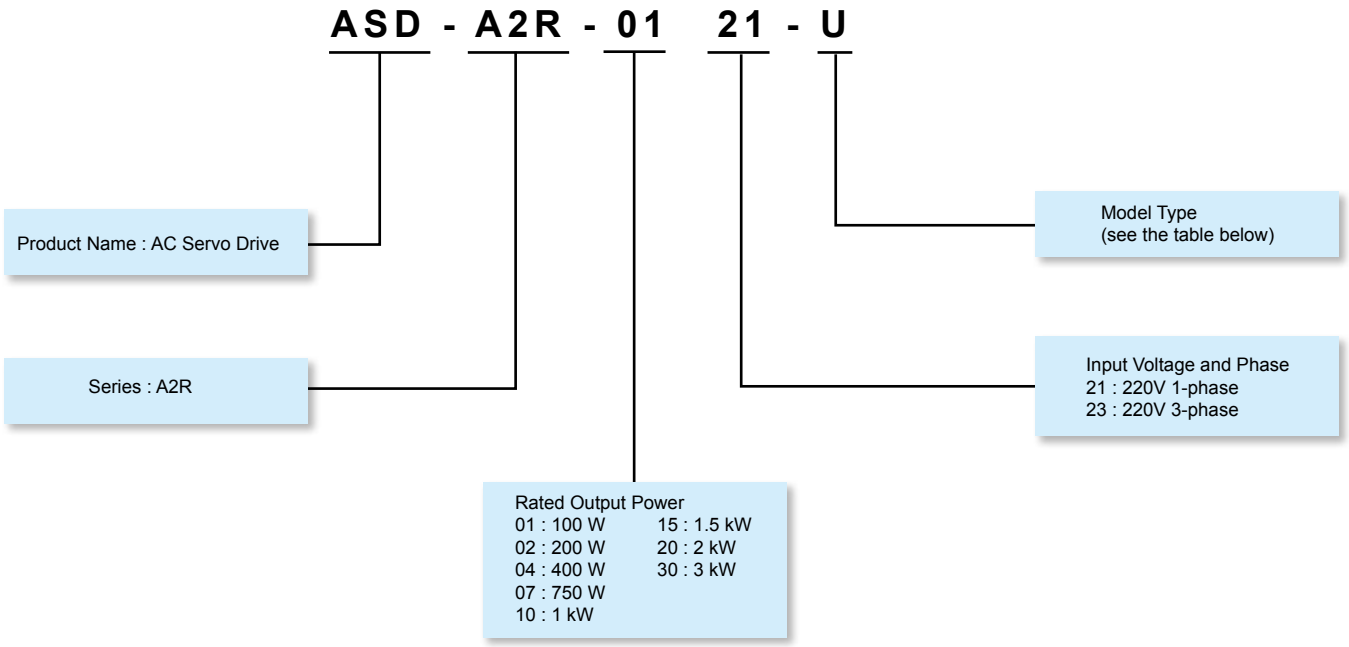
Detection and Compensation of Motor Cogging Force

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



Model Explanation

ASDA-A2R Series Servo Drive



Model Type

	Type	RS-485 (CN3)	Full-Closed Control (CN5)*1	Extension Port for Digital Input (CN7)	EtherCAT	CANopen	DMCNET	Analog Voltage Control	Pulse Input Port	PR Parameters*2	E-Cam*3
Standard Type	L	○	○	X	X	X	X	○	○	○	X
	U	○	○	○	X	X	X	○	○	○	○
Network Type	F	○	○	X	X	X	○	X	X	○	X
	M	○	○	X	X	○	X	○	○	○	○

NOTE

1. In PR mode, only A2R-F supports full-closed control function.
2. PR parameters can be read and written through communication by DMCNET only.
3. E-Cam function can only be used in PR mode.

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 3.5 kW. There are seven frame sizes available: for ASDA-A2E series 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 0.477 N-m to 57.29 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: Electrical Commutation Motor

Driving Type
A: AC Servo Motor

Series

Rated Voltage / Rated Speed

C: 220V / 3000 r/min	J: 400V / 3000 r/min
E: 220V / 2000 r/min	K: 400V / 2000 r/min
F: 220V / 1500 r/min	L: 400V / 1500 r/min
G: 220V / 1000 r/min	M: 400V / 1000 r/min

