



Digitized 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. It also features a built-in Safe Torque Off (STO) function which prevents torque energy from continuing to act upon a motor and averts accidents. In addition, A2-E offers an extension digital input port for a wide range of machinery automation fields. This series covers a power range from 400W to 7.5kW for 400V and 100W to 3kW for 220V.

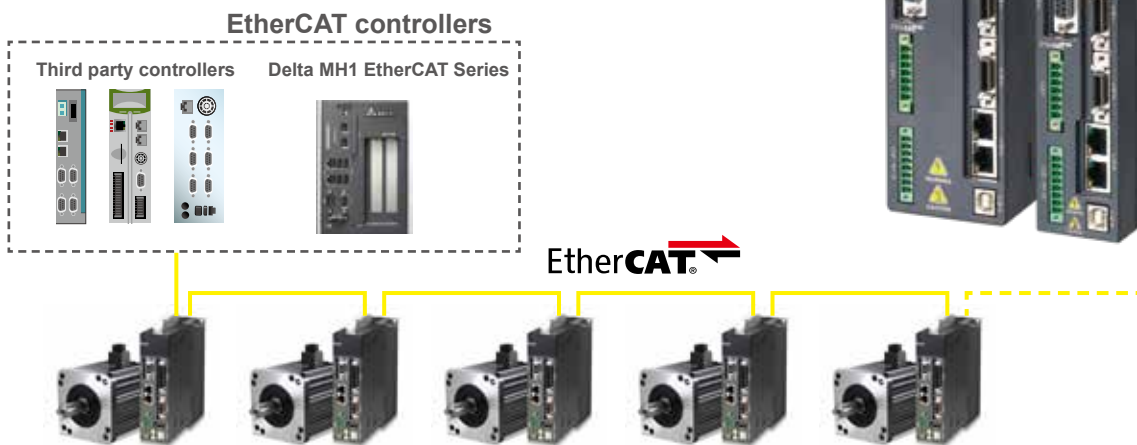
ASDA-A2-E Series is your ideal servo drive to achieve high speed multi-axis synchronization applications.

Features




- Passes 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 of 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 220V _{AC}						Three-phase 220V _{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		0.8	1.11	1.86	3.66	4.68	6.33	8.76	9.83	17.5	19.4	26.3	
Input Current (1PH) 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		Non			Built-in						External		
Position Control	Command Source	DS402 object											
	Smoothing Strategy	Low-pass and P-curve filter											
Mode (CSP)	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)											
	Torque Limit Operation	DS402 object											
Mode (CSV)	Feed Forward Compensation	Internal parameters											
	Speed Control Range ^{*1}	1:5000						1:3000					
Speed Control	Command Source External Analog Signal	DS402 object											
	Smoothing Strategy	Low-pass and S-curve filter											
Mode (CST)	Torque Limit Operation	Set by parameters											
	Frequency Response Characteristic	Maximum 1 kHz											
Mode (CST)	Speed Accuracy (at rated rotation speed) ^{*2}	0.01 % or less at 0 to 100 % load fluctuation											
	Feed Forward Compensation	0.01 % or less at 0°C to 50°C ambient temperature fluctuation											
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 * 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 (kept 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 20Hz, 5.88 m/s ² (0.6 G) 20 ~ 50Hz											
	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	1.45	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				Non				
Position Control Mode (CSP)	Command Source	DS402 object								
	Smoothing Strategy	Low-pass and P-curve filter								
Mode (CSP)	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 (CSV)	Speed Control Range ^{*1}	1:5000			1:3000					
	Command Source	DS402 object								
Mode (CSV)	Smoothing Strategy	Low-pass and S-curve filter								
	Torque Limit Operation	Set by parameters								
Frequency Response Characteristic		Maximum 1 kHz								
Torque Control Mode (CST)	Speed Accuracy (at rated rotation speed) ^{*2}	0.01 % or less at 0 to 100 % load fluctuation								
	Feed Forward Compensation	0.01 % or less at 0°C to 50°C ambient temperature fluctuation								
	Feed Forward Compensation	0.01 % or less at ±10 % power fluctuation								
Digital Inputs/Outputs	Command Source	DS402 object								
	Smoothing Strategy	Low-pass filter								
	Speed Limit Operation	Via analog input								
Inputs	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)								
Protective Functions		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)								
Communication Interface		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								
Environment		USB / EtherCAT								
Environment	Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (kept away from oil mist, flammable gas, dust)								
	Altitude	Ititude 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	9.80665m/s ² (1 G) less than 20 Hz, 5.88 m/s ² (0.6G) 20 ~ 50 Hz								
	Power System	IP 20 TN System ^{*3}								
Approvals		IEC/EN 61800-5-1, UL 508C, C-tick   								

