



Automation for a Changing World

# Delta AC Servo Drive ASDA-A2-E Series



**EtherCAT** 

[www.deltaww.com](http://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.

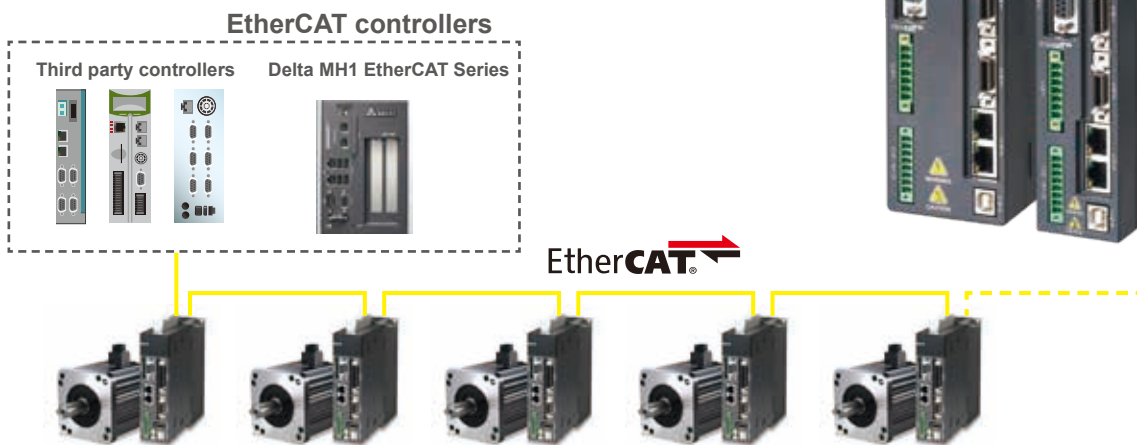
ASDA-A2-E Series is your ideal servo drive to achieve high speed multi-axis synchronization applications.

# 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 <sub>AC</sub>						Three-phase 220 V <sub>AC</sub>					
	Permissible Voltage Range	Three-phase / Single-phase 200 ~ 230 V <sub>AC</sub> , -15%~10%						Three-phase / 200 ~ 230 V <sub>AC</sub> , -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		no						Built-in			External		
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		DS402 object											
Feed Forward Compensation		Internal parameters											
Speed Control Mode (CSV)	Speed Control Range <sup>*1</sup>	1:5000									1:3000		
	Command Source External Analog Signal	DS402 object											
Smoothing 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) <sup>*2</sup>		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	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 <sup>*</sup> 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 <sup>2</sup> (1 G) less than 20 Hz, 5.88 m/s <sup>2</sup> (0.6 G) 20 ~ 50 Hz											
	IP Rating	IP20											
Power System	TN System <sup>*3</sup>												
Approvals	IEC/EN 61800-5-1, UL 508C, C-tick   												




**Footnote:**

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

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

<sup>\*3</sup> 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 <sub>DC</sub> , ±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 <sub>AC</sub> , ±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 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 <sup>*1</sup>	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) <sup>*2</sup>	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								
	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, 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	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 <sup>2</sup> (1 G) less than 20 Hz, 5.88 m/s <sup>2</sup> (0.6G) 20 to 50 Hz								
	IP Rating	IP20								
Power System	TN System <sup>*3</sup>									
Approvals	IEC/EN 61800-5-1, UL 508C, C-tick   									

