



Automation for a Changing World

Delta AC Servo Drive ASDA-A2-E Series



EtherCAT 

www.deltaww.com

 **DELTA**
Smarter. Greener. Together.

Introduction

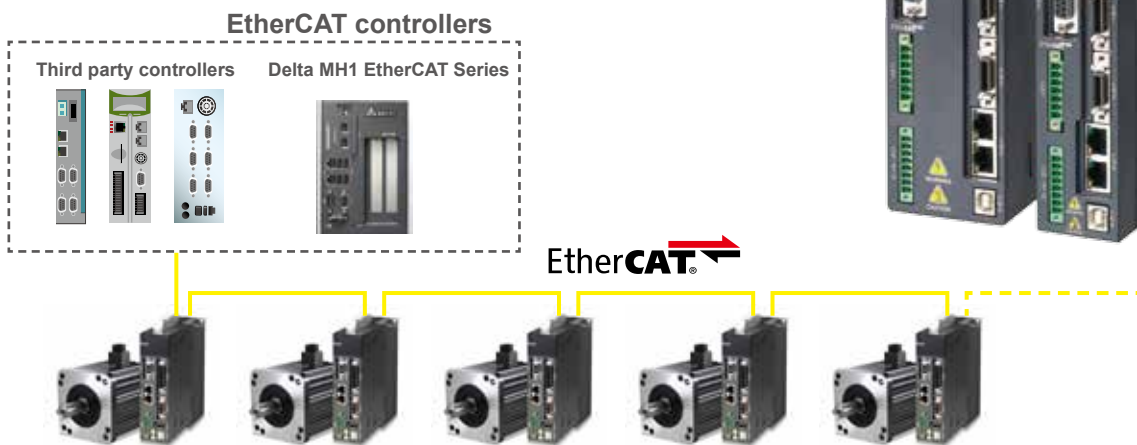
Delta's ASDA-A2-E, an advanced AC Servo Drive with an EtherCAT communication interface, complies with IEC61158 and IEC61800-7 and follows in the footsteps of the successful ASDA-A2 series. This advanced A2-E supports all the modes of the CoE device profile based on CiA402 and all command types of EtherCAT; 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 high speed position latch (Capture) function
 - Enabled with dedicated Digital Input (DI) on CN7 or the external encoder

Applications



Specifications of ASDA-A2-E_220V Series

ASDA-A2-E Series		100W	200W	400W	750W	1kW	1.5kW	2kW	3kW
		01	02	04	07	10	15	20	30
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 (3PH) Unit: Arms		0.39	1.11	1.86	3.66	4.68	5.9	8.76	9.83
Input Current (1PH) Unit: Arms		0.69	1.92	3.22	6.78	8.88	10.3	-	-
Continuous Output Current Unit: Arms		0.9	1.55	2.6	5.1	7.3	8.3	13.4	19.4
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				
Position Control Mode (CSP)	Command Source	DS402 object							
	Smoothing Strategy	Low-pass and P-curve filter							
Mode	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)							
	Torque Limit Operation	DS402 object							
Speed Control Mode (CSV)	Feed Forward Compensation	Internal parameters							
	Speed Control Range ^{*1}	1:5000						1:3000	
Torque Control Mode (CST)	Command Source	DS402 object							
	Smoothing Strategy	Low-pass filter							
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							
	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 1000 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 to 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, 380~480V _{AC} , ±10%								
	Input Current Unit: Arms	1.40	2.35	3.02	4.24	5.65	8.01	11.9	14.1	17.27
	Continuous Output Current Unit: Arms	2.0	3.35	3.52	5.02	6.66	11.9	20	22.37	30
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 Control Mode (CSP)	Command Source	DS402 object								
	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)								
Torque Limit Operation (CSP)	Torque Limit Operation	DS402 object								
	Feed Forward Compensation	Internal parameters								
	Speed Control Range ^{*1}	1:5000			1:3000					
Speed Control Mode (CSV)	Command Source	DS402 object								
	Smoothing Strategy	Low-pass and S-curve filter								
	Torque Limit Operation	Set by parameters								
Frequency Response Characteristic (CSV)	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								
	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								
	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 1000 m or lower above sea level								
	Atmospheric Pressure	86 kPa ~ 106 kPa								
	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 (0.6G) 20 to 50 Hz								
	IP Rating	IP20								
Power System	TN System ^{*3}									
Approvals		IEC/EN 61800-5-1, UL 508C, C-tick								

