



Automation for a Changing World

Delta AC Servo Drive ASDA-A2-E Series



EtherCAT®

www.deltaww.com

 **DELTA**
Smarter. Greener. Together.

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.

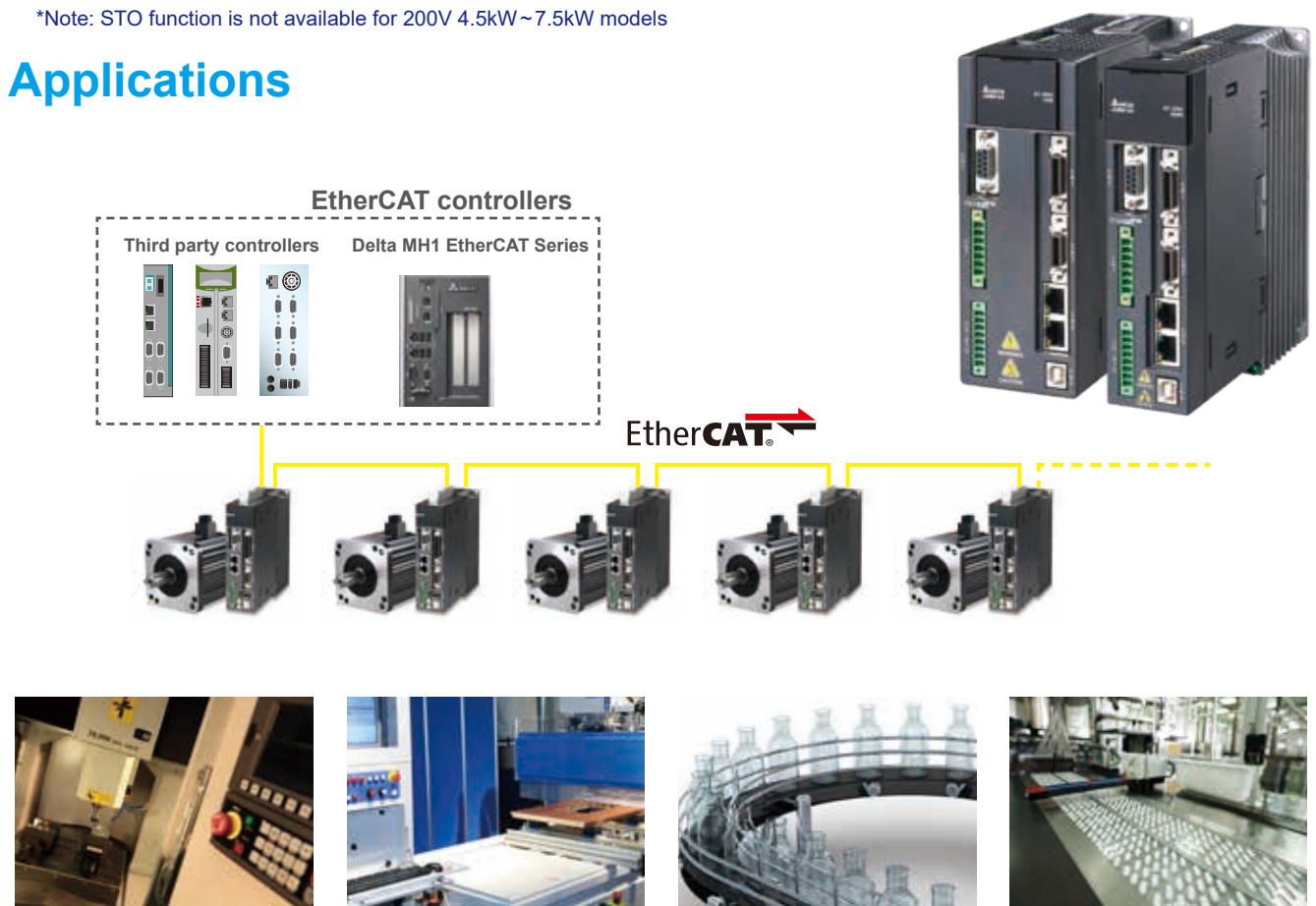
ASDA-A2-E Series is your ideal servo drive to achieve high speed multi-axis synchronization applications.

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)
 - IEC 62016 (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