Footnote:

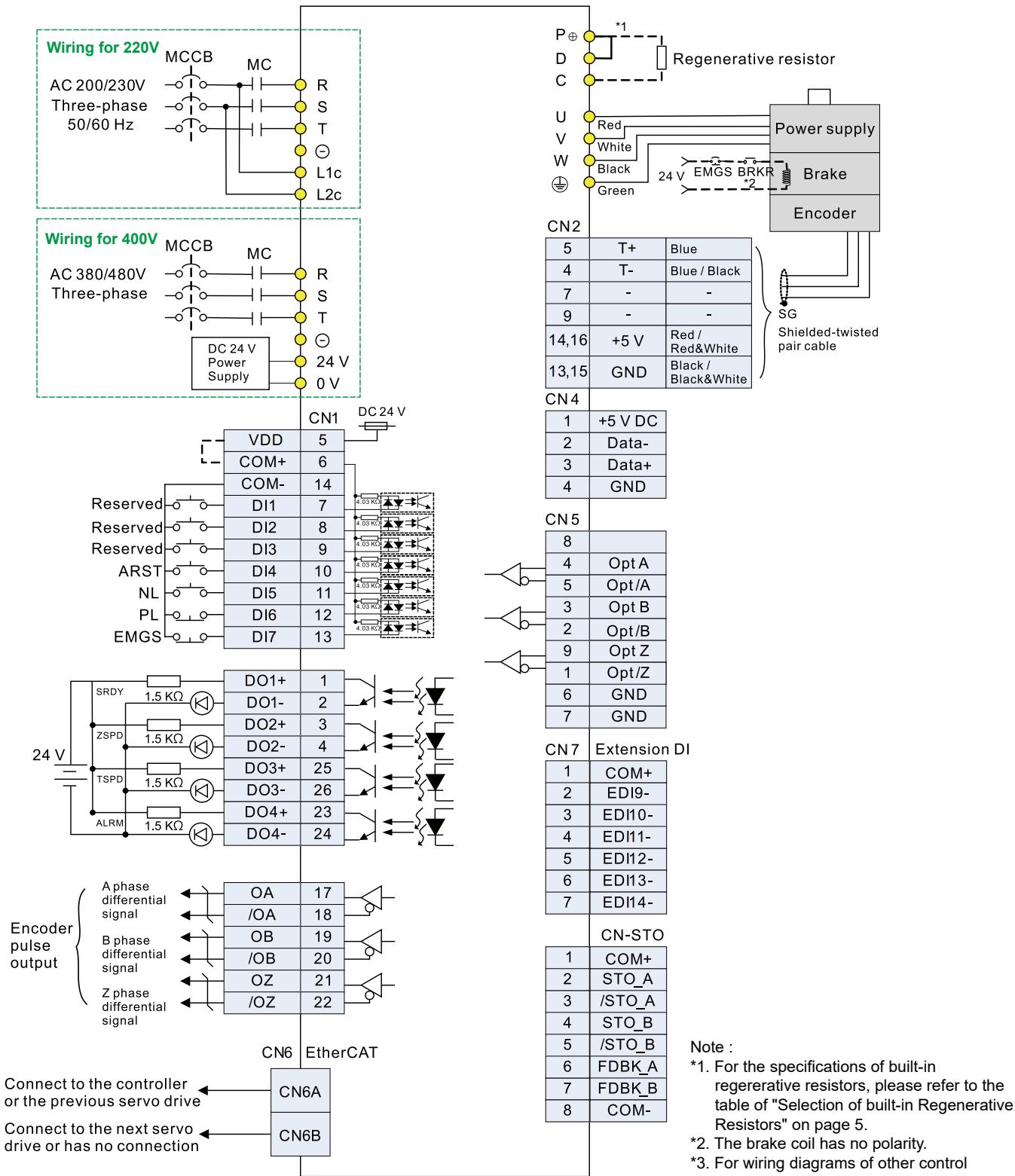
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EtherCAT Communication Mode