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

Motor Frame Size

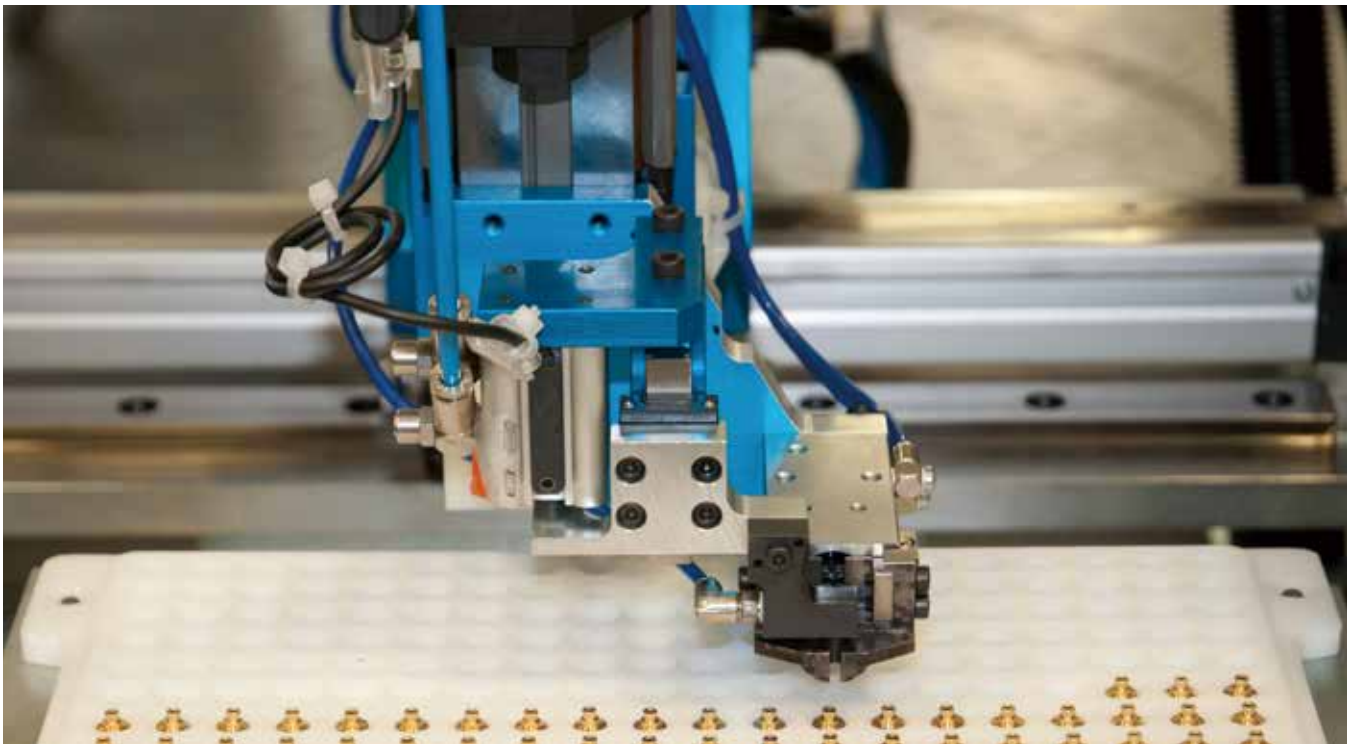
04: 40 mm	10: 100 mm
06: 60 mm	13: 130 mm
08: 80 mm	18: 180 mm
09: 86 mm	

Rated Output Power

0F: 50 W	07: 750 W	20: 2 kW
01: 100 W	08: 850 W	30: 3 kW
02: 200 W	09: 900 W	35: 3.5 kW
03: 300 W	10: 1 kW	
04: 400 W	13: 1.3 kW	
05: 500 W	15: 1.5 kW	
06: 600 W	18: 1.8 kW	

S: Standard Shaft Diameter
H: High Inertia Model

Shaft Type 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 screw hole)	-	-	C	D
Keyway	E	F	-	-
Keyway (with screw hole)	P	Q	R	S



ECML Series Linear Motor - Coil Assembly

ECML - S 1608 A 2 D N S
(1) (2) (3) (4) (5) (6) (7)

	ECML	Product Name	ECM: Electronic Commutation Motor
1	S	Name of the Series Linear Motor Type	S: Shaft Type Coreless
2	1608	Specifications	Magnetic Way Dimensions(mm) / Ø16 / Ø20 / Ø25 / Ø32 Number of Coil Sets: 1606 2003 2504 3204; 1608 2004 2506 3206; 2005 2508 3208
3	A	Wiring Method	A: Wiring Method A
4	2	Input Voltage	2: 220V
5	D	Hall Sensor Type	D: Digital
6	N	Cooling Type	N: N/A
7	S	Customized options	Delta Standard Product

