



DELTA ASDA-A2-E Series AC Servo Drive Installation Guide

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10.1 Delta Electronics, Inc.

11 Asia

11.1 Delta Electronics (Japan), Inc.

11.2 Delta Electronics (Korea), Inc.

11.3 Delta Energy Systems (Singapore) Pte Ltd.

11.4 Delta Electronics (Thailand) PCL.

11.5 Delta Electronics (Australia) Pty Ltd.

12 Americas

12.1 Delta Electronics (Americas) Ltd. Raleigh Office

12.2 Delta Electronics Brazil

12.3 Delta Electronics International Mexico S.A. de C.V.

13 EMEA

13.1 Headquarters: Delta Electronics (Netherlands) B.V.

13.2 Turkey: Delta Greentech Elektronik San. Ltd. Sti. (Turkey) Şerifali Mah. Hendem Cad. Kule Sok.

No:16-A 34775 Ümraniye – İstanbul Mail: Sales.IA.Turkey@deltaww.com TEL: + 90 216 499 9910 GCC:

Delta Energy Systems AG (Dubai BR) P.O. Box 185668, Gate 7, 3rd Floor, Hamarain Centre Dubai, United

Arab Emirates Mail: Sales.IA.MEA@deltaww.com TEL: +971(0)4 2690148 Egypt + North Africa: Delta

Electronics Unit 318, 3rd Floor, Trivium Business Complex, North 90 street, New Cairo, Cairo, Egypt

Mail: Sales.IA.MEA@deltaww.com

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DELTA ASDA-A2-E Series AC Servo Drive Installation Guide



Introduction

Delta's ASDA-A2-E, an advanced AC Servo Drive with an EtherCAT communication interface, complies with

IEC61158 and IEC61800-7 and follows in the footsteps of the successful ASDA-A2 series. This advanced A2-E supports all the modes of the CoE device profile based on CiA402 and all command types of EtherCAT; features built-in Safe Torque Off (STO) function which prevents torque energy from continuing to act upon a motor and avoid accidents. In addition, A2-E offers extension digital input port for a wide range of machinery automation fields. This series cover power range from 400W to 7.5kW for 400V and 100W to 3kW for 220V. ASDA-A2-E Series is your ideal servo drive to achieve high speed multi-axis synchronization applications.

Features

- Pass EtherCAT conformance test by EtherCAT Technology Group (ETG)
- Integrated Safe Torque Off (STO)* safety function according to the following standards:
 - IEC EN 61508 (SIL 2)
 - IEC62016(SIL 2)
 - ISO 13849-1 (Cat.3 PL=d)
- Supports absolute type and incremental type servo motors
- Supports touch probe function
 - Enabled with dedicated Digital Input (DI) on CN7 or the external encoder

*Note: STO function is not available for 200V 4.5kW ~ 7.5kW models

Applications

*Note: STO function is not available for 200V 4.5kW ~ 7.5kW models

Applications



Specifications of ASDA-A2-E_220 V Series

ASDA-A2-E Series	100 W 0 W	200 W 1 kW	400 W 1.5 kW	75	2 kW 5.5 kW	3 kW	4.5 kW 7.5 kW	
	01 10	02 15	04	07	20 55	30 75	45	

Power	Phase / Voltage	Three-phase / Single-phase 220 VAC				Three-phase 220 VAC			
Supply Permissible Voltage Range		Three-phase / Single-phase 200 ~ 230 VAC, -15%~10%				Three-phase / 200 ~ 230 VAC, -15% ~ 10%			
Input Current (3 PH) Unit: Arms		0.8	1.11	1.86	3.66	8.76	9.83	17.5	
			4.68	6.33		19.4		26.3	
Input Current (1 PH) Unit: Arms		1	1.92	3.22	6.78	—	—	—	
			8.88	10.96		—	—		
Continuous Output Current Unit: Arms		0.9	1.55	2.6	5.1	13.4	19.4	32.5	
			7.3	8.86		40		47.5	
Cooling Method		Natural Air Circulation				Fan Cooling			
Encoder Resolution (Servo Drive Resolution)		Incremental type: 20-bit Absolute type: 17-bit							
Control of Main Circuit		SVPWM (Space Vector Pulse Width Modulation) Control							
Tuning Modes		Auto / Manual							
	Dynamic Brake	no Built-in				External			
Position	Command Source	DS402 object							
	Smoothing Strategy	Low-pass and P-curve filter							
Control	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)							
	Torque Limit Operation	DS402 object							
(CSP)	Feed Forward Compensation	Internal parameters							
	Speed Control Range*1	1:5000				1:3000			

