



Automation for a Changing World

Delta EtherCAT Interface Servo Drive ASDA A2-E Series



EtherCAT[®]

www.deltaww.com

 **DELTA**
Smarter. Greener. Together.

Introduction

Delta's ASDAA2-E, an advanced AC Servo Drive with an EtherCAT communication interface, complies with IEC61158 and IEC61800-7 to enable faster, real-time, and accurate performance in high-end applications.

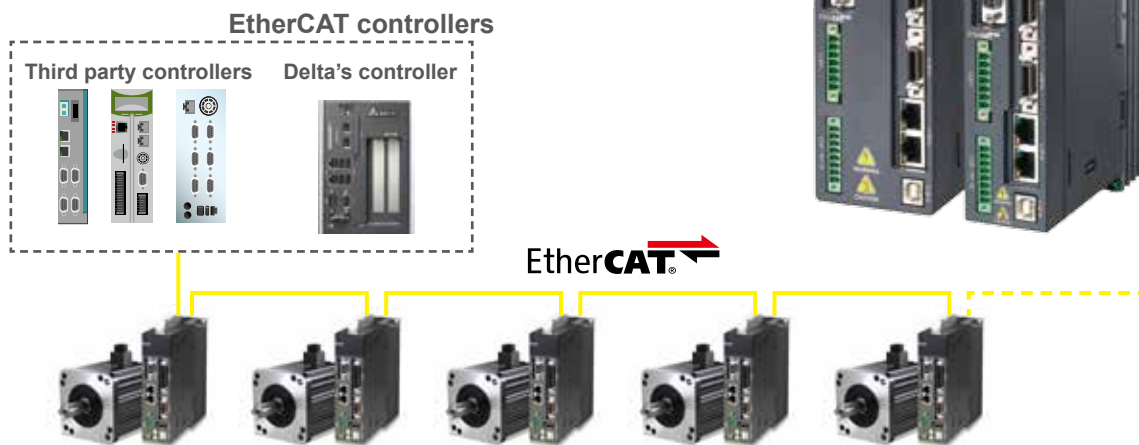
The ASDAA2-E follows in the footsteps of the successful ASDA-A2 series. This new A2-E supports all the modes of the CoE device profile based on CiA402, and all command types of EtherCAT.

In addition to the EtherCAT communication function, A2-E features the integrated Safe Torque Off (STO), short cycle time, and extension digital input port, which makes the A2-E ideal for multi-axis synchronization applications in a wide range of machinery automation fields. This series covers a wide range of rated power to drive the motors, from 400W to 7.5kW for 400V and 100W to 3kW for 220V.





Features

- Touch probe function can be enabled with dedicated Digital Input (DI) on CN7 or the external encoder.
- Integrated Safe Torque Off (STO) safety function according to the standards of IEC61508, SIL2 ; IEC62061, SILCL2 ; ISO13849-1, Cat. 3 PL=d
- Wide power range coverage in both 220V and 400V
- Supports full-closed loop control
- Supports absolute type and incremental type ECMA series motors