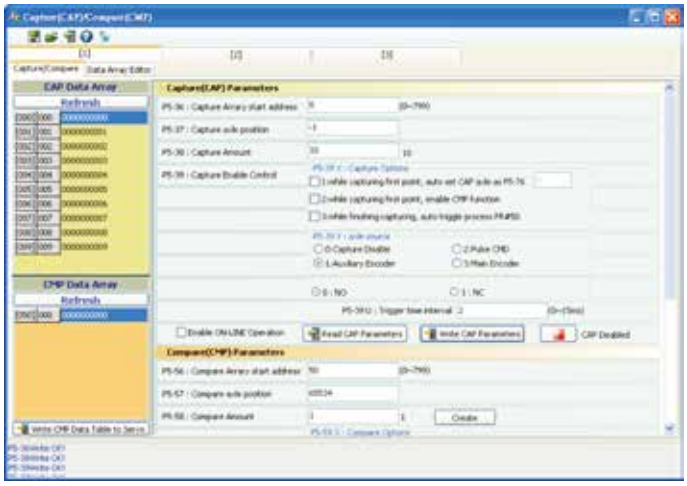
ECML Series Linear Motor - Magnetic Way

ECML - SM 16 1000 S
(1) (2) (3) (4)

	ECML	Product Name	ECML : Electronic Commutation Motor	
1	SM	Name of the Series Linear Motor Type	S: Shaft Type Coreless M: Magnetic Way	
2	16	Magnetic Way Dimensions	16: Ø16 mm 20: Ø20 mm	25: Ø25 mm 32: Ø32 mm
3	1000	Total Length of Magnetic Way	Range: 250~2310 mm	Examples: 0340 : 340 mm 0520 : 520 mm 1060 : 1060 mm
4	S	Customized options	Delta Standard Product	

ASDA-Soft

ASDA-Soft Configuration Software



Capture / Compare

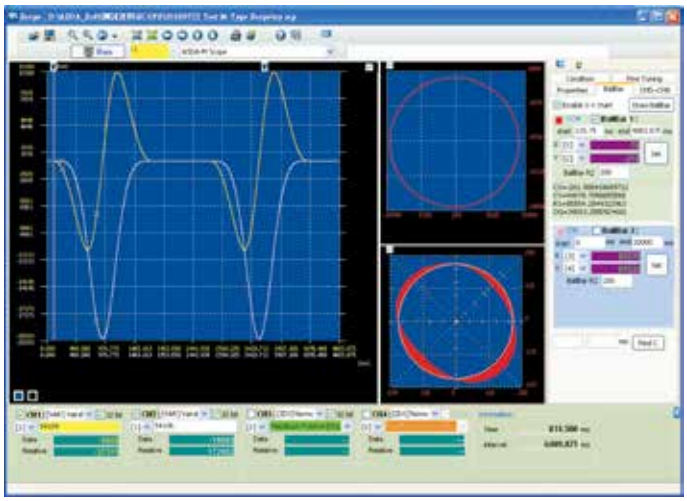
- Strong Capture and Compare functions for position latch and detection help you complete system configuration quickly.

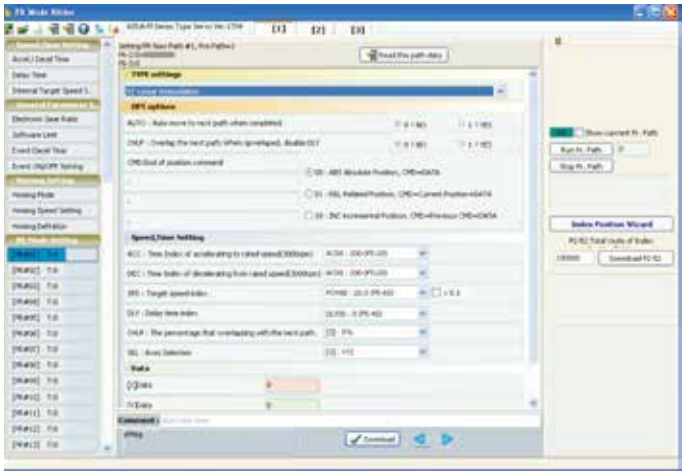
Electronic Cam (E-Cam)

