



## Industrial Automation Headquarters

**Taiwan: Delta Electronics, Inc.**  
Taoyuan Technology Center  
No.18, Xinglong Rd., Taoyuan District,  
Taoyuan City 330477, 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 2, Building A, 18-24 Ricketts Road,  
Mount Waverley, Victoria 3149 Australia  
Mail: IA.au@deltaww.com  
TEL: +61-1300-335-823 / +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 Ltd.**  
Estrada Velha Rio-São Paulo, 5300 Eugênio de  
Melo - São José dos Campos CEP: 12247-004 - 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 2921 987 238

**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

**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

# Delta ASDA-B3 Series Servo Drive User Manual



## Delta ASDA-B3 Series Servo Drive User Manual

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



# Preface

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Thank you for purchasing this product. This manual provides information about the ASDA-B3 series servo drives (B3) and the ECM-B3 and ECM-A3 series servo motors.

This manual includes:

- Installation and inspection of servo drive and servo motor
- Servo structure and wiring diagram
- Instructions for test operation
- Instructions for servo tuning
- Description of motion control
- Description of parameters
- Description of communication protocol
- Troubleshooting
- Inspection and maintenance

Product features:

- New control algorithm: overcomes the problems of a lack of stiffness or flexibility in the machine structure.
- Auto tuning function: user-friendly and allows you to complete tuning easily.
- Gain adjustment function: automatically detects changes in the inertia and improves the control precision.
- New generation servo motor: a compact size servo motor meets the need for reducing the size and weight of the equipment structures.

How to use this manual:

Use this manual as a reference when installing, setting up, using, and maintaining the servo drive.  
Before initiating the tuning or setup process, read Chapters 1 to 5.

Delta technical services:

Consult your Delta equipment distributor or Delta Customer Service Center if you encounter any problems.

## Safety precautions

This product is a high-resolution open type servo drive. It should be installed in a shielded control cabinet during operation. This servo drive uses precise feedback control and a digital signal processor (DSP) with high-speed calculation functions to control the current output generated by IGBT to operate the three-phase permanent magnet synchronous motors (PMSM) and to achieve precise positioning.

This product is used in industrial applications and should be installed in the control cabinet. Servo drives, wires, and motors should all be installed in an environment which complies with the minimum requirement of UL50 Type 1.

Pay special attention to the following safety precautions at all times during inspection, installation, wiring, operation, maintenance, and examination of the servo drive.

The symbols of “DANGER”, “WARNING”, and “STOP” indicate:



**Danger. May cause severe or fatal injuries to personnel if the instructions are not followed.**



**Warning. May cause moderate injury to personnel, or lead to several damage or even malfunction of the product if the instructions are not followed.**



**Absolutely prohibited activities. May cause serious damage or even malfunction of the product if the instructions are not followed.**

### Inspection



Follow the instructions when using the servo drive and servo motor, or it may cause fire or malfunction.

### Installation



Do not expose the product to an environment containing water vapor, corrosive gas, inflammable gas, or other foreign matter to reduce the risk of electric shock or fire.

### Wiring



- Connect the ground terminals to a Class 3 ground system. Ground resistance should not exceed 100  $\Omega$ . Improper grounding may result in electric shock or fire.
- Do not connect the three-phase power source to the motor output terminals U, V, and W, or it may cause personnel injury or fire.
- Tighten the screws of the power and motor output terminals, or it may cause fire.
- When wiring, refer to the description of wire selection in Chapter 3 to prevent any danger.

## Operation



- Before operating the machine, change the servo parameter setting according to the application. If the parameters are not adjusted to the correct values, it may lead to malfunction of the machine or the operation might be out of control.
- Ensure you can activate the emergency stop before operating the machine.
- When applying power, make sure the motor is not rotating because of inertia of the machine or other causes.



During motor operation, do not touch any rotating motor parts, or it may cause personnel injury.



- To avoid accidents, remove all units during the first test run, so that the motor is operating without any load.
- If you fail to operate the servo motor properly after it is connected to the machine, it may damage the machine and lead to personnel injury.
- In order to reduce the danger, make sure the servo motor can operate normally without load. Then try operating the motor with load.
- Do not touch the heat sink of the servo drive when it is operating to avoid scalding.
- There should be at least a 5-minute interval between each operation of the dynamic brake.

