



Automation for a Changing World

Delta AC Servo Drive ASDA-A2-E Series



EtherCAT®

www.haina-auto.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.

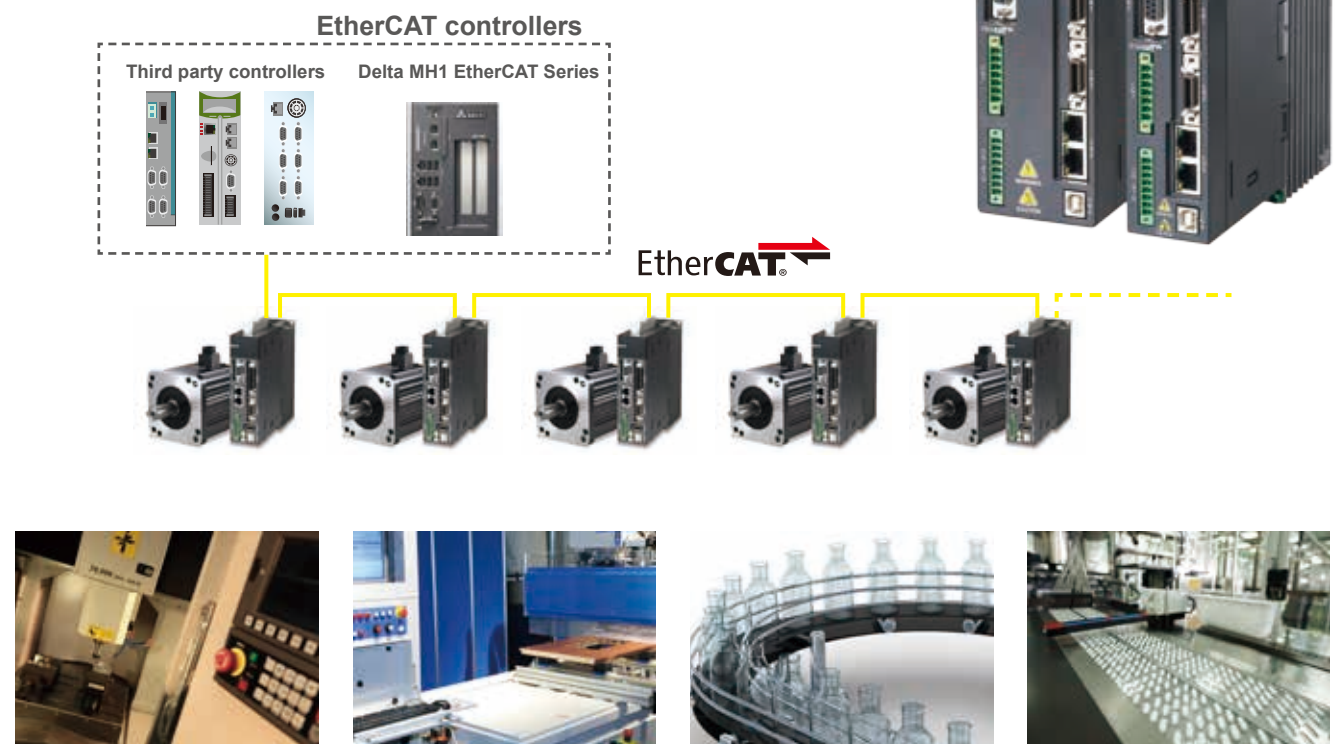
ASDA-A2-E Series is your ideal servo drive to achieve high speed multi-axis synchronization applications.

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										
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 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										
(CSV)	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	Smoother 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								
	Smoother 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							
Smoother 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   								