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 220V _{AC} | | | | | | Three-phase 220V _{AC} | | |
| | Permissible Voltage Range | Three-phase / Single-phase 200 ~ 230V _{AC} , -15%~10% | | | | | | Three-phase 200 ~ 230V _{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 | | Built-in | | | | | | | | |
| Position Control Mode (CSP) | Command Source | External analog signal | | | | | | | | |
| | Smoothing 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 | External analog signal | | | | | | | | |
| Speed Control Mode (CST) | Feed Forward Compensation | External analog signal / Internal parameters | | | | | | | | |
| | Speed Control Range ^{*1} | 1:5000 | | | | | | 1:3000 | | |
| Speed Control Mode (CSV) | Command Source External Analog Signal | External analog signal | | | | | | | | |
| | Smoothing Strategy | Low-pass and S-curve filter | | | | | | | | |
| Mode (CST) | Torque Limit Operation | Set by parameters or via analog input | | | | | | | | |
| | 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 | | | | 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 | External analog signal | | | | | | | | |
| | Smoothing Strategy | Low-pass filter | | | | | | | | |
| Inputs | Speed Limit Operation | Via analog input | | | | | | | | |
| | 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 of full-close control loop, 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 | 0.43 A | | | 1.18 A | | | 1.66 A | | |
| | Input Power | 10.32 W | | | 28.2 W | | | 39.85 W | | |
| 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 | | | | | | | | |
| Position Control Mode (CSP) | Command Source | External analog signal | | | | | | | | |
| | 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 | External analog signal | | | | | | | | |
| Speed Control Mode (CSV) | Feed Forward Compensation | External analog signal / Internal parameters | | | | | | | | |
| | Speed Control Range ^{*1} | 1:5000 | | | | | | | 1:3000 | |
| | Command Source External Analog Signal | External analog signal | | | | | | | | |
| Mode (CSV) | Smoothing Strategy | Low-pass and S-curve filter | | | | | | | | |
| | Torque Limit Operation | Set by parameters or via analog input | | | | | | | | |
| | 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 0.01 % or less at 0°C to 50°C ambient temperature fluctuation | | | | | | | | |
| | Feed Forward Compensation | 0.01 % or less at ±10 % power fluctuation | | | | | | | | |
| | Command Source | External analog signal | | | | | | | | |
| Digital Inputs/Outputs | Smoothing Strategy | Low-pass filter | | | | | | | | |
| | Speed Limit Operation | Via analog input | | | | | | | | |
| | Inputs | Servo on, Reset, Gain switching, Pulse clear, 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, PT / PR command 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 and Pulse inhibit input | | | | | | | | |
| Outputs | Encoder signal output (A, B, Z Line Driver and Z Open Collector) | | | | | | | | | |
| | Outputs | 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 of full-close control loop, 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:

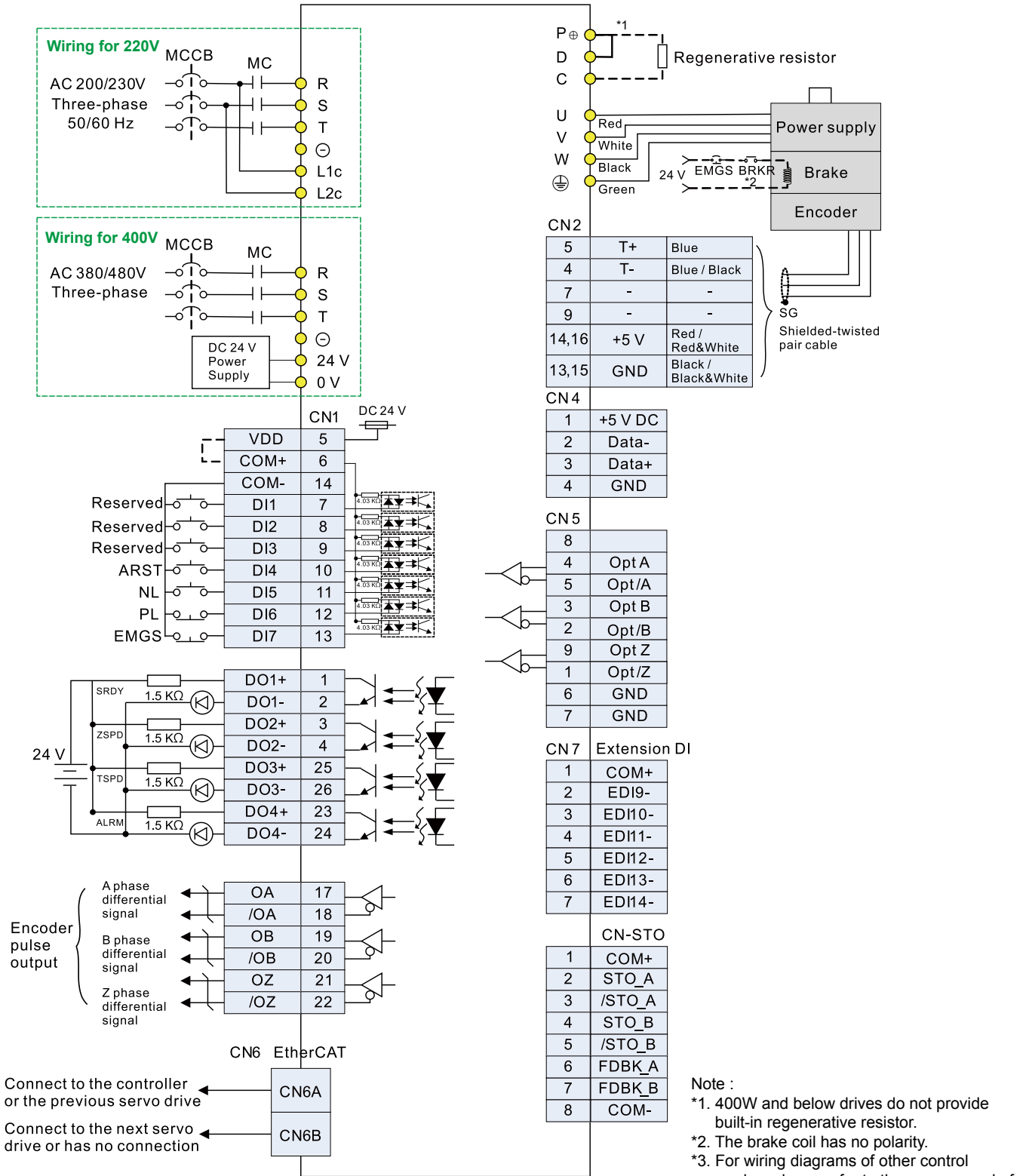
*1 Rated rotation speed: When full load, speed ratio is defined as the minimum speed (the motor will not pause).