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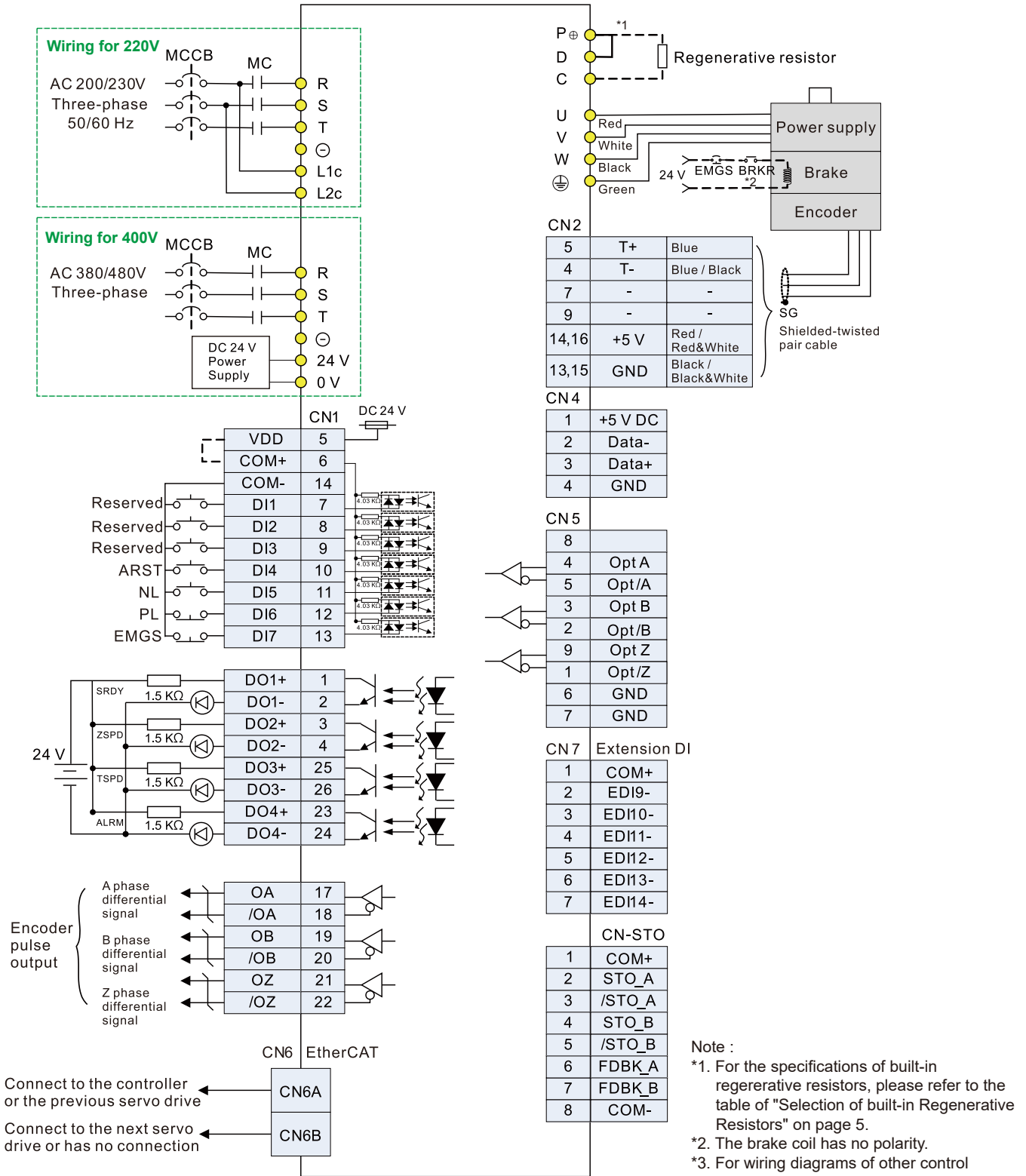
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\*2 When command is rated rotation speed, the speed fluctuation rate is defined as: (Empty load rotation speed – Full load rotation speed) / Rated rotation speed

\*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

**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

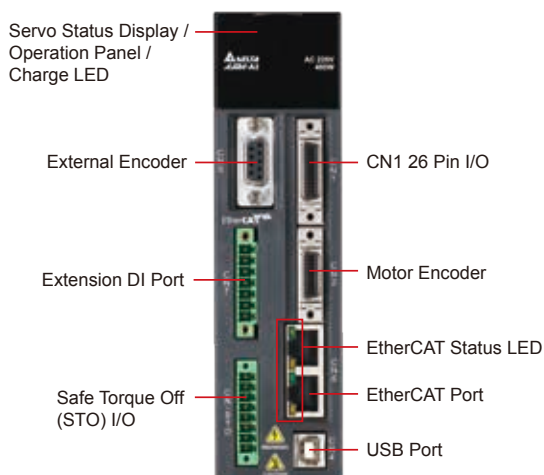
<b>Physical Layer</b>	IEEE802.3u (100 BASE-TX)
<b>Data Link Layer</b>	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
<b>Device Profile (CiA402)</b>	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn. Velocity Mode, Cyclic Syn. Torque Mode, Touch Probe Function, Torque Limit Function
<b>Process Data Size</b>	Tx: 8 Object (32 byte, Max.); Rx: 8 Object (32 byte, Max.) Dynamic Mapping supported.
<b>Bus Clock</b>	DC cycle with min. 250 us*
<b>LED Indicator</b>	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.

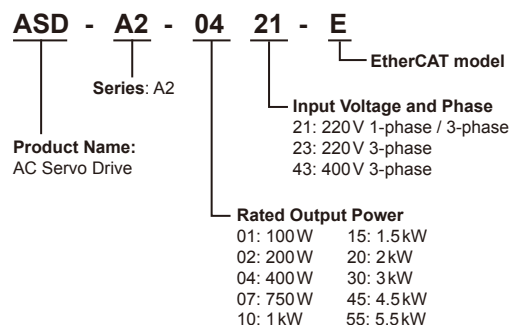
# Selection of Built-in Regenerative Resistors

220V Series									
<b>Servo Drive (kW)</b>	100 W	200 W	400 W	750 W	1.0 kW	1.5 kW	2.0 kW	3.0 kW	
<b>Specification of Built-in Regenerative Resistor</b>	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									
<b>Servo Drive (kW)</b>	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
<b>Specification of Built-in Regenerative Resistor</b>	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