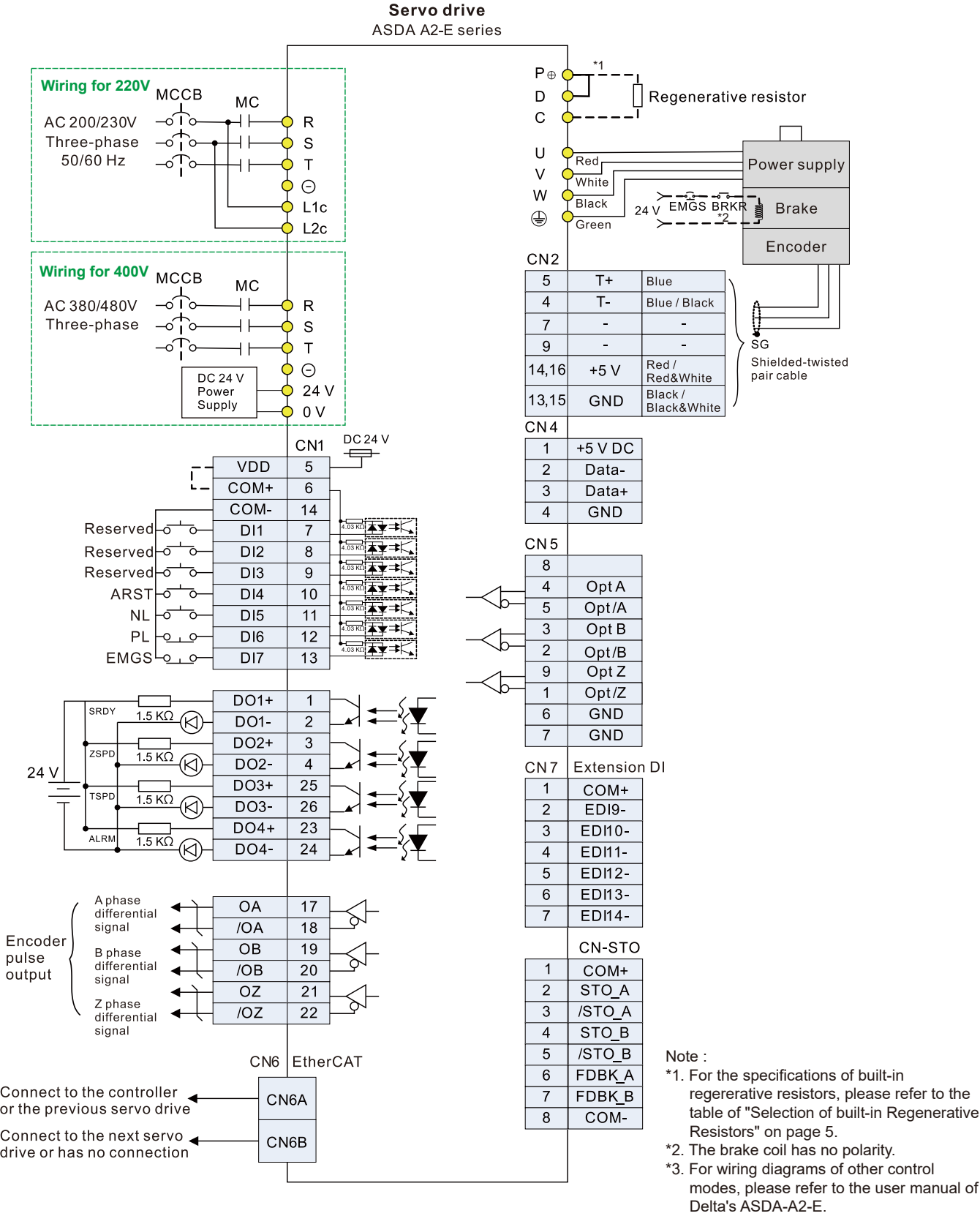
Footnote:

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EtherCAT Communication Mode



Communication Specifications

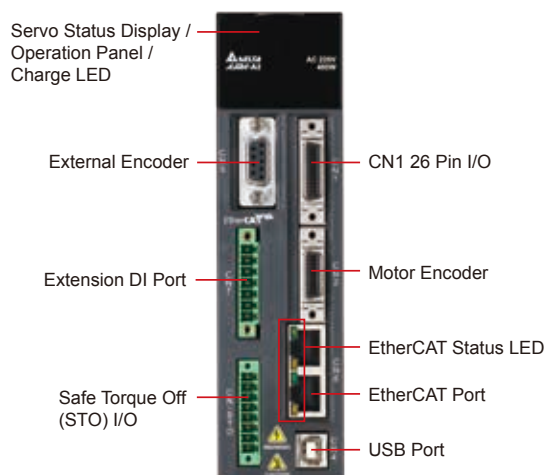
Physical Layer	IEEE802.3u (100 BASE-TX)
Data Link Layer	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
Device Profile (CiA402)	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn.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

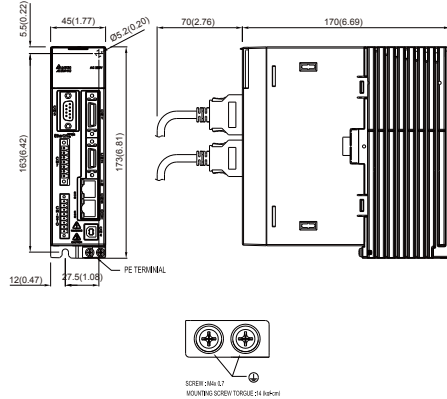


Note :
For other accessories, please refer to Delta's ASDA-A2 product catalogue.