- 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

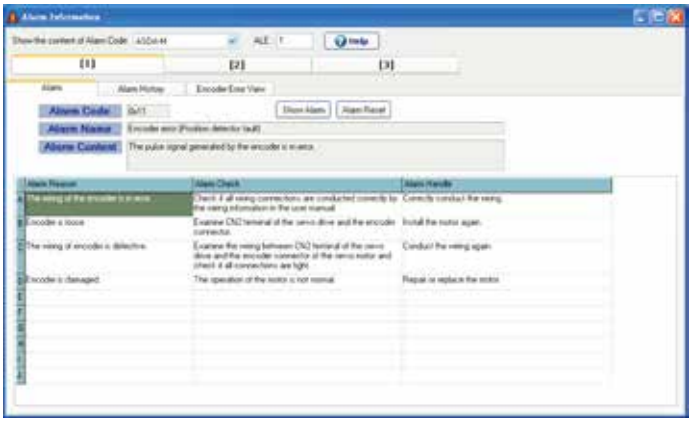
- Versatile on-line monitoring function, similar to a digital oscilloscope is able to quickly record the status and data of each axis. Real-time monitoring is easy.





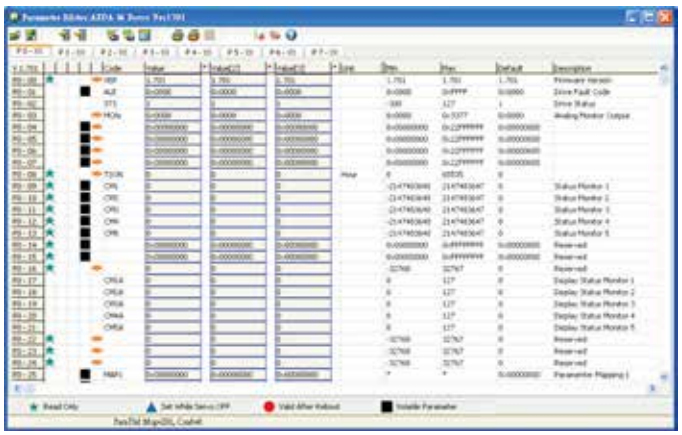
PR Mode

- 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.

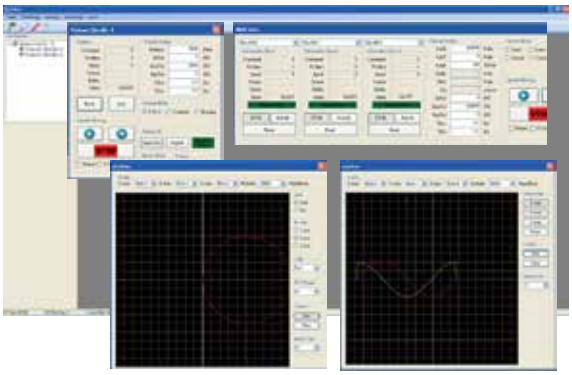
PAC Solution

Programmable Automation Controller (PAC)

MH1-Series

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

- Robust Hardware: Up to Intel i7 Quad Core 2.1 GHz 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



- 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

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

Ordering Information

Model Explanation - MH1 Series

M H 1 - S 3 0 D - A 1 1 D 0

Product Name:
Motion Control Hub 1st Generation

CPU Information:
S30 = VIA Nano X2 Dual Core 1.2GHz
A12 = Intel Atom E3845 Quad Core 1.91GHz
C50 = Intel Core i5-3610ME Dual Core 2.7GHz
C70 = Intel Core i7-3612QE Quad Core 2.1GHz

Extension Interface:
D = DMCNET
E = EtherCAT
G = Giga LAN

Extension Slot Interface:
0 = No Extension Slot
A = 2 PCI slots
B = 2 PCIe slots x1 + x1
C = 2 PCIe slots x4 + x1

Version:
D0 = Standard Version

DRAM & Micro-SD Card Options:

	CFast	SSD
0	-	-
1	4GB	4GB

CFast Card & SSD Card Options:

	DRAM	micro-SD
0	-	-
1	4GB	4GB

PAC Selection Guide

Specifications - MH1 Series

Model Name		MH1-S30D	MH1-A12D	MH1-A12E	MH1-C50D	MH1-C50E	MH1-C70D	MH1-C70E
Processor System	Processor	VIA Nano X2 Dual Core 1.2GHz	Intel Atom E3845 Quad Core 1.91GHz		Intel Core i5-3610ME Dual Core 2.7GHz		Intel Core i7-3612QE Quad Core 2.1GHz	
	System Chipset	VIA VX900	x		Intel QM77			
	MRAM	128KB						
	BIOS	AMI BIOS						
	System Memory	1 x DDR3-1066 Max. up to 8 GB	DDR3L-1333 4 GB, supports ECC		2 x DDR3-1600 Max. up to 16 GB, supports ECC			
Display Interface	CRT	2048x1536 / 75Hz	2560x1600 / 60Hz		2048x1536 / 75Hz			
I/O Interface	Ethernet	2 x IEEE 802.3/802.3u/802.3ab 1Gbps						
	DMCNET	√	√	x	√	x	√	x
	EtherCAT	x	x	√	x	√	x	√
	USB	4 x USB 2.0						
	Serial Port	1 x RS-232 (Hardware auto flow control)						
	Digital Input	x	1-CH isolated, 24VDC Sink (5mA/CH)	x	1-CH isolated, 24VDC Sink (5mA/CH)	x	1-CH isolated, 24VDC Sink (5mA/CH)	x
	Digital Output	x	1-CH isolated, 24VDC Sink (10mA/CH)	x	1-CH isolated, 24VDC Sink (10mA/CH)	x	1-CH isolated, 24VDC Sink (10mA/CH)	x
	Encoder Input	x	4-CH isolated, QEP±	x	4-CH isolated, QEP±	x	4-CH isolated, QEP±	x
	Compare Output	x	2-CH isolated, CMP±	x	2-CH isolated, CMP±	x	2-CH isolated, CMP±	x
	Expansion	[2 x PCI slot] [2 x PCIe slot]x1	2 x PCI slot 2 x PCIe slotx1		[2 x PCI slot] x1 [2 x PCIe slot]x1 [1 x PCIe slot] x4 + [1 x PCIe slot] x1			
Storage	CFast card	1 x CFast Cat (optional)						
	Micro-SD card	1 x Micro-SD card (optional)	x	x	x	x	x	x
	eMMC	x	1 x eMMC (optional)		x	x	x	x
	Solid State Disk	1 x 2.5" SATA SSD (optional)						
Power Requirements	Input Voltage	DC12~30V±10%						
	Input Type	ATX						
Certification	Safety	CE						
Dimensions (W x H x D)		127 x 175 x 250 mm (5"x6.89"x9.85")						
Operation Temperature		0°C ~50°C						
Weight		4.7 Kg						
Software Support		Windows 7.0, Windows XP/7 Embedded, RTX	Windows 7.0, Windows 7 Embedded, RTX		Windows 7.0, Windows XP/7 Embedded, RTX			