	Command Source External Analog Signal	DS402 object	
Speed	Smoothing Strategy	Low-pass and S-curve filter	
Control	Torque Limit Operation	Set by parameters	
Mode	Frequency Response	Maximum 1 kHz	
	Characteristic		
(CS V)	Speed Accuracy	0.01 % or less at 0 to 100 % load fluctuation	
	(at rated rotation speed)*2	0.01 % or less at 0°C to 50°C ambient temperature fluctuation	
	Feed Forward Compensation	0.01 % or less at ±10 % power fluctuation	
Torque	Command Source	DS402 object	
Control	Smoothing Strategy	Low-pass filter	
Mode <u> </u> (<u>CST</u>)	Speed Limit Operation	DS402 object	
	Inputs	Servo on, Reset, Gain switching, Zero speed CLAMP, Command input reverse control, Command triggered, Speed/Torque limit enabled, Position command selection, Motor stop, Speed position selection, Position / Speed mode switching, Speed / Torque mode switching, Torque / Position mode switching, Emergency stop, Forward / Reverse inhibit limit, Reference “Home” sensor, Forward / Reverse operation torque limit, Move to “Home”, Electronic Cam (E-Cam), Forward / Reverse JOG input, Event trigger PR command, Electronic gear ratio (Numerator) selection	
Digital		* Please note that the above digital signals and inputs are available	

Inputs/		only for Non-DMCNET mode. In DMCNET mode, it is recommended to write digital inputs into the servo drives through DMCNET communication, and the digital inputs should be used for Emergency Stop, Forward / Reverse Inhibit limit and Reference "Home" sensor only.	
Outputs		Encoder signal output (A, B, Z Line Driver and Z Open Collector)	
	Outputs	Servo ready, Servo on, At Zero speed, At Speed reached, At Positioning completed, At Torques limit, Servo alarm (Servo fault) activated, Electromagnetic brake control, Homing completed, Output overload warning, Servo warning activated, Position command overflow, Forward / Reverse software limit, Internal position command completed, Capture operation completed output., Motion control completed output., Master position of E-Cam (Electronic Cam)	
	Protective Functions	Overcurrent, Overvoltage, Undervoltage, Motor overheated, Regeneration error, Overload, Overspeed, Abnormal pulse control command, Excessive deviation, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, Position excessive deviation, Serial communication error, Input power phase loss, Serial communication time out, short circuit protection of U, V, W, and CN1, CN2, CN3 terminals	
	Communication Interface		
	Installation Site	USB / EtherCAT	
		Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)	
Environment	Altitude	Altitude 2000 m or lower above sea level	
	Atmospheric Pressure	86kPa ~ 106kPa	
	Operating Temperature	0°C ~ 55°C (If operating temperature is above 45°C , forced cooling will be required)	
	Storage Temperature	-20°C ~ 65°C	
	Humidity	0 ~ 90% RH (non-condensing)	
	Vibration	9.80665 m/s ² (1 G) less than 20 Hz, 5.88 m/s ² (0.6 G) 20 ~ 50 Hz	
	IP Rating	IP20	
	Power System	TN System *3	
	Approvals	IEC/EN 61800-5-1, UL 508C, C-tick	

Footnote:

*1 Rated rotation speed: When full load, speed ratio is defined as the minimum speed (the motor will not pause).