Footnote:

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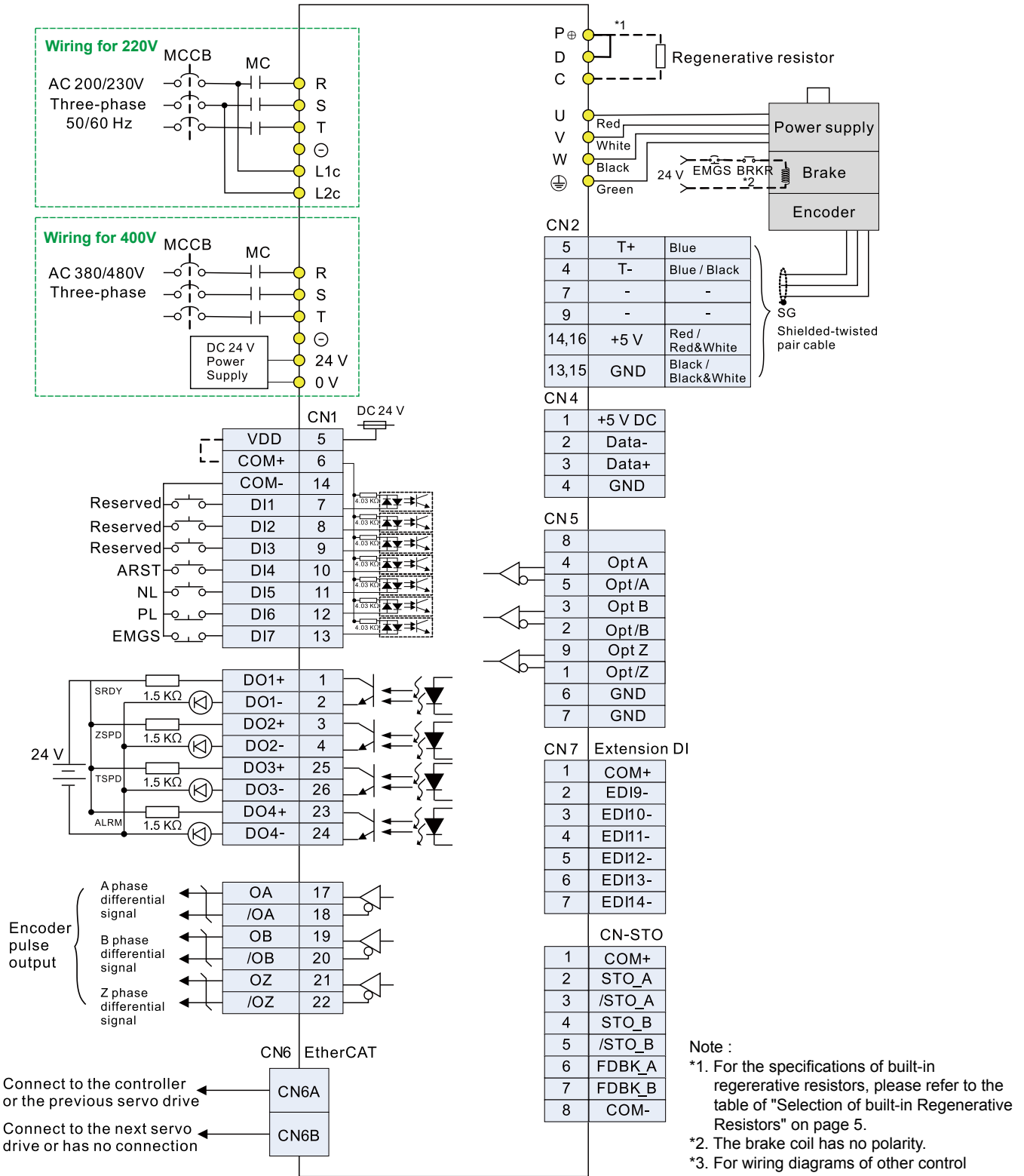
*2 When command is rated rotation speed, the speed fluctuation rate is defined as: (Empty load rotation speed – Full load rotation speed) / Rated rotation speed