Servo drive
ASDA A2-E series



Note :

- *1. For the specifications of built-in regenerative resistors, please refer to the table of "Selection of built-in Regenerative Resistors" on page 5.
- *2. The brake coil has no polarity.
- *3. For wiring diagrams of other control modes, please refer to the user manual of Delta's ASDA-A2-E.

Communication Specifications

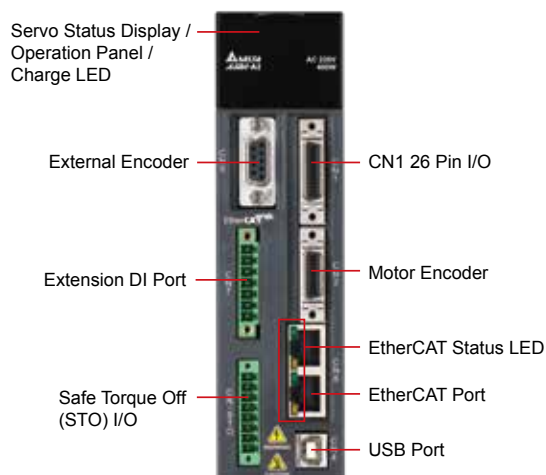
Physical Layer	IEEE802.3u (100 BASE-TX)
Data Link Layer	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
Device Profile (CiA402)	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn.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

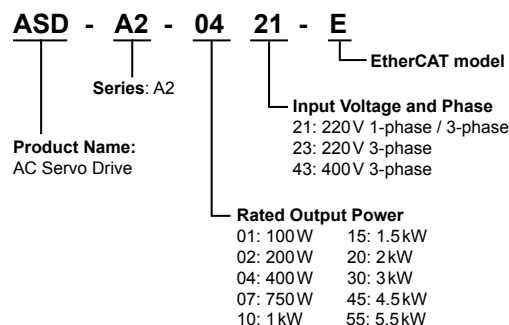
Selection of Built-in Regenerative Resistors

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




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

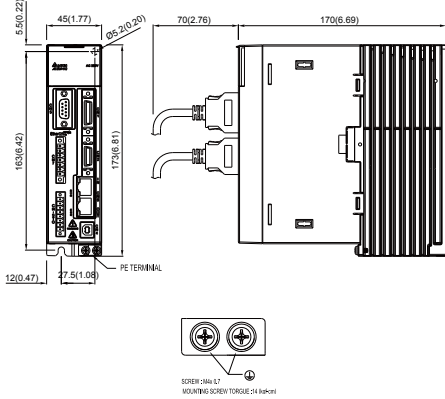


Note :
For other accessories, please refer to Delta's ASDA-A2 product catalogue.

Dimensions

► 220 V Series

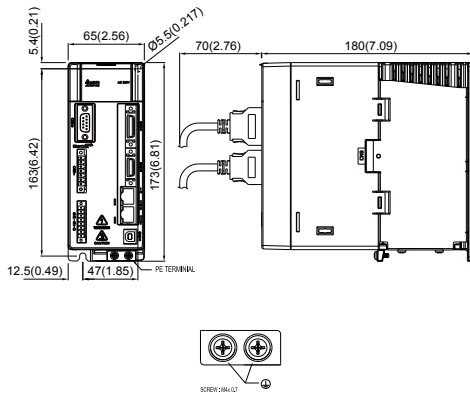
100 W / 200 W / 400 W



Weight 1.5 (3.3)