*2 When command is rated rotation speed, the speed fluctuation rate is defined as: (Empty load rotation speed – Full load rotation speed) / Rated rotation speed

*3 TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that point by a protective earth conductor.

Specifications of ASDA-A2-E 400 V Series

ASDA-A2-E Series		400 W	750 W 1 kW			1.5 k W	2 k W	3 kW	4.5 k W	5.5 kW 7.5 kW	
		04	07		10	15	20	30	45	55 75	
Power	Input Voltage	24 VDC, ±10%									
	Input Current			0.43 A				1.18 A		1.66 A	
Supply	Input Power			10.32 W				28.2 W		39.85 W	
	Permissible Voltage Range	Three-phase, 380~480 VAC, ±10%									
Main Circuit	Input Current Unit: Arms	1.45	2.22		3.02	4.24	5.65	8.01	11.9	14.1 17.27	
	Continuous Output Current	2.0	3.07		3.52	5.02	6.66	11.9	20	22.37 28.4	
	Unit: Arms										
	Cooling Method	Fan Cooling									
Encoder Resolution (Servo Drive Resolution)		Incremental type: 20-bit Absolute type: 17-bit									
Control of Main Circuit		SVPWM (Space Vector Pulse Width Modulation) Control									
Tuning Modes		Auto / Manual									

Contr ol	Smoothing Str ategy	Low-pass filter	
Mode			
(CST)	Speed Limit O peration	Via analog input	
Digital	Inputs	Servo on, Reset, Gain switching, Zero speed CLAMP, Comma nd input reverse control, Command triggered, Speed/ Torque li mit enabled, Position command selection, Motor stop, Speed p osition selection, Position / Speed mode switching, Speed / To rque mode switching, Torque / Position mode switching, Emer gency stop, Forward / Reverse inhibit limit, Reference “Home” sensor, Forward / Reverse operation torque limit, Move to “Ho me”, Electronic Cam (E-Cam), Forward / Reverse JOG input, Event trigger PR command, Electronic gear ratio (Numerator) selection	
Inp uts/ Out put s	Outputs	Encoder signal output (A, B, Z Line Driver and Z Open Collect or)	
		Servo ready, Servo on, At Zero speed, At Speed reached, At P ositioning completed, At Torques limit, Servo alarm (Servo fault) activated, Electromagnetic brake control, Homing completed, Output overload warning, Servo warning activated, Position co mmand overflow, Forward / Reverse software limit, Internal po sition command completed, Capture operation completed outp ut., Motion control completed output., Master position of E-Ca m (Electronic Cam)	
	Protective Functi ons	Overcurrent, Overvoltage, Undervoltage, Motor overheated, R egeneration error, Overload, Overspeed, Abnormal pulse contr ol command, Excessive deviation, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, Position excessive deviation, Serial communicatio n error, Input power phase loss, Serial communication time out , short circuit protection of U, V, W, and CN1, CN2, CN3 termin als	
Communication Interfa ce		USB / EtherCAT	
Installation Site		Indoor location (free from direct sunlight), no corrosive liquid a nd gas (far away from oil mist, flammable gas, dust)	
	Altitude	Altitude 2000 m or lower above sea level	
	Atmospheric P ressure	86 kPa ~ 106 kPa	
	Operating Tem perature	0°C ~ 55°C (If operating temperature is above 45°C , forced co oling will be required)	

Environment	Storage Temperature	-20°C ~ 65°C	
	Humidity	0 ~ 90% RH (non-condensing)	
	Vibration	9.80665 m/s ² (1 G) less than 20 Hz, 5.88 m/s ² (0.6 G) 20 to 50 Hz	
	IP Rating	IP 20	
	Power System	TN System ^{*3}	
	Approvals	IEC/EN 61800-5-1, UL 508C, C-tick 	