■ Centralized Slave Modules

■ 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-EC6022: 2ms

■ 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

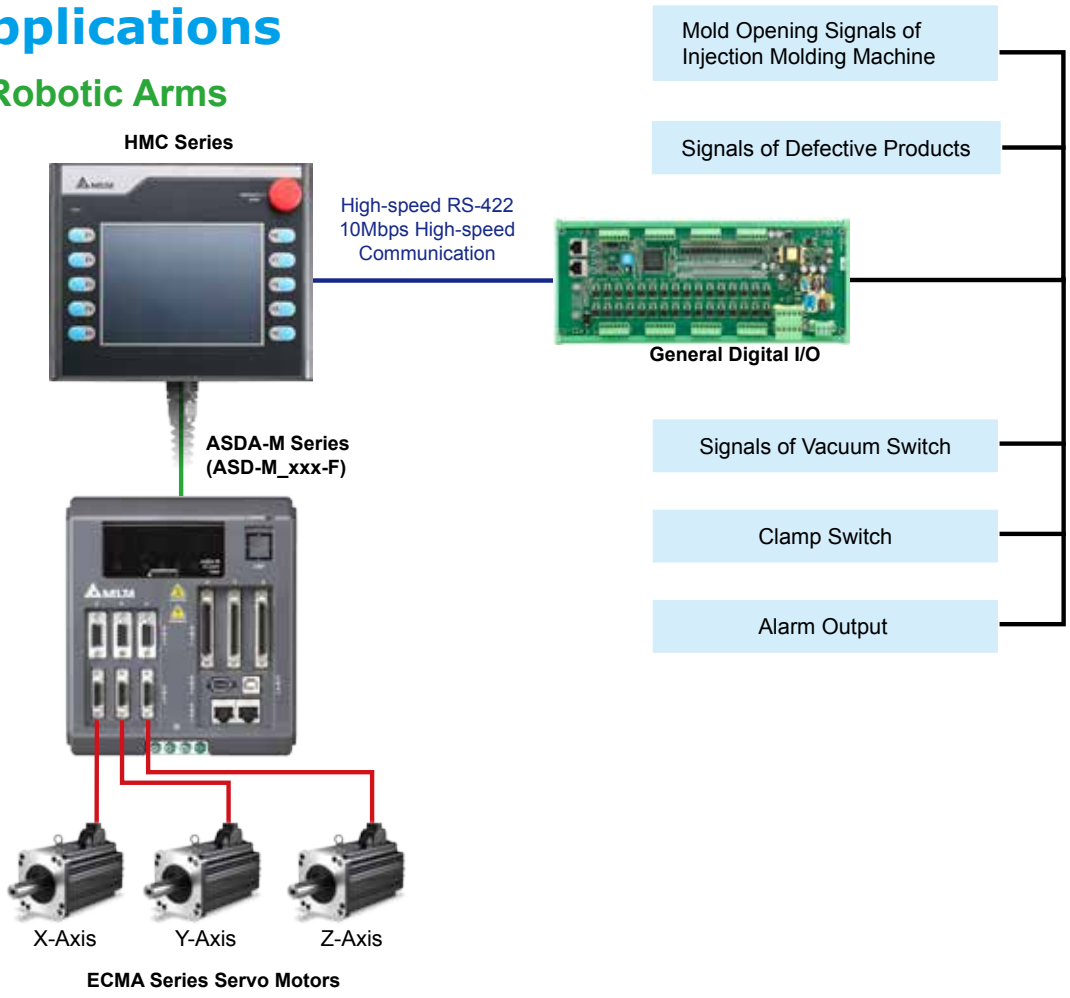
■ DAC Type Module

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



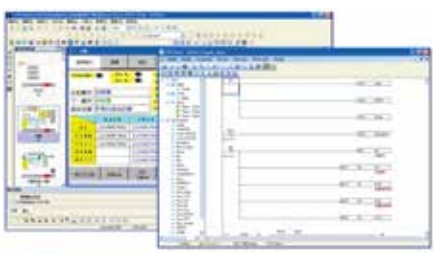
Features

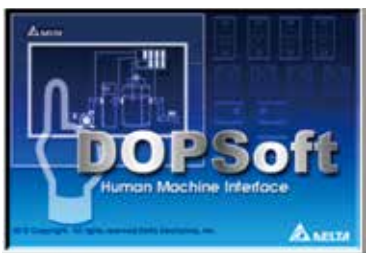
Powerful Dual Processors

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.

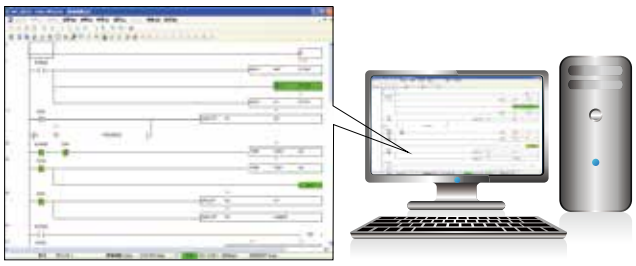
DOPSoft, HMI Screen Editor & PLC Programming Software

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

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

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

Model 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
- Version
  10 : up to 4 axes of control
  11 : up to 12 axes of control
- Type of Model
  H : Hand-held
  S : Standard
- External Control Interface (Bus)
  0 : None
  5 : DMCNET
- Peripheral Interface
  0 : None
  2 : SD + USB

Planetary Gearbox PS High Precision S

The PS Series Planetary Gearbox features many advantages such as low noise, h
smoothly transfer power from motor to applications and is widely applied to various
industrial robot, medical device and precision measurement.

Helical Gear Design

The speed reduction mechanism employs helical gears, which doubles the tooth mesh rate when compared with regular spur gears. In addition, it also features extremely smooth running, low noise, high torque output and low backlash.

Synthetic Lubrication Grease

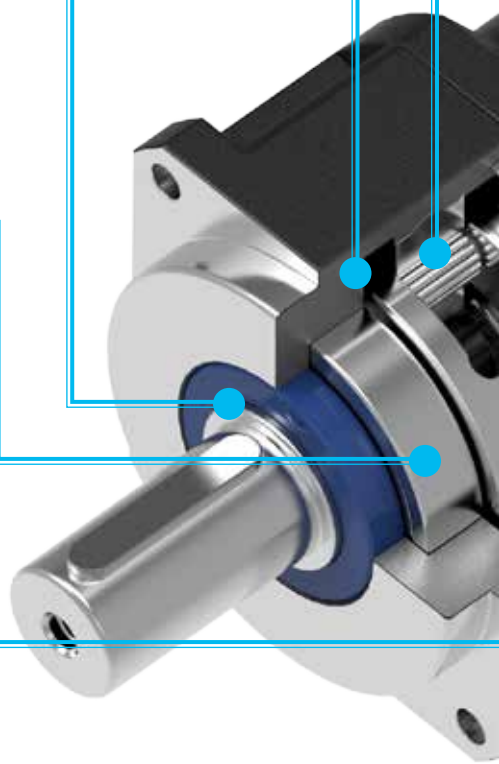
The protective class IP65 seals design avoids leakage problems and requires no maintenance.

Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are constructed as one-piece to increase torsional rigidity and accuracy. The entire structure is one-time machined for controlling accuracy in the specified tolerance.

One-piece Gearbox & Advanced Surface Treatment

The gearbox and internal gear ring are constructed as one-piece. High gear accuracy meets the DIN6 class standard. Gearbox surface is anticorrosive treated to enhance environment resistance and corrosion resistance capabilities.

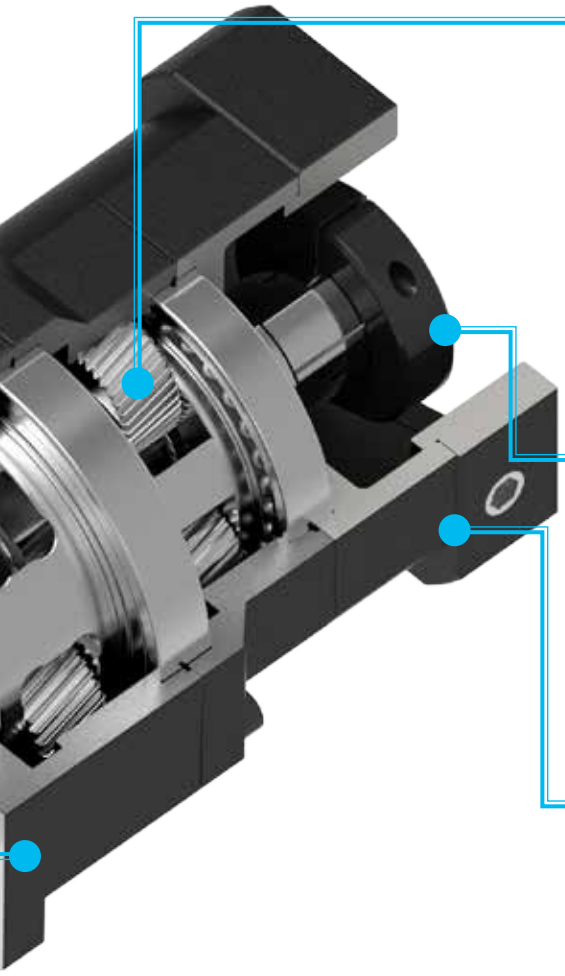


Series

igh output torque and low backlash. It is able to
s industries including aerospace, semiconductor,

Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly enhances structural rigidity and service life.



High Precision Gear Machining

The planetary gear and sun gear are made from high quality Ni-Cr-Mo alloy steel (SNCM220), precision machined and carburized to hardness 57-60 HRC. Precision teeth grinding assures gear accuracy reaches DIN6 class. It provides better wear resistance, impact resistance and longer service life than gears that are only surface nitrided.

Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking meshanism. It has passed dynamical balance analysis to assure concentricity and balance for the connection and no backlash for power transmission while running at high speed.

Modular Design of Motor Connection Plate

The special modular design of the motor connection plate is made by an aluminum alloy that is suitable for all series of Delta servomotor.

Features

The Delta Planetary Gearbox is made with high-tech design software, high-precision gear hobbing machine and comprehensive quality control to ensure that it provides high accuracy gear engagement, smooth running and minimum noise.

▸ High Stability

Employs high tensile strength alloy steel. The gear is made using a vacuum carburizing process to enable both core and surface hardness, which extends gear service life and maintains high precision after long periods operation.

▸ High Precision

Backlash for concentric 1-stage gearbox is under 3 arcmin.

Backlash for right angle 1-stage gearbox is under 4 arcmin.

▸ High Input Speed

Input speed allows for 5,000 RPM.

▸ High Torque

Higher output torque is in comparison with spur gearbox.

▸ High Efficiency

Efficiency for 1-stage model exceeds 97%.

2-stage model exceeds 94%.

▸ Low Noise

Under 65dB.

▸ Lifetime Lubrication

The protective class IP65 seals design avoids leakage problems and requires no maintenance during the product life time.