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EtherCAT Communication Mode

Servo drive
ASDA A2-E series



Communication Specifications

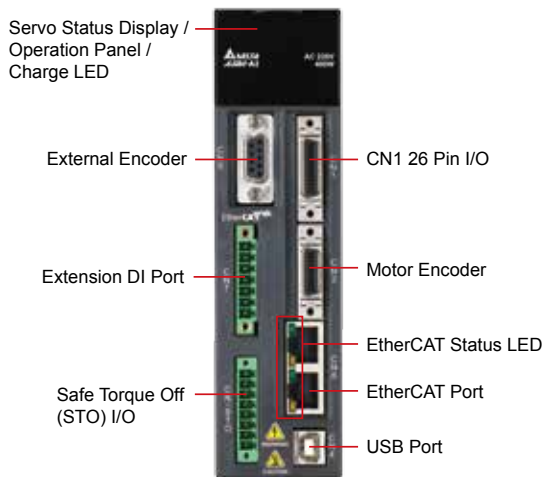
Physical Layer	IEEE802.3u (100 BASE-TX)
Data Link Layer	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
Device Profile (CiA402)	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn.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

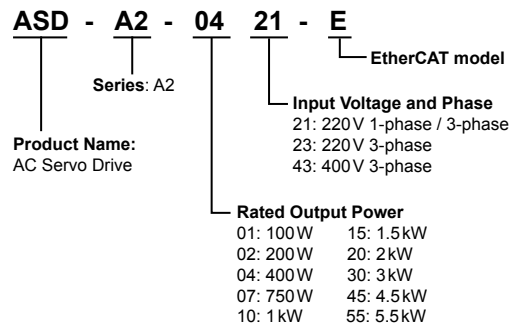
Selection of Built-in Regenerative Resistors

220V Series									
Servo Drive (kW)	100 W	200 W	400 W	750 W	1.0kW	1.5kW	2.0kW	3.0kW	
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 20ohm	100 W 20ohm	
400V Series									
Servo Drive (kW)	400 W	750 W	1.0kW	1.5kW	2.0kW	3.0kW	4.5kW	5.5kW	7.5kW
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



Accessories for ASDA-A2-E

Part Number	ASD-CN5C0026
Description	CN1 connector

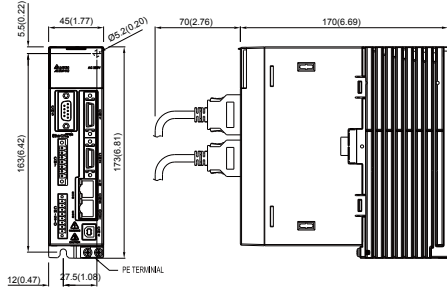
Part Number	ASD-CNFS0808
Description	Pack of connectors used for STO wiring, 8 pcs of connectors in one pack

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

Dimensions

► 220 V Series

100 W / 200 W / 400 W

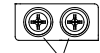
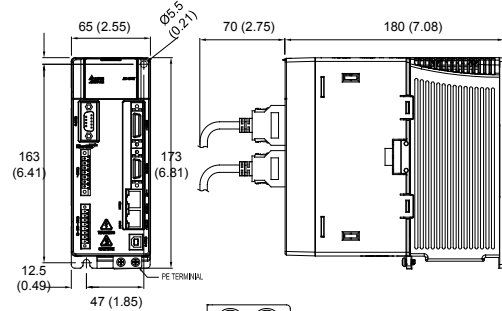


Weight 1.5 (3.3)

Weight

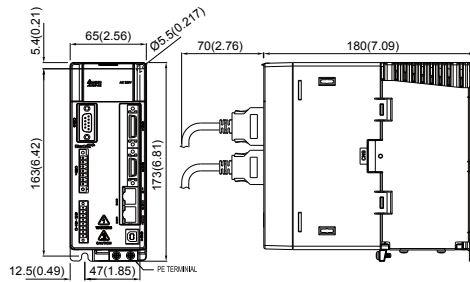
► 400 V Series

400 W / 750 W / 1 kW / 1.5 kW



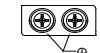
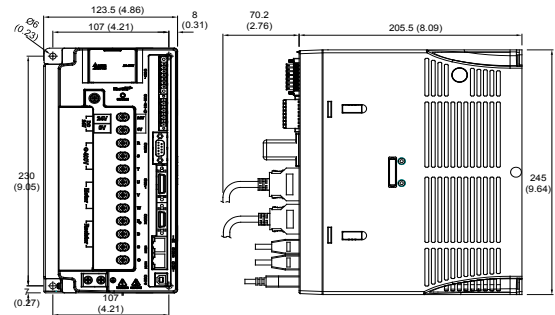
Weight 2.0 (4.4)