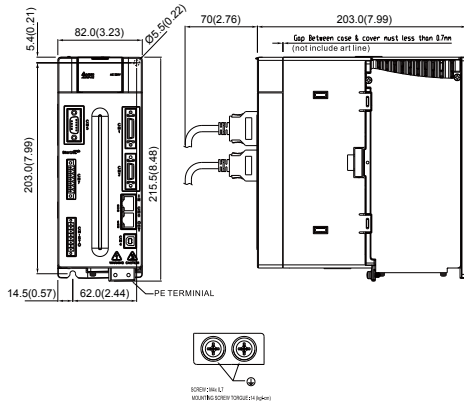
Weight

750 W / 1 kW / 1.5 kW



Weight 2.0 (4.4)

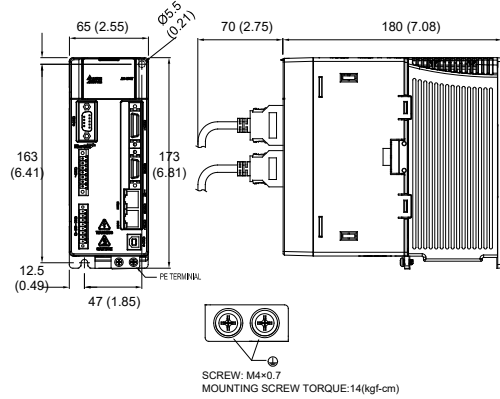
2 kW / 3 kW



Weight 2.89 (6.36)

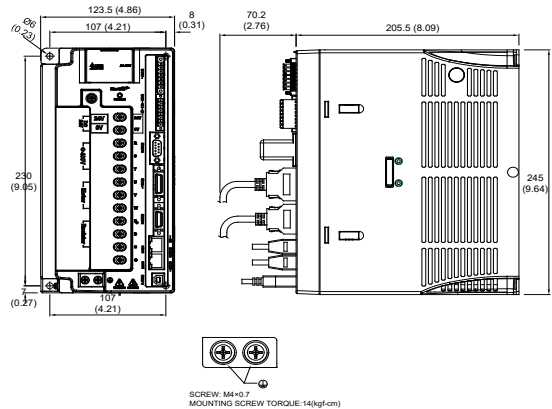
► 400 V Series

400 W / 750 W / 1 kW / 1.5 kW



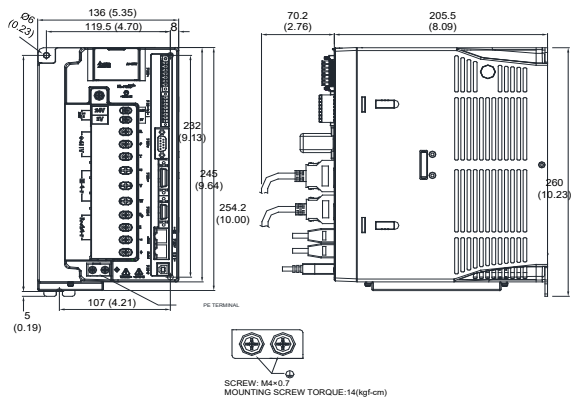
Weight 2.0 (4.4)

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 notice.



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Industrial Automation Headquarters

Taiwan: 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

China: 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

Japan: Delta Electronics (Japan), Inc.

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

Korea: Delta Electronics (Korea), Inc.

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

Singapore: Delta Energy Systems (Singapore) Pte Ltd.

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

India: Delta Electronics (India) Pvt. Ltd.

Plot No.43, Sector 35, HSIIDC Gurgaon,
PIN 122001, Haryana, India
TEL: +91-124-4874900 / FAX: +91-124-4874945

Thailand: 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: +66-2709-2827

Australia: Delta Electronics (Australia) Pty Ltd.

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

Americas

USA: Delta Electronics (Americas) Ltd.

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

Brazil: Delta Electronics Brazil

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

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

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

EMEA

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.

Automotive Campus 260, 5708 JZ Helmond, 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

MEA: Eltek Dubai (Eltek MEA DMCC)

OFFICE 2504, 25th Floor, Saba Tower 1,
Jumeirah Lakes Towers, Dubai, UAE
Mail: Sales.IA.MEA@deltaww.com
TEL: +971(0)4 2690148