*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.

EtherCAT Communication Mode

Servo drive ASDA A2-E series



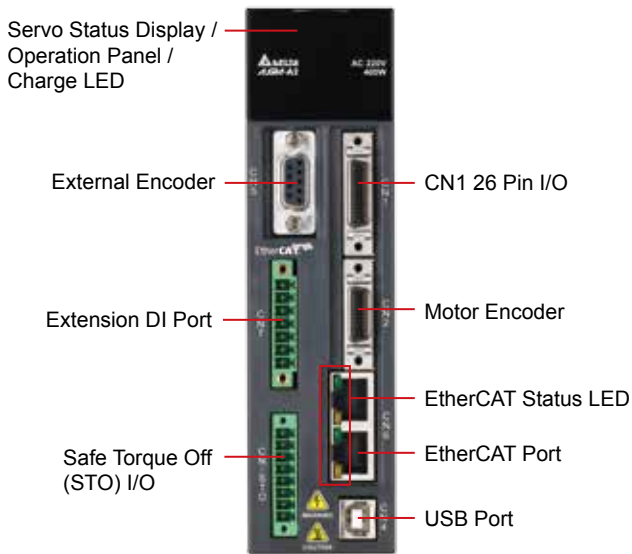
Note :
 *1. 400W and below drives do not provide built-in regenerative resistor.
 *2. The brake coil has no polarity.
 *3. For wiring diagrams of other control modes, please refer to the user manual of Delta's ASDA A2-E.

Communication Specifications

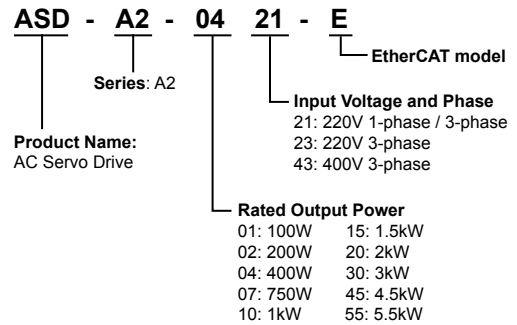
| | |
|--------------------------------|--|
| Physical Layer | IEEE802.3u (100 BASE-TX) |
| Data Link Layer | APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW |
| Device Profile (CiA402) | Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated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