## Maintenance and Inspection



- Do not touch the internal parts of the servo drive and servo motor, or it may cause electric shock.
- Do not disassemble the servo drive panel when the power is on, or it may cause electric shock.
- After turning off the power, do not touch the wiring terminals until the “CHARGE” indicator is off, or the residual voltage may cause electric shock.
- Do not disassemble the servo motor, or it may cause electric shock or personnel injury.
- Do not change the wiring when the power is on, or it may cause electric shock or personnel injury.
- Only qualified electricians can install, wire, repair, and maintain the servo drive and servo motor.

## Main Circuit Wiring



- Do not put the power cable and signal cable in the same channel or bond them together. Separate the power cable and signal cable by at least 30 centimeters (11.8 inches).
- Use stranded wires and multi-core shielded-pair wires for signal cables and encoder feedback cables. The maximum length of the signal input cable is 3 meters (9.84 feet) and the maximum length of the encoder feedback cable is 20 meters (65.62 feet).
- High voltage may remain in the servo drive after the power is turned off. Wait until the “CHARGE” indicator is off before performing inspection.



Do not repeatedly turn the power on and off. If continuous power on and off is needed, wait one minute between intervals.

## Terminal Wiring of the Main Circuit



- When wiring, securely tighten the screws of the terminal block.
- When wiring, do not short-circuit the wire with adjacent wires.
- Before applying power, inspect and ensure that the wiring is correct.

## Leakage Current



- The leakage current of the servo drive is greater than 3.5 mA.
- According to the IEC 61800-5-1 standard, the wires must comply with one of the following specifications to ensure proper grounding:
  1. Copper wire cross-sectional area is at least 10 mm<sup>2</sup>.
  2. Aluminum wire cross-sectional area is at least 16 mm<sup>2</sup>.
- Failure to comply with the specifications may result in personnel injury.
- Before applying power, inspect and ensure that the wiring is correct.

## Disposal instructions



- When disposing of the product, make sure it is disposed of as general industrial waste in accordance with the local laws and regulations.

## Inspection and maintenance

Operating conditions:

- Average annual ambient temperature: 30°C (86°F)
- Average load rate: 80% or less
- Average operating time: 20 hours per day

| Inspection frequency | Inspection item                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------|
| Daily inspection     | Check if the ambient temperature and humidity are normal.                                                      |
|                      | Check if the input voltage is normal.                                                                          |
|                      | Check if there is abnormal vibration and noise.                                                                |
|                      | Check if there is any abnormal smell.                                                                          |
|                      | Check if the servo drive has any visible damage.                                                               |
|                      | Check if the ventilation holes are kept clear of dust and other foreign objects. *1                            |
|                      | Check if the wirings are damaged or disconnected.                                                              |
|                      | Check if any cable is loose or damaged.                                                                        |
| Annual inspection    | Check if any screw is loose or damaged.                                                                        |
|                      | Check if the servo drive, motor, and control cabinet are properly grounded.                                    |
|                      | Check if the color and temperature of the power input, power output, and regenerative terminals are normal. *2 |

Note:

1. Install dust filters on the control cabinet openings, where there are fans or ventilation holes, and clean the filters regularly. Install door seals on cabinet doors and rubber grommets on cable openings for better seal.
2. Check if the servo drive is properly wired. If the color of any terminal turns black or is abnormal, it is suggested that you replace the terminal.

## Replacing the parts

Operating conditions:

- Average annual ambient temperature: 30°C (86°F)
- Average load rate: 80% or less
- Average operating time: 20 hours per day

| Product     | Part name              | Suggested replacement cycle              | Note                                                                                                                            |
|-------------|------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Servo drive | Electrolytic capacitor | Approx. 5 years                          | The replacement cycle varies depending on the ambient conditions and usage. Replace the part immediately when any error occurs. |
|             | Cooling fan            | 2 to 3 years<br>(10,000 to 30,000 hours) |                                                                                                                                 |
|             | Relay                  | Approx. 100,000 times                    |                                                                                                                                 |
|             | Soft start resistor    | Approx. 20,000 times                     |                                                                                                                                 |
| Battery box | Battery                | Refer to Section 10.1.1                  |                                                                                                                                 |
| Servo motor | Bearing                | 20,000 hours                             |                                                                                                                                 |
|             | Oil seal               | 5,000 hours                              |                                                                                                                                 |



- When the part reaches the suggested replacement cycle, consult the distributor or Delta for replacement suggestions.
- Do not attempt to disassemble or repair the product yourself.

Note: the content of this manual may be revised without prior notice. Refer to the latest information from [Delta's website](#).