Specifications of ASDA-A2-E_220V Series

ASDA-A2-E Series		100 W	200 W	400 W	750 W	1 kW	1.5 kW	2 kW	3 kW	4.5 kW	5.5 kW	7.5 kW
		01	02	04	07	10	15	20	30	45	55	75
Power Supply	Phase / Voltage	Three-phase / Single-phase 220 V _{AC}						Three-phase 220 V _{AC}				
	Permissible Voltage Range	Three-phase / Single-phase 200 ~ 230 V _{AC} , -15%~10%						Three-phase / 200 ~ 230 V _{AC} , -15% ~ 10%				
Input Current (3 PH) Unit: Arms		0.8	1.11	1.86	3.66	4.68	6.33	8.76	9.83	17.5	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	7.3	8.86	13.4	19.4	32.5	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 Control Mode (CSP)	Command Source	DS402 object										
	Smoother Strategy	Low-pass and P-curve filter										
Mode (CSV)	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)										
	Torque Limit Operation	DS402 object										
	Feed Forward Compensation	Internal parameters										
Speed Control Mode (CST)	Speed Control Range ^{*1}	1:5000									1:3000	
	Command Source External Analog Signal	DS402 object										
	Smoother Strategy	Low-pass and S-curve filter										
	Torque Limit Operation	Set by parameters										
	Frequency Response Characteristic	Maximum 1 kHz										
	Speed Accuracy (at rated rotation speed) ^{*2}	0.01 % or less at 0 to 100 % load fluctuation 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 Control Mode (CST)	Command Source	DS402 object										
	Smoother Strategy	Low-pass filter										
	Speed Limit Operation	DS402 object										
Digital Inputs/Outputs	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 * Please note that the above digital signals and inputs are available 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) 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		USB / EtherCAT										
Environment	Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)										
	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_400V Series

ASDA-A2-E Series		400W	750W	1kW	1.5kW	2kW	3kW	4.5kW	5.5kW	7.5kW
		04	07	10	15	20	30	45	55	75
Power Supply	Input Voltage	24V _{DC} , ±10%								
	Input Current	0.43A				1.18A			1.66A	
	Input Power	10.32W				28.2W			39.85W	
Main Circuit Power	Permissible Voltage Range	Three-phase, 380~480 V _{AC} , ±10%								
	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 Unit: Arms	2.0	3.07	3.52	5.02	6.66	11.9	20	22.37	28.4
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								
Dynamic Brake		Built-in				no				
Position	Command Source	DS402 object								
Control	Smoothing Strategy	Low-pass and P-curve filter								
	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)								
Mode	Torque Limit Operation	DS402 object								
(CSP)	Feed Forward Compensation	Internal parameters								
Speed	Speed Control Range ^{*1}	1:5000							1:3000	
	Command Source	DS402 object								
	Smoothing Strategy	Low-pass and S-curve filter								
Control	Torque Limit Operation	Set by parameters								
	Frequency Response Characteristic	Maximum 1 kHz								
Mode (CSV)	Speed Accuracy (at rated rotation speed) ^{*2}	0.01 % or less at 0 to 100 % load fluctuation 0.01 % or less at 0℃ to 50℃ ambient temperature fluctuation								
	Feed Forward Compensation	0.01 % or less at ±10 % power fluctuation								
	Torque Control Mode (CST)	Command Source	DS402 object							
Smoothing Strategy		Low-pass filter								
Speed Limit Operation		Via analog input								
Digital Inputs/Outputs	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								
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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		USB / EtherCAT								
Environment	Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)								
	Altitude	Ititude 2000 m or lower above sea level								
	Atmospheric Pressure	86 kPa ~ 106 kPa								
	Operating Temperature	0℃ ~ 55℃ (If operating temperature is above 45℃ , forced cooling will be required)								
	Storage Temperature	-20℃ ~ 65℃								
	Humidity	0 ~ 90% RH (non-condensing)								
	Vibration	9.80665 m/s ² (1 G) less than 20 Hz, 5.88 m/s ² (0.6G) 20 to 50 Hz								
	IP Rating	IP20								
	Power System	TN System ^{*3}								
Approvals		IEC/EN 61800-5-1, UL 508C, C-tick   								