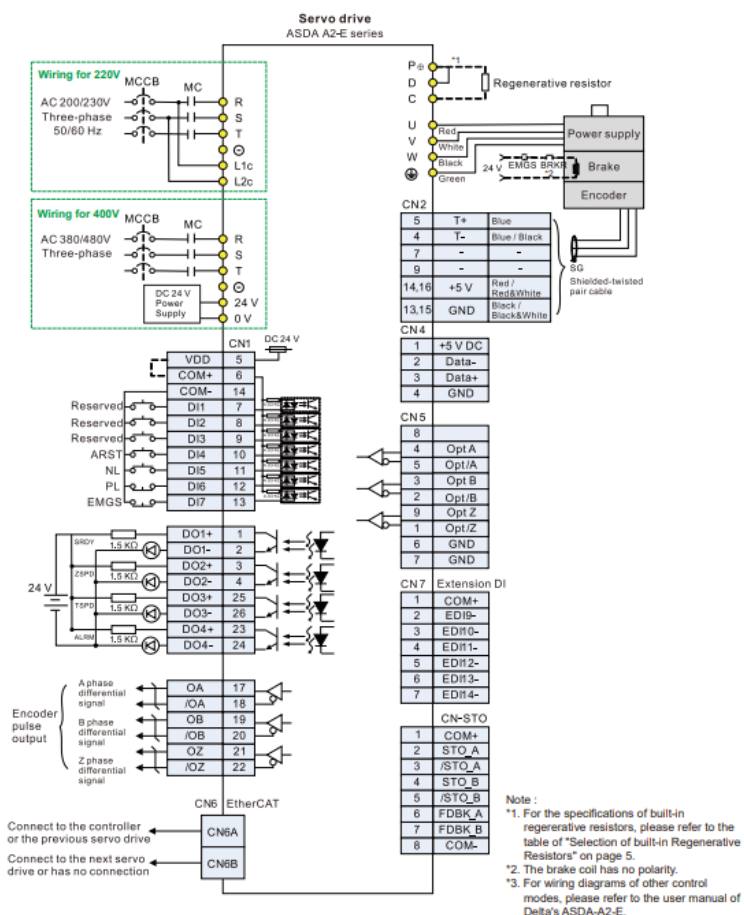
Footnote:

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*2 When command is rated rotation speed, the speed fluctuation rate is defined as: (Empty load rotation speed – Full load rotation speed) / Rated rotation speed

*3 TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that point by a protective earth conductor.

EtherCAT Communication Mode



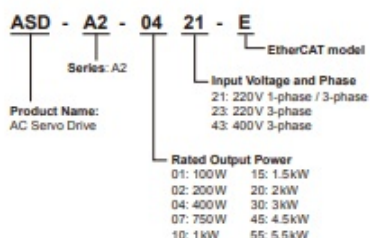
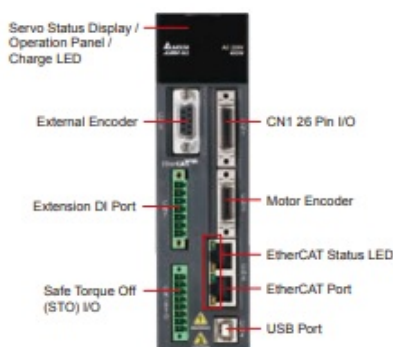
Communication Specifications

Physical Layer	IEEE802.3u (100 BASE-TX)
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

- [Selection of Built-in Regenerative Resistors](#)

220 V Series									
Servo Drive (kW)	100 W	200 W	400 W	750 W	1.0 kW	1.5 kW	2.0 kW	3.0 kW	
Specification of Built-in			40 W	60 W	60 W	60 W	100 W	100 W	
Regenerative Resistor	NA	NA	40 ohm	40 ohm	40 ohm	40 ohm	20 ohm	20 ohm	
400 V Series									
Servo Drive (kW)	400 W	750 W	1.0 kW	1.5 kW	2.0 kW	3.0 kW	4.5 kW	5.5 kW	7.5 kW
Specification of Built-in	40 W	40 W	40 W	40 W					
Regenerative Resistor	80 ohm	80 ohm	80 ohm	80 ohm	NA	NA	NA	NA	NA