Dimensions

► 220 V Series

100 W / 200 W / 400 W

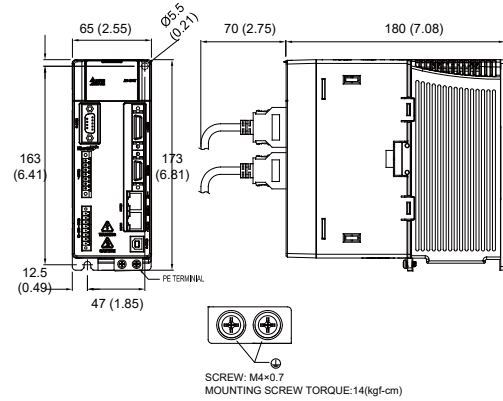


Weight 1.5 (3.3)

Weight

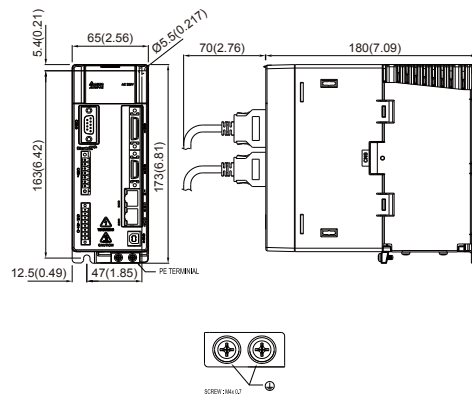
► 400 V Series

400 W / 750 W / 1 kW / 1.5 kW



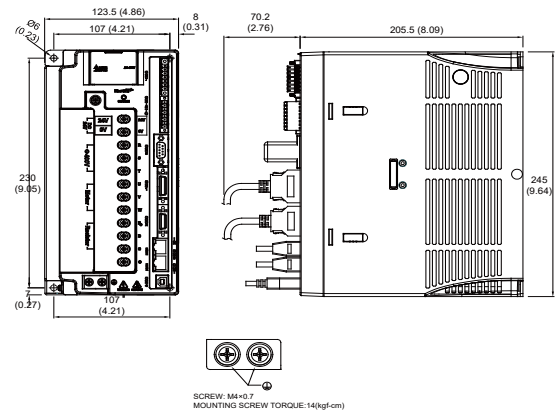
Weight 2.0 (4.4)

750 W / 1 kW / 1.5 kW



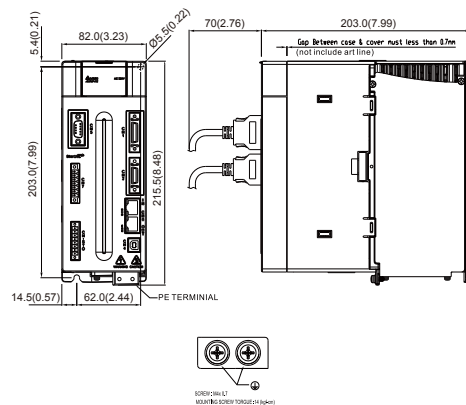
Weight 2.0 (4.4)

2 kW / 3 kW / 4.5 kW / 5.5 kW



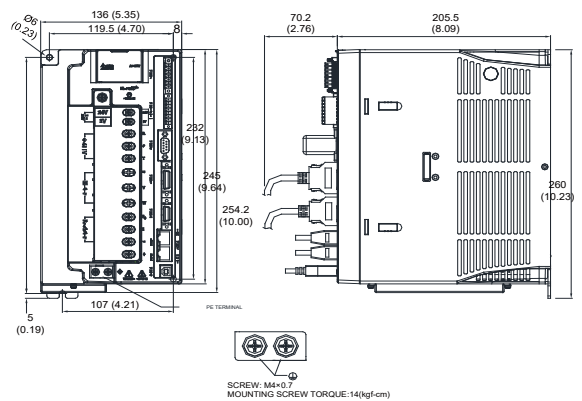
Weight 4.6 (10.1)

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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