<b>Part Number</b>	ASD-CN5C0026
<b>Description</b>	CN1 connector

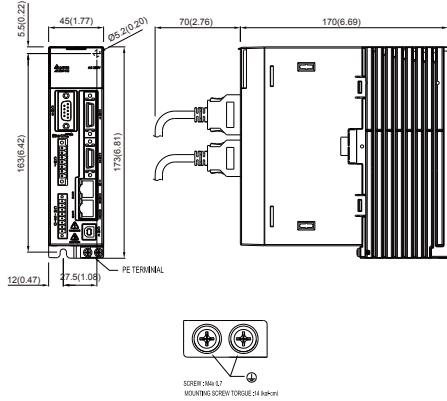
<b>Part Number</b>	ASD-CNFS0808
<b>Description</b>	Pack of connectors used for STO wiring, 8 pcs of connectors in one pack

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

# Dimensions

## ► 220 V Series

100 W / 200 W / 400 W

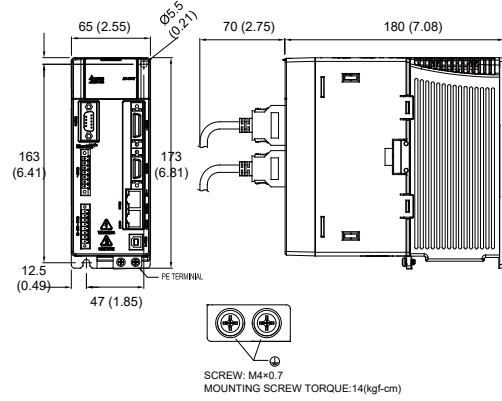


**Weight** 1.5 ( 3.3 )

**Weight**

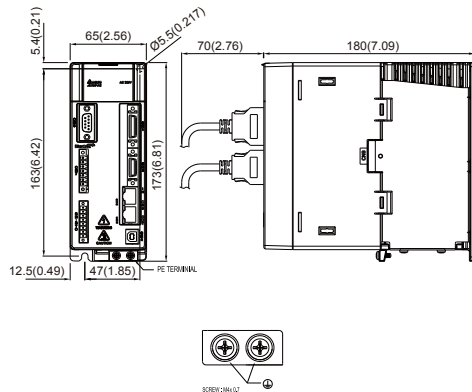
## ► 400 V Series

400 W / 750 W / 1 kW / 1.5 kW



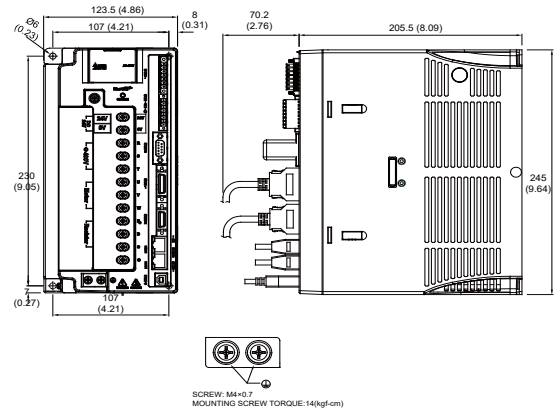
**Weight** 2.0 ( 4.4 )

750 W / 1 kW / 1.5 kW



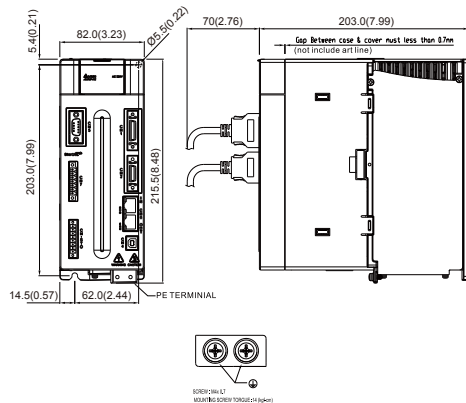
**Weight** 2.0 ( 4.4 )

2 kW / 3 kW / 4.5 kW / 5.5 kW



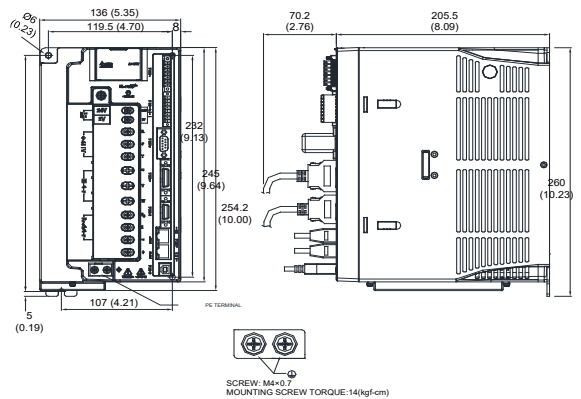
**Weight** 4.6 ( 10.1 )

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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