Part Names and Functions Ordering Information

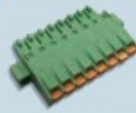


Accessories for ASDA-A2-E

Part Number	ASD-CNSC0026
Description	CN1 connector



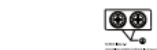
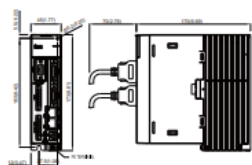
Part Number	ASD-CNFS0808
Description	Pack of connectors used for STO wiring, 8 pcs of connectors in one pack



Note :
For other accessories, please refer to Delta's ASDA-A2 product catalogue.

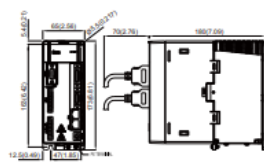
Dimensions

► **220 V Series**
100 W / 200 W / 400 W



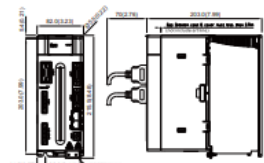
Weight 1.5 (3.3)
Weight

750 W / 1 kW / 1.5 kW



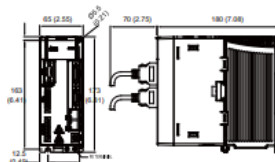
Weight 2.0 (4.4)

2 kW / 3 kW



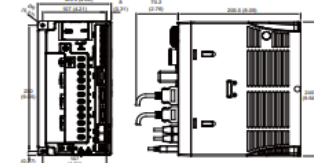
Weight 2.89 (6.36)

► **400 V Series**
400 W / 750 W / 1 kW / 1.5 kW



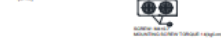
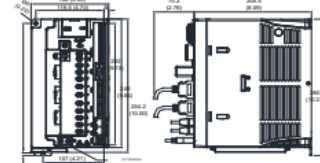
Weight 2.0 (4.4)

2 kW / 3 kW / 4.5 kW / 5.5 kW



Weight 4.6 (10.1)

7.5 kW



Weight 5.5 (12.1)

Footnote:

1. Dimensions are in millimeters (inches); Weights are in kilograms (kg) and pounds (lbs)
2. Dimensions and weights of the servo drive may be revised without prior

Industrial Automation Headquarters

Delta Electronics, Inc.

Taoyuan Technology Center

No.18, Xinglong Rd., Taoyuan District, Taoyuan City 33068, Taiwan

TEL: 886-3-362-6301 / FAX: 886-3-371-6301

Asia

Delta Electronics (Shanghai) Co., Ltd. No.182 Minyu Rd., Pudong Shanghai, P.R.C. Post code : 201209

TEL: 86-21-6872-3988 / FAX: 86-21-6872-3996

Customer Service: 400-820-9595

Delta Electronics (Japan), Inc.

Tokyo Office
Industrial Automation Sales Department 2-1-14 Shibadaimon, Minato-ku
Tokyo, Japan 105-0012
TEL: 81-3-5733-1155 / FAX: 81-3-5733-1255

Delta Electronics (Korea), Inc.

Seoul Office
1511, 219, Gasan Digital 1-Ro., Geumcheon-gu, Seoul, 08501 South Korea
TEL: 82-2-515-5305 / FAX: 82-2-515-5302

Delta Energy Systems (Singapore) Pte Ltd.

4 Kaki Bukit Avenue 1, #05-04, Singapore 417939
TEL: 65-6747-5155 / FAX: 65-6744-9228

Delta Electronics (India) Pvt. Ltd. Plot No.43, Sector 35, HSIIDC Gurgaon, PIN 122001, Haryana, India

TEL: 91-124-4874900 / FAX : 91-124-4874945

Delta Electronics (Thailand) PCL.