Model Explanation

P S 062 - C 010 3 B1430

Product Name:
Planetary Gearbox

Series:
PS

Output Flange Dimensions:
062 : 62mm
090 : 90mm
120 : 120mm
142 : 142mm

Model Type:
C: Concentric (1-stage)
A: Concentric (2-stage)
R: Right Angle (1-stage)
L: Right Angle (2-stage)

Ratio:
5 : 1/5
10 : 1/10
20 : 1/20
30 : 1/30

Backlash Class:
3: 3 arcmin
4: 4 arcmin
5: 5 arcmin
7: 7 arcmin

Motor Interface Code:
B1430: F60/PCDΦ70/output shaft diameter Φ14/ output shaft length 30mm
C1430: F80/PCDΦ90/output shaft diameter Φ14/ output shaft length 30mm
C1935: F80/PCDΦ90/output shaft diameter Φ19/ output shaft length 35mm
E2255: F130/PCDΦ145/output shaft diameter Φ22/ output shaft length 55mm
E2455: F130/PCDΦ145/output shaft diameter Φ24/ output shaft length 55mm
F3579: F180/PCDΦ200/output shaft diameter Φ35/ output shaft length 79mm

Compatible Motor Table

Type	Motor Frame Code	Power Rating	Output Shaft Diameter (S) & Length (LR) (mm)	Stage	Ratio	Backlash Class	Compatible Gearbox Model No.
Concentric	F60	200 W, 400 W	Φ14 / 30	1-stage	5, 10	3	PS062-CxxxxB1430
Concentric	F80	400 W, 750 W	Φ14 / 30	1-stage	5, 10	3	PS090-CxxxxC1430
Concentric	F80	750 W	Φ19 / 35	1-stage	5, 10	3	PS090-CxxxxC1935
Concentric	F130	300 W, 500 W, 600 W, 800 W, 900 W 1 kW, 1.3 kW, 1.5 kW, 1.8 kW, 2 kW	Φ22 / 55	1-stage	5, 10	3	PS120-CxxxxE2255
Concentric	F130	3 kW	Φ24 / 55	1-stage	5, 10	3	PS120-CxxxxE2455
Concentric	F180	2 kW, 3 kW, 3.5 kW, 4.5 kW	Φ35 / 79	1-stage	5, 10	3	PS142-CxxxxF3579
Concentric	F60	200 W, 400 W	Φ14 / 30	2-stage	20,30	5	PS062-AxxxxB1430
Concentric	F80	400 W, 750 W	Φ14 / 30	2-stage	20,30	5	PS090-AxxxxC1430
Concentric	F80	750 W	Φ19 / 35	2-stage	20,30	5	PS090-AxxxxC1935
Concentric	F130	300 W, 500 W, 600 W, 800 W, 900 W 1 kW, 1.3 kW, 1.5 kW, 1.8 kW, 2 kW	Φ22 / 55	2-stage	20,30	5	PS120-AxxxxE2255
Concentric	F130	3kW	Φ24 / 55	2-stage	20,30	5	PS120-AxxxxE2455
Right-angle	F60	200 W, 400 W	Φ14 / 30	1-stage	5, 10	4	PS062-RxxxxB1430
Right-angle	F80	400 W, 750 W	Φ14 / 30	1-stage	5, 10	4	PS090-RxxxxC1430
Right-angle	F80	750 W	Φ19 / 35	1-stage	5, 10	4	PS090-RxxxxC1935
Right-angle	F130	300 W, 500 W, 600 W, 800 W, 900 W 1 kW, 1.3 kW, 1.5 kW, 1.8 kW, 2 kW	Φ22 / 55	1-stage	5, 10	4	PS120-RxxxxE2255
Right-angle	F130	3 kW	Φ24 / 55	1-stage	5, 10	4	PS120-RxxxxE2455
Right-angle	F180	2 kW, 3 kW, 3.5 kW, 4.5 kW	Φ35 / 79	1-stage	5, 10	4	PS142-RxxxxF3579
Right-angle	F60	200 W, 400 W	Φ14 / 30	2-stage	20,30	7	PS062-LxxxxB1430
Right-angle	F80	400 W, 750 W	Φ14 / 30	2-stage	20,30	7	PS090-LxxxxC1430
Right-angle	F80	750 W	Φ19 / 35	2-stage	20,30	7	PS090-LxxxxC1935
Right-angle	F130	300 W, 500 W, 600 W, 800 W, 900 W 1 kW, 1.3 kW, 1.5 kW, 1.8 kW, 2 kW	Φ22 / 55	2-stage	20,30	7	PS120-LxxxxE2255
Right-angle	F130	3 kW	Φ24 / 55	2-stage	20,30	7	PS120-LxxxxE2455

Smarter. Greener. Together.

Industrial Automation Headquarters

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