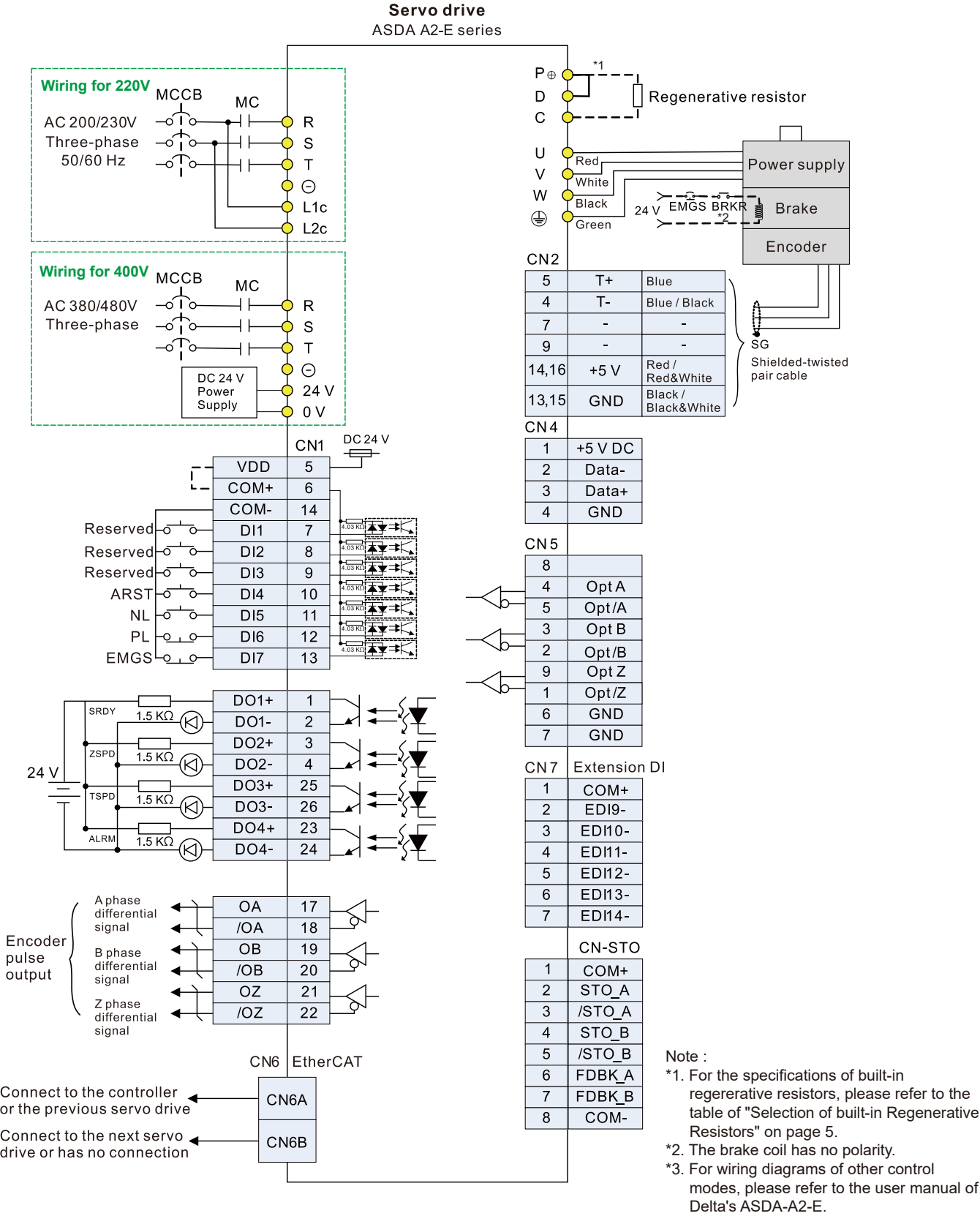
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EtherCAT Communication Mode



Communication Specifications

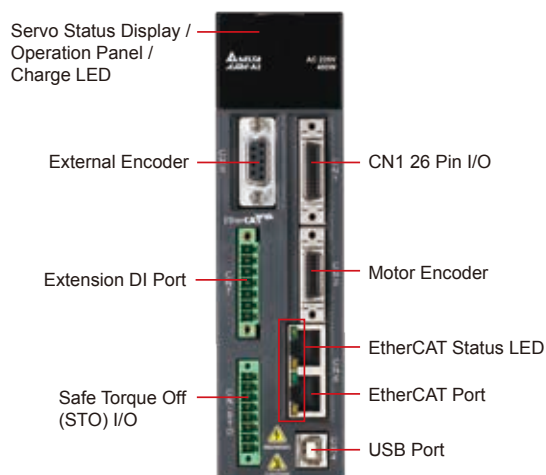
Physical Layer	IEEE802.3u (100 BASE-TX)
Data Link Layer	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
Device Profile (CiA402)	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn. 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

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

Selection of Built-in Regenerative Resistors

220V 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 Regenerative Resistor	NA	NA	40 W 40 ohm	60 W 40 ohm	60 W 40 ohm	60 W 40 ohm	100 W 20 ohm	100 W 20 ohm	
400V 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 Regenerative Resistor	40 W 80 ohm	40 W 80 ohm	40 W 80 ohm	40 W 80 ohm	NA	NA	NA	NA	NA

Part Names and Functions



Ordering Information

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

Accessories for ASDA-A2-E

Part Number	ASD-CN5C0026
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.

100 W / 200 W / 400 W

**Weight**

Weight	2.0 (4.4)
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5.40 (2.1)

203.0 (7.99)

14.5 (0.57)

62.0 (2.44)

82.0 (3.23)

70 (2.76)

203.0 (7.99)

215.5 (8.48)

Gap Between case & cover must less than 0.7mm
(not include air line)

BORNECH L1
1) Use the same material as the case

Weight	2.89 (6.36)
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400 W / 750 W / 1 kW / 1.5 kW



Weight	2.0 (4.4)
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Technical drawing of the front and side views of the 1U rack-mountable device. The front view shows a 1U rack unit with dimensions: 123.5 (4.88) for the top width, 107 (4.21) for the main body width, 8 (0.31) for the top flange width, 70.2 (2.76) for the top flange height, 205.5 (8.09) for the main body height, 230 (9.05) for the total height, 68 (2.68) for the top flange thickness, 7 (0.27) for the bottom flange thickness, 107 (4.21) for the bottom width, and 245 (9.64) for the total height including the bottom flange. The side view shows the device's profile with various ports and connectors. A detail view shows the mounting screw holes with dimensions M4±0.7 and a mounting screw torque of 14kgf·cm.

Weight	4.6 (10.1)
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Weight	5.5 (12.1)
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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