909 Soi 9, Moo 4, Bangpoo Industrial Estate (E.P.Z), Pattana 1 Rd., T.Phraksa, A.Muang,
Samutprakarn 10280, Thailand
TEL: 66-2709-2800 / FAX : 662-709-2827

Delta Electronics (Australia) Pty Ltd.

Unit 20-21/45 Normanby Rd., Notting Hill Vic 3168, Australia TEL: 61-3-9543-3720

Americas

**Delta Electronics (Americas) Ltd.
Raleigh Office**

P.O. Box 12173, 5101 Davis Drive, Research Triangle Park, NC 27709, U.S.A. TEL: 1-919-767-3813 / FAX: 1-919-767-3969

Delta Electronics Brazil

São Paulo Sales Office
Rua Itapeva, 26 – 3º, andar Edifício Itapeva,
One – Bela Vista 01332-000 – São Paulo – SP – Brazil TEL: 55-12-3932-2300 / FAX: 55-12-3932-237

Delta Electronics International Mexico S.A. de C.V.

Mexico Office
Gustavo Baz No. 309 Edificio E PB 103 Colonia La Loma, CP 54060 Tlalnepantla, Estado de México
TEL: 52-55-3603-9200

EMEA

Headquarters: Delta Electronics (Netherlands) B.V.

Sales: Sales.IA.EMEA@deltaww.com Marketing: Marketing.IA.EMEA@deltaww.com

Technical Support: iatechnicalsupport@deltaww.com Customer Support: Customer-Support@deltaww.com
Service: Service.IA.emea@deltaww.com

TEL: +31(0)40 800 3900

BENELUX: Delta Electronics (Netherlands) B.V. De Witbogt 20, 5652 AG Eindhoven, The Netherlands Mail: Sales.IA.Benelux@deltaww.com

TEL: +31(0)40 800 3900

DACH: Delta Electronics (Netherlands) B.V.

Coesterweg 45, D-59494 Soest, Germany Mail: Sales.IA.DACH@deltaww.com TEL: +49(0)2921 987 0

France: Delta Electronics (France) S.A. ZI du bois Challand 2, 15 rue des Pyrénées, Lisses, 91090 Evry Cedex, France

Mail: Sales.IA.FR@deltaww.com TEL: +33(0)1 69 77 82 60

Iberia: Delta Electronics Solutions (Spain) S.L.U

Ctra. De Villaverde a Vallecas, 265 1º Dcha Ed. Hormigueras – P.I. de Vallecas 28031 Madrid TEL: +34(0)91 223 74 20

Carrer Llacuna 166, 08018 Barcelona, Spain Mail: Sales.IA.Iberia@deltaww.com

Italy: Delta Electronics (Italy) S.r.l. Via Meda 2–22060 Novedrate(CO) Piazza Grazioli 18 00186 Roma Italy

Mail: Sales.IA.Italy@deltaww.com

TEL: +39 039 8900365

Russia: Delta Energy System LLC Vereyskaya Plaza II, office 112 Vereyskaya str. 17 121357 Moscow Russia

Mail: Sales.IA.RU@deltaww.com TEL: +7 495 644 3240

Turkey: Delta Greentech Elektronik San. Ltd. Sti. (Turkey)

Şerifali Mah. Hendem Cad. Kule Sok. No:16-A 34775 Ümraniye – İstanbul

Mail: Sales.IA.Turkey@deltaww.com TEL: + 90 216 499 9910

GCC: Delta Energy Systems AG (Dubai BR)

P.O. Box 185668, Gate 7, 3rd Floor, Hamarain Centre Dubai, United Arab Emirates

Mail: Sales.IA.MEA@deltaww.com TEL: +971(0)4 2690148

Egypt + North Africa: Delta Electronics

Unit 318, 3rd Floor, Trivium Business Complex, North 90 street, New Cairo, Cairo, Egypt

Mail: Sales.IA.MEA@deltaww.com

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