Part Names and Functions



Ordering Information

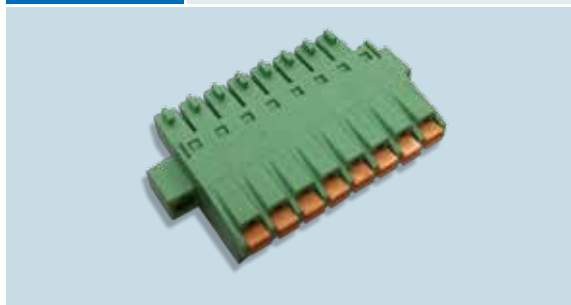


Accessories for ASDA A2-E

| | |
|--------------------|---------------|
| 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 |

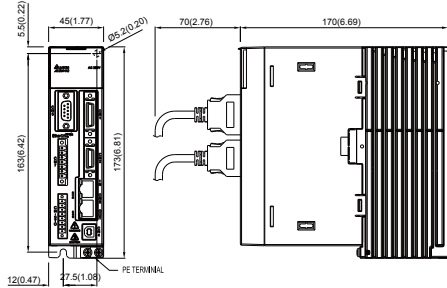


Note :
For other accessories, please refer to Delta's ASDA-A2 product catalogue.

Dimensions

► 220V Series

100W / 200W / 400W

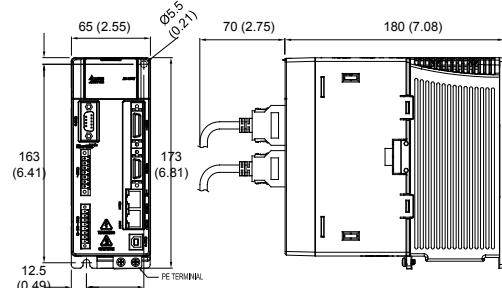


Weight 1.5 (3.3)

Weight

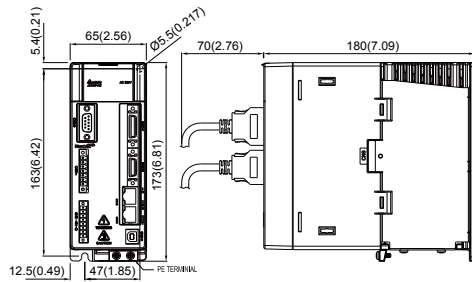
► 400V Series

400W / 750W / 1kW / 1.5kW



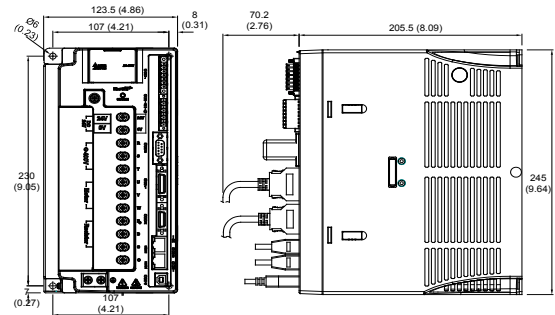
Weight 2.0 (4.4)

750W / 1kW / 1.5kW



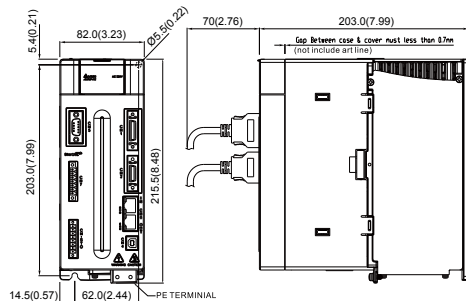
Weight 2.0 (4.4)

2kW / 3kW / 4.5kW / 5.5kW



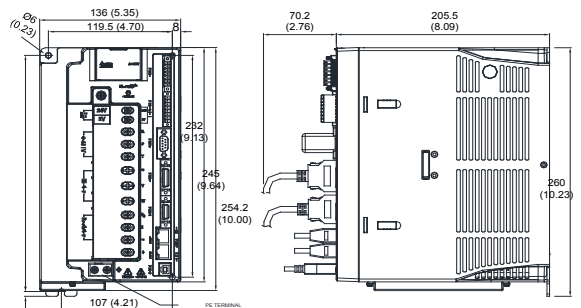
Weight 4.6 (10.1)

2kW / 3kW



Weight 2.89 (6.36)

7.5kW



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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