750 W / 1 kW / 1.5 kW



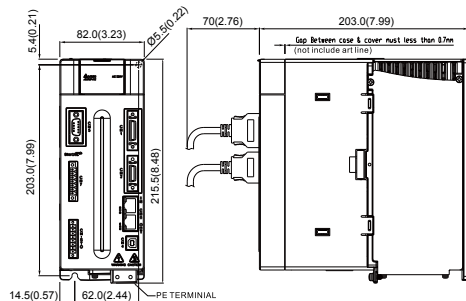
Weight 2.0 (4.4)

2 kW / 3 kW / 4.5 kW / 5.5 kW



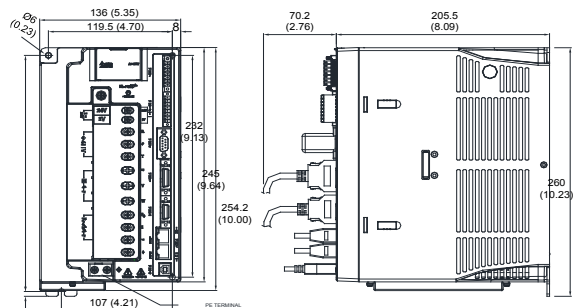
Weight 4.6 (10.1)

2 kW / 3 kW



Weight 2.89 (6.36)

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 notice.



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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 Energy Systems (Australia) Pty Ltd.

Unit 20-21/45 Normanby Rd., Nottling 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 Greentech (Brasil) S/A

São Paulo Office
Rua Itapeva, 26 – 3° Andar - Bela Vista
CEP: 01332-000 – São Paulo – SP - Brasil
TEL: 55-11-3530-8642 / 55-11-3530-8640

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

Mexico Office
Vía Dr. Gustavo Baz No. 2160, Colonia La Loma,
54060 Tlalnepantla Estado de Mexico
TEL: 52-55-2628-3015 #3050/3052

EMEA

Delta Electronics (Netherlands) BV

Eindhoven Office
De Witbogt 20, 5652 AG Eindhoven, The Netherlands
MAIL: Sales.IA.EMEA@deltaww.com
MAIL: Sales.IA.Benelux@deltaww.com

Delta Electronics (France) S.A.

ZI du bois Chaland 2 15 rue des Pyrénées,
Lisses 91056 Evry Cedex, France
MAIL: Sales.IA.FR@deltaww.com

Delta Electronics Solutions (Spain) S.L.U

Ctra. De Villaverde a Vallecas, 265 1° Dcha Ed.
Hormigueras – P.I. de Vallecas 28031 Madrid
C/Llull, 321-329 (Edificio CINC) | 22@Barcelona, 08019 Barcelona
MAIL: Sales.IA.Iberia@deltaww.com

Delta Electronics (Italy) Srl

Ufficio di Milano Via Senigallia 18/2 20161 Milano (MI)
Piazza Grazioli 18 00186 Roma, Italy
MAIL: Sales.IA.Italy@deltaww.com

Delta Electronics (Germany) GmbH

Coesterweg 45, D-59494 Soest, Germany
MAIL: Sales.IA.DACH@deltaww.com

Delta Energy Systems LLC (CIS)

Vereyskaya Plaza II, office 112 Vereyskaya str.
17 121357 Moscow, Russia
MAIL: Sales.IA.RU@deltaww.com

Delta Greentech Ltd. (Turkiye)

Serifali Mevkii Barbaros Bulvari Soylesi Sok
No 19 34775, Y.Dudullu-Umraniye/Istanbul
MAIL: Sales.IA.Turkey@delta-emea.com

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

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